

### **April 26 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: 1:30-6:30 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 Chair Persons**

- Amy Hendricks '14
- Kelsey Wolf '16
- Ashley McDonald '15
- Camilla Morrison '14
- Madeline Scott '13
- Jennifer Rote '15
- Christopher Grubb '14
- Bailey Heldmar '15

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**URCAS 2013 Presentation Sessions & Locations**

**11:30-1:30 pm**

*Poster Session I & Lunch Buffet*, multisports forum of the Bryan Campus Life Center  
70 poster presentations from all divisions

**1:30 pm**

*Spanish Senior Seminar* (-3:00 pm), Language Center  
*Intentional Community* (-2:30 pm), Palmer 205  
*Ethnographers at Home and in the Field* (-6:30pm), Buckman 110  
*St. Jude Summer Plus Fellows* (-2:45 pm), FJB  
*Research in the Fine Arts*, (-2:00 pm), Clough 410

**2:00 pm**

*Understanding Water as an Environmental Issue*, (-3:30pm), Buckman 108  
*Research in Economics, Law, and Politics* (-3:00pm), Kennedy 208  
*Genetics, Biochemistry, and Molecular Biology I* (-2:45 pm)

**2:15pm**

*Johann Sebastian Bach's B-minor Mass* (-4:00pm), Hassell 100

**2:30pm**

*Quantitative and Computational Science I* (-3:15pm), FJC

**2:45pm**

*Four Views of Hamlet* (-3:45pm), Palmer 205

**3:00pm**

*Knowledge and Writing in the Ancient World* (-4:00pm), Language Center  
*Research in Psychology* (-3:30pm), Kennedy 205  
*Genetics, Biochemistry, and Molecular Biology II* (-3:45pm), FJA

**3:30pm**

*Social Challenges and Advocacy* (-4:15pm), Buckman 108  
*Remembering Fort Pillow* (-4:30pm), Barrett 034  
*Quantitative and Computational Science II* (-4:30pm), FJC

**4:00pm**

*Remembering the Great War* (-4:45pm), Palmer 205  
*Research in Education and Housing Policy* (-4:30pm), Kennedy 205  
*Conservation and the Environment* (-4:20pm), FJA

**4:30pm**

*Lost in Translation* (-5:00pm), Buckman 108

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

*Video projects from Art 166*, FJB  
*Poster Session II & Closing Reception*, multisports forum of the Bryan Campus Life Center  
70 poster presentations from all divisions

**URCAS 2013 Presentation Schedule Overview**  
**(Locations in parentheses after each session name)**

11:30- 1:30		1:30	2:00	2:30	3:00	3:30	4:00	4:30	6:00	
<b>Poster Session I &amp; Lunch Reception 11:30-1:30 (multisports forum of the BCLC)</b>	<b>Humanities</b>	Spanish Senior Seminar (Language Center)			Knowledge and Writing in the Ancient World (Language Center)					
			Understanding Water as an Environmental Issue (Buckman 108)			Social Challenges and Advocacy (Buckman 108)			Lost in Translation (Buckman 108)	
			Intentional Community (Palmer 205)		Four Views of Hamlet (Palmer 205)			Remembering the Great War (Palmer 205)		
									Remembering Fort Pillow (Barret 034)	
	<b>Social Sciences</b>		Research in Economics, Law, and Politics (Kennedy 208)			Research in Psychology (Kennedy 205)		Research in Education and Housing Policy (Kennedy 205)		
		Ethnographers at Home and in the Field (Buckman 110) - 6:30PM								
			Genetics, Biochemistry, and Molecular Biology I (FJA)			Genetics, Biochemistry, and Molecular Biology II (FJA)		Conservation and the Environment (FJA)		
	<b>Natural Sciences</b>	St. Jude's Summer Plus Fellows (FJB)				Quantitative and Computational Science I (FJC)		Quantitative and Computational Science II (FJC)		
		Research in the Fine Arts (Clough 410)		Johann Sebastian Bach's B-minor Mass (Hassell 100)						
										Art 166: Videos (FJB) - 6PM
<b>Fine Arts</b>										

**Poster Session II & Closing Reception 4:30-6PM (multisports forum of the BCLC)**

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## HUMANITIES ORAL SESSIONS

### Spanish Senior Seminar

#### Language Center

#### Session Chair: Clara Pascual-Argente

**1:30 PM** *Long Live the Queen: Borges, Games, and “Emma Zunz”*

**Andrew Galow**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

Scholarship on Jorge Luis Borges has long been interested in the Argentinian writer's exploration of play and games. In particular, critics have connected games in Borges' stories to Huizinga's classical approach to play and games in his famous work, *Homo Ludens*, explored the writer's connection with game theory and the emergence of postmodern thinking in the 20th century, and investigated the links between characters' names and chess pieces. Borges scholars have thoroughly addressed the metaphysical games shown in stories like *Tlon, Uqbar, Orbis Tertius*, and *The Library of Babel*, where male protagonists inexorably fail in their doomed quest for knowledge. However, this form of criticism has not extended to his story, “Emma Zunz,” which presents us with a winning, female protagonist, a stark contrast with Borges' usual formula of men who lose their metaphysical games. In this paper, I read “Emma Zunz” as a game of chess from the point of view of postmodern theories on play and games as they apply to literary structures. This perspective will enrich our understanding of Borges's playful writing.

**1:45 PM** *Airing the Laundry in a Butcher Shop: Everyday Comic Violence in El día de la bestia (dir. Álex de la Iglesia, 1995)*

**Jenelle Francis**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

*El día de la bestia* (1995), the first commercial success from cult director Alex de la Iglesia, is a “satanic black comedy” that follows a priest and his heavy-metal enthusiast sidekick as they traverse Madrid on Christmas Eve searching for the birthplace of the Antichrist. Throughout the film, brutal violence is contrasted with comedic and quotidian elements, in effect lessening the violence but creating a feeling of discomfort for the viewer. In their approach to this controversial film, critics have focused on de la Iglesia's use of iconic Madrid locations and subsequent social commentary. However, they have not dealt with the film's presentation of violence, crucial for recognizing its unique place in contemporary Spanish cinema. In this paper, I will explore the uncomfortable representation of violence in *El día de la bestia* and its polarizing effects on audiences and critics. Using specific scenes from the film, critics' responses, and recent phenomenological approaches to film, I will examine the cinematic techniques used to mix genres and the resulting portrayal of casual and comic violence.

**2:00 PM** “*Claro, querido:*” *Heroic Masculinity in Ricardo Piglia's Plata quemada (1997)*

**Colleen Parrish**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

*Plata quemada*, an enormously successful novel by Argentinean Ricardo Piglia, is based on the true story of a violent bank heist that took place in Buenos Aires in 1965. Piglia recounts how a group of bandits steals over five million pesos and escapes to Uruguay, where they meet their downfall in an intense gunfight with the police. The main characters are the criminal pair known as “the twins,” Nene and Gaucho Rubio, who develop a close emotional and occasionally sexual relationship, which reaches its pinnacle in the novel's climax when Nene dies in his partner's arms. While critics routinely label the novel as criminal fiction, I will argue that its construction of heroic masculinity through Nene and Gaucho's relationship is better understood from the generic viewpoint of epic. In this presentation, I will examine the narrative structure and voices within the novel from a gender and sexuality studies standpoint and explore their connections with ancient, classical, and medieval epics featuring prominent male partnerships.

**2:15 PM** *Collective Memory and Intertextuality in Los girasoles ciegos (Alberto Méndez, 2004)*

**Maria Raffanti**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

Alberto Méndez's 2004 collection of short stories, *Los girasoles ciegos*, is one of the more recent and successful attempts to construct the collective memory of Spain's traumatic Civil War and post-war period. Francisco Franco's

fascist government memorialized these events from the point of view of the winners and worked to repress any competing version coming from the defeated. Spain's transition to democracy brought about the so-called "pacto del olvido" (Pact of Forgetting), which left behind the Francoist collective memory but did not attempt to create any alternative. Although Méndez's book is relatively new, scholars have begun to analyze its relevance to the construction of an alternative memory of those events. These critics have not addressed, however, the relationship to the collective memory of a key feature in the book: its use of intertextuality through the inclusion of literary quotes and references. Using Maurice Halbwachs and Jan Assmann's studies on collective/cultural memory, I will show that there is a connection between the use of literary references and the changing role of the narrator within each story, both of which are significant to the construction of a collective memory of the defeated.

**2:30 PM** *Mexican Orphans: Reading El laberinto de la soledad (Octavio Paz, 1950) in Comala*

**Ines Tamaddon**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

In his influential collection of essays *El laberinto de la soledad*, published in 1950, Octavio Paz constructs an image of 'the Mexican' as a detached and distrusting character, insecure about his heritage, unable to accept neither his past nor present, and an orphan of his own country. Despite the crucial thread that the image of the orphan weaves throughout the essays, critics have yet to analyze this theme or the family relations presented in the text. The importance of this image is particularly highlighted when *El laberinto* is read against *Pedro Páramo*, published five years later, in 1955. The story of an orphan on his journey to find his father, *Pedro Páramo* is a novel written by Juan Rulfo that illustrates the struggle of past and present, and the living and the dead in the rural Mexican town of Comala. In this paper, I will connect Doris Sommer's work, *Foundational Fictions*, which describes the relationship between patriotism and family romance in nineteenth-century Latin America, to Paz and Rulfo's construction of 'the Mexican' as an orphan, asking which historical circumstances encouraged the use of family relations as the root of the 'orphaned' Mexican identity in both works.

**2:45 PM** *Language and Power in Julio Ramón Ribeyro's Short Stories*

**Jared Williams**

**Faculty Sponsor: Clara Pascual-Argente, Department of Modern Languages and Literatures**

Julio Ramón Ribeyro, a Peruvian writer whose career spans from the 1950's until his death in 1994, is best known for his short stories, many of which critique society, focusing on injustice and the relationships between distinct classes in Peru. While Ribeyro's work, overshadowed by contemporaries such as Mario Vargas Llosa, did not attract much critical attention during his lifetime, as of late this has changed. Scholarship on Ribeyro's work has analyzed how race and ethnicity are entangled with issues of class and status in his works. Critics have not yet, however, made a connection between Ribeyro's use of dialogue, a major stylistic feature in his short stories, and issues of class, language, and power. In this presentation, I will analyze Ribeyro's short stories "El profesor suplente," "Los gallinazos sin plumas," "La piel de un indio no cuesta caro," and "Los merengues" from the anthropological/sociological perspective developed by Pierre Bourdieu. It is my contention that Ribeyro utilizes language and dialogue in his short stories in order to critique the tensions and power struggles between different classes in Peruvian society during the latter half of the twentieth century.

## **Knowledge and Writing in the Ancient World**

**Language Center**

**Session Chair: Amy Hendricks**

**3:00 PM** *Common Knowledge and the Athenian Navy*

**Mills McArthur**

**Faculty Sponsor: Joseph Jansen, Department of Greek and Roman Studies**

From the late 480s to 322 BCE, Athens was both a democracy and a naval power. Operating the Athenian navy posed a series of logistical challenges. Foremost among these was the problem of cooperation. The navy demanded that the rich and the poor, citizens and slaves, and foreigners and metics work together. But the wealthy were compelled to make large financial contributions while the lower classes gained ground through state pay, giving rise to class strife. Athens smoothed over such barriers to cooperation with strategies based on common knowledge. The practice of crowning trierarchs would motivate them with appeals to honor. The naval infrastructure of Athens, such as the monumental ship-sheds, sent ideological messages to the people. When it came to other logistical challenges,

like securing manpower and equipment, Athens still employed strategies based on common knowledge to advance its naval agenda. Several Athenian public documents and speeches related to the navy acknowledge this strategy with statements of "hortatory intention"—acknowledgements that an action is being taken "so that all will know" something. These sources are concerned with how public action would affect common knowledge and with what consequences that knowledge would have for the navy.

**3:15 PM** *The Writing on the Walls: Looking at Political and Social Graffiti in Ancient Pompeii*

**Rachel Strug**

**Faculty Sponsor: David Sick, Department of Greek and Roman Studies**

The graffiti found on buildings throughout the ancient Roman city of Pompeii has been an intriguing topic for both scholars and tourists for centuries. The writing style, word choice and content of the graffiti reveal different aspects of the culture of Pompeii prior to the city being buried under the volcanic ash of Mount Vesuvius' eruption in 79 AD. Although devastating to the people of Pompeii, the volcanic ash resulted in the preservation of many artifacts, including graffiti writings that continue to shed light on the ancient culture of Pompeii. The inscriptions found covering houses, businesses, and walls of the amphitheater spark questions regarding the authors, the intended audience, and the underlying significance of the graffiti. Due to the diversity of the population of Pompeii, the writings illustrate a wide cross-section of contemporary thought in the city. I will explore why the graffiti is not truly indicative of the political life and climate of the time, but does, in fact, shed light on the social lives, customs, and interests of the common people of the city prior to the cataclysmic Vesuvius eruption.

**3:30 PM** *From Vir to Woman: Catullus' Progressively Passive Personality within the Lesbia Cycle*

**Nicholas Jensen**

**Faculty Sponsor: David Sick, Department of Greek and Roman Studies**

Writing in the mid-1st century BC, Catullus quickly establishes himself as a new breed of Roman poet by infusing his own experiences and personality into his predominantly non-epic works. Considered a key member of Rome's *poetae novi*, Catullus bucks the standard Homeric prototype and dares to utilize first-person narrative, a novel poetic technique that allows him to record chapters of self-reflection that reveal an active abdication of masculine authority to his female love interest, Lesbia. Considering how unconventional this redistribution of power to a female lead truly is, the following investigation examines masculine and feminine gender roles portrayed by Catullus throughout his poems, leading to the conclusion that Catullus' conscious but uncontrollable submission to Lesbia is caused by an unyielding psychological plague from which the poet prays to the gods for deliverance. It is perhaps this ability to speak genuinely and without restriction that explains Catullus' enduring support through the ages, as this skill enables the poet to connect with audiences in different times and locations by freely discussing a common experience—the constant negotiation of the relationship between men and women.

**Understanding Water as an Environmental Issue**

**Buckman 108**

**Session Chair: Jeffrey Jackson**

**2:00 PM** *Drinking the Mississippi*

**Lin Qiu**

**Faculty Sponsor: Jeffrey Jackson, Department of History**

Located above a prestigious aquifer, the Memphis Aquifer, the city of Memphis has had the privilege of accessing one of the finest water resources. For years the city residents have been enjoying clean and drinkable groundwater from the aquifer and somehow been taking it for granted. Recently emergent issues regarding Memphis groundwater, however, might threaten to put an end to this water-carefree era. Among the issues, there is a dispute between the state of Mississippi and the city of Memphis, the former of which has issued a lawsuit accusing Memphis of using the groundwater that belongs to Mississippi. In addition, underground sewage leakage, reduction of green coverage, and urban sprawling, have brought potential damages to the quality and quantity of the groundwater. Based on these issues, the main object for this study is to examine the possibility for the city of Memphis to use Mississippi River for drinking water in supplement of its current primary source – the groundwater. By examining the costs and benefits of “drinking” Mississippi River, in terms of economy and ecology, the study is aimed to calculate the practicality of using Mississippi River as a drinking water resource for the residents of Memphis.

**2:15 PM** *Memphis' Urban Water System Predicts Future Growth*

**Laura Brown**

**Faculty Sponsor: Jeffrey Jackson, Department of History**

Memphis' urban water system is an integral part of the city's future development and vitality. Memphis' drinking water comes from the Memphis Aquifer. Sand, found naturally in this aquifer, serves as a natural filter for contaminants such as lead, nitrate, and copper giving Memphis a reputation for having superior drinking water. However, the superiority of the city's water system is not full-circle. In 2010, the city violated the Clean Water Act after investigations reported 1,170 sanitation systems overflows. In overflow situations, wastewater treatment plants dispose raw sewage into the Mississippi River. Subsequent to these findings, the EPA sued the city of Memphis over 1.29 million dollars in fines. The city settled with federal and state government offices with an agreement to renovate ten percent of sewer infrastructure yearly. This project will investigate social, economical, and environmental impacts of the sewer spills and renovations to assess the sustainability of Memphis' urban water system. Sustainability will be measured using a systems analysis approach from a study funded by Stockholm Water Company addressing three main areas: a) flexibility and functional robustness, b) be adapted to local conditions, and c) ease of understanding to encourage responsible behavior by users. The vitality of the city depends on its ability to provide both drinking water and appropriate sanitation facilities to industries and residents without compromising the environment, welfare of its citizens, or the water supply of future generations.

**2:30 PM** *The Role of Virtual Water in Resource Conservation*

**Ian Preston**

**Faculty Sponsor: Jeffrey Jackson, Department of History**

The global fresh water supply is dwindling, and with it the notion that it is acceptable to continue using water inefficiently. Like Brazil, China, and many European countries, the United States is rich in water resources (with average precipitation higher in these areas than most in the world). Yet many believe that over the next century or so these water-powers may find themselves in "water wars." The virtual water strategy has been proposed as a tool for water scarce countries to encourage policies that improve their water use efficiency. Virtual water is the amount of water used during the production goods. Water rich countries like the U.S. can specialize in goods and products that require larger water input in exchange for unique goods produced by water scarce countries. In this way, fresh water for agriculture in water scarce countries does not need to be used because they may import them from water specializing countries. As of 2009 the U.S. has a trade agreement with Jordan that allows the latter to retain the precious water supply of the Jordan River by specializing in goods that do not use large amounts of water. This paper seeks to measure the success of this agreement and if others can be made between more countries as a way of efficiently using water for agricultural and trade purposes. With most of the globe's water supply sustaining irrigation and agriculture virtual water continues to receive attention.

**2:45 PM** *Bottling the Frontier: The Environmental Harm of Fiji Water's Misleading Claims about the Safety of Tap Water*

**Katie Faucher**

**Faculty Sponsor: Jeffrey Jackson, Department of History**

Despite what is known about the harmful effects of bottled water on our environment and the safer EPA regulations on tap water, the water rich United States continues to manufacture and import bottled water. This study focuses on the imported Fiji Water brand, whose environmental consequences are much greater than domestic bottled water sources because of the further distance the water must be shipped. This study borrows from Frederick Jackson Turner's Frontier Thesis but expands the frontier to include any environment seen as pristine across the globe. This lens helps explain why Fiji Water has been successful in the United States and how Fiji Water advertisements play on this mentality to lead consumers to believe that Fiji Water is safer than tap water and domestic bottled water. This study uses evidence from Fiji Water advertisements and labels, newspaper articles, and studies about bottled water and tap water to reach the conclusion that an expanded frontier mentality causes fear of tap water which adds to environmental degradation through the importation of plastic water bottles.

**3:00 PM** *“What the Frack?”*

**Megan Matthews**

**Faculty Sponsor: Jeffrey Jackson, Department of History**

Hydraulic fracturing is the process by which people are able to collect more oil and natural gas from previously drilled wells. This process, also known as “fracking,” is very intensive and involves the use of large amounts of water and potentially harmful chemicals. Fracking has become widely associated with negative environmental issues including contaminated ground water, lower water tables, damage of aquatic habitats, and increases in earthquakes. In Central Arkansas five different claims from residents were made against the practice of fracking. These claims were made on the belief that harmful chemicals had leaked into the drinking water, as well as the increase in earthquakes was because of the local fracking and had caused rising prices in earthquake insurance. Some research presented by a private research company has shown that local fracking in Central Arkansas has not caused these problems. Using Central Arkansas as a case study, this research project will show the complexity and importance of a cost benefit analysis regarding hydraulic fracturing. In addition, this research project will explore ways to manage the potential risks brought with fracking.

### **Social Challenges and Advocacy**

**Buckman 108**

**Session Chair: Kelsey Wolf**

**3:30 PM** *The Bridge: The First Memphis Street Paper*

**Anna Stratton-Brook**

**Faculty Sponsor: Milton Moreland, Department of Religious Studies**

The Bridge, the first street paper in Memphis, aims to bridge the disconnect between the homeless population and Memphis community. Unlike the traditional street paper, which is run by a fulltime staff, The Bridge was founded by co-directors James Ekenstedt and Evan Katz and the management and direction of the paper is handled entirely by Rhodes students. Modeled after successful street papers in major cities such as Nashville, New York, and Washington D.C., The Bridge aims to raise awareness about homelessness while providing a sustainable source of income to those who are homeless or have experienced homelessness. Currently and formerly homeless vendors find employment by purchasing copies of the paper for a quarter each and selling the paper to the larger community for \$1 each. Vendors keep one hundred percent of the profit. The Bridge puts money directly into the hands of the homeless community. It is a professionally printed sixteen-page paper featuring artwork and content crafted largely by people with experiences of homelessness. The Bridge is currently partnered and working with non-profits such as Door of Hope, Hospitality Hub, Mid-South Peace and Justice, and Rhodes College Kinney Program.

**3:45 PM** *Queer Kinship, AIDS, and the Push for Same-Sex Marriage*

**Sarah Holland Bacot**

**Faculty Sponsor: Judith Haas, Department of English**

Over the past decade, there has been great success in the push for same-sex marriage, with striking improvements in public support and in legislative and judicial action. This movement for same-sex marriage no doubt offers a number of benefits to same-sex couples in both the legal and the social realms. It also, however, reflects a very specific understanding of what it means to be a family and leaves the queer community in a problematic place in terms of its relationship to the state and with regard to its own history of alternative kinship structures and subversive possibility. This paper seeks to understand the movement for same-sex marriage as, to some extent, a political phenomenon related to the trauma of AIDS on the queer community and to investigate how the reclamation of queer kinship might serve as a radical political tool. In order to do this, I focus on the impact of the AIDS crisis on the political face of the LGBT rights movement, most notably the shift away from the more radical politics of organizations like the AIDS Coalition to Unleash Power (ACT UP) to the HRC.

**4:00 PM** *Cultural Intelligence Abroad: Franco-American Differences in their Education System*

**Olivia Hipp**

**Faculty Sponsor: Laura Loth, Department of Modern Languages and Literatures**

I will be exploring my studies concerning the different stages of perspectival transformation toward cultural intelligence in a foreign country. I will discuss this development using my time in the French education system, both through taking a class in an acclaimed Political Science university, Science-Po Aix, and teaching English to a class

of middle schoolers once a week as a platform for cultural differences. I will also chart out the write-ups I composed while abroad detailing the cultural patterns I noticed in the south of France and how they differed from my experience within my own culture. Through these patterns, I hope to highlight the ways in which cultural values are a function of a society's history that do not necessarily imply a difference of value. The way the French values and norms are so deeply rooted in the history as a nation is particularly intriguing when one considers how similar their history seems to that of America at face value, both having fought revolutions during the same era that stemmed largely from similar ideals. The differences, however, are radical, and they are especially clear in the school systems. The cross-temporal gradient toward cultural intelligence transitions from denial to polarization to acceptance, and I will be using my personal experiences in France to show these stages.

### **Lost in Translations**

#### **Buckman 108**

**Session Chair: Ashley McDonald**

**4:30 PM** *Understanding the Liturgy: a Literal Translation of the Ordo Missae*

**David Adams**

**Faculty Sponsor: David Sick, Department of Greek and Roman Studies**

The Mass is one of the most central components of Catholic faith and worship. It is what unites all Catholics around the world and a major part of what defines them as Catholics. In English-speaking countries, a new translation of the Mass was recently put into effect which strives to provide a more literal rendering of the official Latin text issued by the Vatican. This new translation includes many changes to the words English-speaking Catholics had become accustomed to saying every week for decades. Why were these changes necessary, and what is better about a more literal translation? Is the new translation actually an improvement over the old? Could this new translation have been even more literal? What makes a translation "literal"? From where does the official Latin text of the Mass derive? By composing my own strictly literal translation of the Mass from the official Latin and comparing it to both the old and the new English translations and by researching the origins of the Mass, I have sought to answer these questions and found that the new translation is, in fact, a significant improvement over the old.

**4:45 PM** *The Ambivalence of Transnationalism in Lost in Translation*

**Hayley Farmer**

**Faculty Sponsor: Rashna Richards, Department of English**

This essay examines the ambivalent nature of transnationalism in Sofia Coppola's "Lost In Translation" (2003). According to Elizabeth Ezra and Terry Rowden, transnationalism encompasses the "global forces that link people or institutions across nations"; implicit in this definition is "the recognition of the decline of national sovereignty as a regulatory force in global existence." However, when this concept is applied to cinema, transnationalism becomes more difficult to define. In ways, transnationalism has always existed in film; even in the past directors and actors were of different nationalities while filming in yet another "foreign" location. The change has occurred in the way we think about transnationalism. Today, it allows for the ambiguous nature of filmmaking, and cinema is seen as "a global system rather than as a collection of [ . . . ] autonomous nations," but the influence of the national cannot disappear altogether. This tension between these forces affects the viability of truly erasing cultural boundaries and is epitomized in "Lost In Translation." At times the film seems optimistic about real human connections through transnationalism; however, national tensions never seem to completely dissipate. The ambivalence that "Lost In Translation" has toward transgressing cultural borders exemplifies the film's and consequently contemporary cinema's ambivalence toward connections through transnationalism.

### **Intentional Community**

#### **Palmer 205**

**Session Chair: Bernadette McNary-Zak**

**1:30 PM** *An Examination of Transferable Qualities of Dietrich Bonhoeffer's Life Together*

**Paula Vasichko, Shannon Blair, Allison Cowling, and Emily Shaw**

**Faculty Sponsor: Bernadette McNary-Zak, Department of Religious Studies**

Dietrich Bonhoeffer's *Life Together* describes a form of Christian fellowship in the context of Nazi Germany. Even though *Life Together* was written in a different time period and context, it still remains relevant as a model for

modern intentional communities. Its relevance is defined by the presence and application of several transferable qualities. In this study, the Ruka Intentional Community at Rhodes College and the Bonhoeffer House at Hendrix College were analyzed in light of three shared transferable qualities: personal reflection, relationships among community members, and an orientation to the world.

**1:45 PM** *Defining Intentionality: An exploration of intentional communities in Memphis*

**Emily Shaw, Paula Vasichko, Allison Cowling, and Shannon Blair**

**Faculty Sponsor: Bernadette McNary-Zak, Department of Religious Studies**

In many urban areas across the United States, neighbors are strangers and organized groups are parting ways. My research explores intentional communities as a model for addressing this issue. I explored scholarly work on the formation and development of urban intentional communities and interviewed members of Memphis-based intentional communities. I looked specifically at how each community defines intentionality and found that though the communities are similar in their location, they are diverse in their members, purpose, and understanding of intentionality. Intentional communities offer an alternative response to a capitalistic, materialistic, and individualistic worldview. Life in an intentional community promotes accountability, co-creation, reciprocity, social inclusion, and the importance of small groups as ways to increase social capital.

**2:00 PM** *"Everybody who comes here is in the same space but not the same place." An Exploration of Caritas Village*

**Allison Cowling, Shannon Blair, Allison Cowling, and Emily Shaw**

**Faculty Sponsor: Bernadette McNary-Zak, Department of Religious Studies**

Binghampton is one of Memphis's poorer, more dangerous, and more underserved neighborhoods in the city. Yet, within the Binghampton neighborhood, Caritas Village stands as a place for community, change, and love. Though advertised as a simple coffee shop and cultural center, Caritas Village has become much more to the Binghampton neighborhood and Memphis community. The ability of Caritas Village to break down social boundaries, promote human relationships, and offer people a place to belong is remarkable. Why is Caritas Village substantial in this community? This study explores the role Caritas Village serves in the Binghampton neighborhood. I analyzed research on the importance of physical space in community and interviewed community members. My research findings reveal that Caritas Village is being defined as a shared space, a social space, and a significant space.

**2:15 PM** *Peacemakers: The establishment of place attachment and community development for children of the Binghampton neighborhood*

**Shannon Blair, Allison Cowling, Emily Shaw, and Paula Vasichko, Rhodes College**

**Faculty Sponsor: Bernadette McNary-Zak, Department of Religious Studies**

The Peacemakers Program at Caritas Village, like many outreach urban youth organizations, intends to create an alternative to the streets for the children of Binghampton neighborhood. The mission of the Peacemakers is to be a ministry of presence by simply being with the children and practicing and modeling peacemaking attitudes and behaviors. In practice, this program creates place attachment for the child participants. This research demonstrates the formation of importance these attachments on the basis of individual belonging, personal accountability, and community identity. Place attachment contributes directly to Caritas Village as a safe haven and center for change in the community. Personal interviews, observations, and studies on child development, community formation and urban youth programs inform this study.

## **Four Views of Hamlet**

**Palmer 205**

**Session Chair: Scott Newstok**

**2:45 PM** *"O Goodman Delver:" The Knave Who Was Baptized in Rhenish Wine*

**Colin Smith**

**Faculty Sponsor: Scott Newstok, Department of English**

My paper will deal exclusively with the "Gravedigger's Scene." Rhenish Wine in Hamlet is a signifier for the Monarchy much as the throne, scepter, and crown. Whereas the Rhenish Wine in Hamlet 4.1, 5.1, and 5.2 aligns with the Crown and therefore royalty and power, the Liquor in 5.1 aligns with the Gravedigger and hence, a lower class. What I argue in this paper is that through the use of the Rhenish Wine and the Liquor, the Sexton in

Shakespeare's Hamlet parodies the role of the Monarch, asserting his own power and authority over his own dominion in the Churchyard.

**3:00 PM** *"Do not saw the air too much with your hand:" Garrick's Search for Natural Performance Techniques*

**Samantha Smith**

**Faculty Sponsor: Scott Newstok, Department of English**

Eighteenth-century actor David Garrick used gesture as a performing technique while playing Hamlet. The extensive writings of audience members and theatre critics provide a record of Garrick's famous gestures, many of which remained consistent through different performances of Hamlet throughout his career. A product of his time, Garrick's gestures occasionally relayed the affected artifice pervasive in the acting techniques of his contemporaries but on the whole he represented a transition to more genuine expression of emotion. Garrick's attempt to express authentic reaction to emotion through gesture was a marked departure from his predecessors' reliance on vocal cues to convey passion. Although some of his more exaggerated gestures would be considered excessive to modern theatre-goers, Garrick made important strides in convincing actors and audiences that emotion could be expressed through the body.

**3:15 PM** *Unveiling Ophelia*

**Michelle Hardin**

**Faculty Sponsor: Scott Newstok, Department of English**

This paper will explore the relationship between the talents of Harriet Smithson and her applauding reception in France during the year of 1827 in which she played the role of Ophelia in William Shakespeare's Hamlet at the Odeon and the Theater des Italiens. Smithson's success is fascinating for though she performed in English on the French stage, France adored her as a dramatic representation of Ophelia. My paper's argument is that France's enthusiasm for Smithson's Ophelia derived from the image Smithson created of Shakespeare's heroine that included the combination of beauty, cleverness with props, and talent that she paired along with a drastically reduced text. By using these skills wisely and taking advantage of the omissions to the text, Smithson was able to shift the spotlight from Hamlet to Ophelia on the French stage to the point that French audiences treated her as if she was the leading character of the play.

**3:30 PM** *"His Characters Are So Much Nature Her Self:" Pope's Cultivation of Man*

**Genevieve M. Bettendorf**

**Faculty Sponsor: Scott Newstok, Department of English**

In his 1725 edition of Shakespeare's collected works, Alexander Pope endeavored not only to oppose the editorial traditions of both his immediate and remote predecessors; his edition served, most importantly, as a method of exploring his own set of emerging tastes. Later, in 1734, Pope published *An Essay on Man*, a declaration, at its very least, of his own tastes. But, in a way, Pope introduced evidence of his tastes by means of his marginal markings, in-text punctuations, and editorial arrangements of the Shakespearean texts themselves, and regarded his edition of Shakespeare as a sort of primer for his own contributions to early eighteenth century discourses on the place and function of taste. Pope's 1725 edition of Shakespeare's collected dramas was a fierce iteration of Pope's own taste, a dialogue that contributed to and opposed the conventional notions thereof, and an exploration of a new, or at least significantly and fundamentally different, theory and ideology of taste. My research attempts to identify Pope's own tastes within his edition of Hamlet and to recognize the key ways in which Pope's view of his editorial task affected his treatment of the work. His handling of the play itself will, in turn, reveal a commentary further expounded upon in his *Essay on Man*.

## **Remembering the Great War**

**Palmer 205**

**Session Chair: Camilla Morrison**

**4:00 PM** *Grave of the Fireflies: Victimhood and Memory in Japan During the 1980s*

**Laura Fogarty**

**Faculty Sponsor: Seok-Won Lee, Department of History**

There is a great deal of effort put into remembering the victims of the atomic bombings of Hiroshima and Nagasaki during World War II, as there should be. However, there is relatively little attention given to the firebombing

campaigns perpetrated by the United States against the Japanese mainland during 1942-45. These campaigns resulted in catastrophic damage to Tokyo, Nagoya, Osaka, Kobe and sixty-two other cities. In fact, by the end of the campaign only five Japanese cities remained unscathed. This paper attempts to address the imbalance by examining the "Grave of the Fireflies"(1988), which is an animated film created by Studio Ghibli. The film follows the gradual decline and eventual death of the two main characters, Seita and Setsuko, siblings whose home was destroyed during the 1945 Kobe fire bombing. The paper is divided into two main sections. The first shows how anime served as a visual representation of the Japanese peoples' cultural disquiet during the 1980s and the second addresses the effect of victimization on the Japanese people and on the film. The paper concludes that "Grave of the Fireflies" was and continues to be an important part of the dialogue about war remembrance and Japanese victimization today.

**4:15 PM *Conflicted Spirits: Japanese Modernism in the Early 20th Century***

**Theodore Nollert**

**Faculty Sponsor: Seok-Won Lee, Department of History**

How do societies respond to modernization? In the case of Japan, modernization was artificially halted for about two hundred years in a period of complete isolation, which intensified the effects of modernization after Japan was opened to the West. The strong feelings about modernism generated a Romantic movement in Japan as well as speculation about human nature and the possibility for good in human beings. By comparing Ryunosuke Akutagawa's short stories "Rashomon" and "The Nose" with aspects of Natsume Soseki's *I am a Cat*, I shall discuss leading critiques of Japanese modernization and the changes it wrought on Japanese society. These criticisms demonstrate the characteristic resistance to change in a Romantic movement as well as the emerging sense of 'Japanese Spirit' that set the stage for World War II.

**4:30 PM *Satan's Synagogue: World War and Economic Conspiracy***

**Phoebe Strom**

**Faculty Sponsor: Tait Keller, Department of History**

Although historians still debate the causes of WWI, one of the most influential and controversial theories of the Interwar period has been largely ignored in contemporary scholarship. This theory, initially voiced from the margins of society but later achieving widespread acceptance in both Germany and the United States, attributed the devastation of the war to a vast, global consortium of bankers and industry magnates. However arguably misguided or paranoid this economic conspiracy interpretation was, its popularity provides valuable insight into the social, political, and economic climate of the 1920s and 30s. By exploring the differences between the German and U.S. conceptions of this theory and linking it to several significant sociopolitical movements of the early twentieth century, it becomes clear that its articulation, while shocking in retrospect, was hardly surprising and played a key role in the political issues surrounding WWII, the economic instability that characterized the Interwar period, and the Western world's transition to a culture of conspiracism.

**Remembering Fort Pillow**

**Barret 034**

**Session Chair: Dee Garceau**

**3:30 PM *Remembering Fort Pillow***

**Matthew Niegos, Talor Paige, Dale Hutcherson, Nicole Milani, Briony Leslie, Andrew Jury, Christopher Hanewald, Emily Andrews, Molley Glaser, Annabeth Hayes, Patrick Harris, Gayle Hughes, Miller Shuey, Nicholas Said, Zoe St. John**

**Faculty Sponsor: Dee Garceau, Department of History**

On April 12, 1864, Fort Pillow, a remote Union fort on the Mississippi River fell to Confederate troops. The Union loss might have been unremarkable, had it not been for disturbing rumors in the days that followed. Survivors claimed the Rebels massacred Union captives *after* they surrendered, and that African-American troops bore the worst of it. In response, Congress held an investigation, the records of which survive today. Fort Pillow was never fully resolved, perhaps because it raised larger questions about race relations, human rights in wartime, guerilla conflict within border states, and competing ideologies of manhood and nationalism in the American South. Controversies over Fort Pillow further reveal the contested nature of public memory. Using records from the U.S. War Department, the Congressional hearings, soldier letters from both sides, and site visits, a team of 15 students has researched Fort Pillow and is currently producing a documentary film on these issues.

## SOCIAL SCIENCE ORAL SESSIONS

### Research in Psychology

#### Kennedy 205

#### Session Chair: Kim Gerecke

**3:00 PM** *“After this I learned...” Moral and Cultural Voices in Chinese Children’s Personal Narratives about Peer Conflict*

**Jiawen Li**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Bruner (1990) proposed that sharing personal narratives is critical to social and moral development. Stories are told when something goes awry in human interaction. As we tell stories, we attempt to position ourselves vis-à-vis the other actors in our stories, those listening to our story, and the standards and norms of our larger cultural traditions (Bamberg, 2003). Although considerable work has examined parent-child narrative practices in China, no studies have looked at conflict narratives in Chinese elementary schoolers. We have studied 152 stories by Chinese 4th – 6th graders about “a conflict that really happened to you.” Quantitative results showed unexpected grade effects, with fifth graders exceeding the older and younger children in their reports of moral lessons, puzzlement and positive resolution of their conflicts. They were the most skilled appropriators of mainstream culture and values that approximate Confucian teachings. Qualitative analyses revealed children’s use of other resources such as popular culture to form distinctive cultural voices. Both quantitative and qualitative analyses guide our discussion of children’s use of narrative to position the self vis-à-vis cultural traditions undergoing rapid change in China.

**3:15 PM** *Neuroprotective effects of intranasally administered insulin against chronic-restraint stress induced oxidative stress in the cortex and hippocampus of mice*

**Madeline R. Scott, Megan Ververis**

**Faculty Sponsor: Kim Gerecke, Department of Psychology**

Neurodegenerative disorders are becoming an increasingly large problem in our current society, and as of yet there is no known cure. Oxidative stress is a common toxic mechanism across these disorders, and can be caused by physical and/or psychological stress. Chronic restraint stress (CRS) is one method of inducing oxidative stress in animal models. Insulin has been shown to be beneficial within both human and animal models of neurodegeneration, including protection against oxidative stress. Intranasal administration of insulin allows for insulin to enter the central nervous system without causing hypoglycemia, which can be dangerous. This study aimed to examine whether intranasal insulin administration is neuroprotective against CRS-induced oxidative stress. This question was examined by quantifying the number of reactive microglia, which play pivotal roles in the generation and perpetuation of oxidative stress, in the cortex and hippocampus of mice exposed to CRS. Reactive microglia were determined by the co-expression of the microglial marker Iba1 and the inflammatory marker Cox-2 as determined using confocal microscopy. In addition, we examined if intranasal insulin administration protected against the expression of reactive microglia. In the hippocampus, insulin treatment resulted in more microglia overall, while stress resulted in a higher percentage of microglia that were reactive. In the cortex, both insulin and stress increased the overall amount of microglia, but not reactive microglia. These results suggest that insulin protects against CRS-induced increases in reactive microglia, and thus, oxidative stress in the hippocampus and cortex.

### Research in Education and Housing Policy

#### Kennedy 205

#### Session Chair: Madeline Scott

**4:00 PM** *An Analysis of Community-Based Education Reform*

**Meagan Keller-Fowler**

**Faculty Sponsor: Jeanne Wilson, Department of Psychology**

Over the last fifty years the US education system has been morphed by a multitude of federal education reform initiatives, most recently No Child Left Behind and Race to the Top. Quite often these federal reforms ignore the importance of community engagement, parent involvement, or making students life-long learners. This fact has led

me to ask several questions: Why are the majority of education reform initiatives formed and executed without input from the teachers and parents within the affected communities? Does this contribute to why these reform initiatives are unsuccessful on multiple levels? These issues have a common answer: community-based education reform. Community-based reform can be defined as any reform that occurs inside a particular community instigated by teachers, local leaders, parents or engaged community members. From this working definition, I analyzed research discussing aspects of community-based education reform and case studies where this type of reform is implemented and discovered the key components necessary for successful reform.

**4:15 PM** *Public Housing Here and There: An Analysis of American and Dutch Solutions*

**Robert Cook**

**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**

The terms “public housing” and “the projects” in the United States conjure a number of negative social stereotypes and associations of crime, poverty, drug use, and urban blight. Social scientists, citizens, and policy makers consistently frame public housing as a national social problem in need of serious repair and revitalization. This is not always the case around the world. In the Netherlands, 32% of the nation’s housing stock is publicly owned, and in some cities, like Amsterdam, upwards of 55% of the population lives in these dwellings. Similarly, there is little social disdain for these residents and their residences. The purpose of this project is to examine the difference between these two country’s public housing systems; specifically how the building design, tenant selection, and funding structures each government has put in place affects the social environments and communities in which they exist. Concluding in a close study of Memphis and Amsterdam, an inspection of these cities may put forward suggestions on solutions for the future of public housing both in the United States and abroad.

## **Research in Economics, Law, and Politics**

**Kennedy 208**

**Session Chair: Anna Smith**

**2:00 PM** *A Better Carrot Strategy: Using Incentives to Improve Zambia’s Failing Economy*

**June Mi Elisha Kang**

**Faculty Sponsor: Teresa Beckham Gramm, Department of Economics**

When Zambia gained its independence in 1964, the world held an optimistic view towards the country’s future economic growth. It was a middle-income country, ranking the second in the continent following South Africa by wealth. Zambia also had an elected government, abundant resources like the world’s best copper mines, and a generous amount of foreign aid. Contrary to the donors’ hope that the inflow of foreign capital and the country’s own natural and human resources would automatically lead to sustainable growth in the country, however, Zambia’s economy steadily declined and now ranks among the poorest countries in the world. Poverty remains as a significant problem in Zambia despite the government’s recent gestures to create business-friendly environment, qualifying the country for debt relief under the Highly Indebted Poor Country Initiative that consisted of approximately US\$6 billion in debt forgiveness. My research aims to identify the causes for Zambia’s underdevelopment and assess the impacts of poverty, focusing specifically on the role of government intervention and later privatization of the copper industry. I then make policy prescription for Zambia’s failing economy, based on the economic principle that people respond to incentives.

**2:15 PM** *"Guardians" of Democracy: How have the militaries of Argentina and Turkey influenced Democratization?*

**Ivonne Cornejo**

**Faculty Sponsor: Esen Kirdis, Department of International Studies**

A country’s military is meant to be a protector, an enforcer, a guardian; however, what happens when the military undermines the country’s government and takes control? When a military is directly involved in the government and politics of a country, its constituents will feel enslaved, almost trapped. Though Turkey and Argentina are on different sides of the globe, they have one thing in common: A history of multiple military coups. In both cases, the coups were justified as an act to protect the countries from falling into disarray as well as to help the central government continue in the right direction: The path to democratization. In fact, the militaries of both countries have called themselves “guardians of democracy.” How exactly have the Turkish and Argentine militaries influenced democratization? The influence has been so massive that the Turkish and Argentine militaries have appointed

themselves as the “guardians of democracy.” Yet, this self-defined mission and its justification of military interventions has caused only harm to democratization. By comparing the ideologies and missions of both militaries and by studying the several interventions made on behalf of the military, I will demonstrate how the armed forces have caused harm to democratization in Turkey and Argentina.

**2:30 PM** *Socializing Politics: The Historical Social Construction of Political Parties in Cameroon*

**Jonathan Sokoll**

**Faculty Sponsor: Steve Ceccoli, Department of International Studies**

Multi-party politics opened up again in Cameroon in 1990/1 after a nearly 25 year hiatus. President Paul Biya’s party the Cameroon People’s Democratic Movement (CPDM) and the Social Democratic Front (SDF) emerged as the major parties. Presidential election data from 1992 demonstrates a clear regional divide between the parties: the Social Democratic Front garnished the most support in West Cameroon and the CPDM in the remainder. The primary difference between these two regions begin an ethnographic divide between English speakers in west Cameroon and French speakers in the East and North. The formalization of a bi-lingual government in the Cameroonian constitution ensures that formal institutional or legal discrimination against speakers of a certain language such as English is illegal. We can consider then that the creation of the SDF not as a product of some form of formalized legal discrimination, but rather we can consider the SDF as the product of a difference in linguistic identity. This difference was polarized and propagated the presence of a predominately French speaking government enshrined in Paul Biya’s ruling political party the CPDM. The dominance of the CPDM of government jobs and policy created a ‘in-group’ of French speakers and an ‘out-group’ of English speakers. When opposition parties were legalized, the ‘out-group’ of English speakers whose voice had previously been repressed rallied under the SDF banner to champion their cause. We can then explain the emergence of political parties in Cameroon as a product of the difference between in and out group mentalities. Notes: I think this year’s proposal would set up a good base for expanding the paper and my overall idea. I think I could easily begin to loop back to historical institutional vis-a-vis social constructivism and talk about how the ‘in-group’s’ mentality was and is socialized by a legacy of historical colonial institutions (British and French rule). I think the two arguments would dovetail nicely. We can talk more in depth about this.

**2:45 PM** *Glasman Edwards Internship*

**Paul Hubbell**

**Faculty Sponsor: Anna Smith, Department of Political Science**

This past fall I interned with a local law firm—Glasman, Edwards, Wyatt, Tuttle, Cox, P.C. Since September, I have been involved in drafting opening statements presentations for four various product liability cases around the United States. I started at the firm as an unpaid intern earning credit for Political Science 460 and have now been given a paid job. Through the course of my internship I had to research how the product that malfunctioned actually worked. I was given over 200 documents that I was to include in the opening statements, which I had to analyze so the jury would clearly understand all the information. My education and training through the political science department helped in organizing and analyzing all the information in the opening presentation and has allowed me to continue to work for Glasman, Wyatt, Tuttle, Cox, P.C.

**Ethnographers at Home and in the Field**

**Buckman 110**

**Session Chair: Susan Kus**

**1:30 PM** *People Before Profit: An Ethnographic Study of the Antique Warehouse Mall*

**Jessica Perez**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

The phrase, “put yourself in someone else’s shoes” overly simplifies, but provides a strong visual for the ethnographic method. Commonly utilized by anthropologists, this method promotes participant observation that allows the observer to gain cultural knowledge through personal experiences and interactions with people of a different culture. Ethnography is a powerful tool that helps both the ethnographer and their audience gain a deeper appreciation for different cultures, and as a result their own culture. I have implemented the ethnographic method through an observation of the people working and shopping in the Antique Warehouse Mall. This expansive store houses an eclectic collection of clothing, jewelry, books, music, knickknacks, furniture, and home décor. I soon

discovered that the people that work at and visit the Antique Warehouse Mall are as equally diverse and interesting as the antique treasures found on the shelves. Additionally, those varying personalities and styles complement each other, creating one harmonious collective. On my journey to gain a fuller appreciation of the ethnographic process, I ultimately developed a greater understanding of community while witnessing the warmth and familiarity between employees and customers of the Antique Warehouse Mall.

**1:42 PM** *Fresh Food, Fresh Atmosphere: Trolley Stop Market*

**Danielle Jones**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

When studying a cultural scene, the ethnographic method becomes integral in discovering the underlying rules and nuances of an unfamiliar place. Ethnography is a practice used by anthropologists and sociologists allowing them to delve into a social scene, through both active participation and participant observation. I chose Trolley Stop Market as the site of my ethnographic site because it is a restaurant with a mission. The owners, also farmers, use as many products from local farms in their food as they can. Goods such as honey, coffee, fresh cut meats and milk can be found on display. They also support local artisans in showcasing their work varying from jewelry and purses to hand-turned wooden bowls. Despite the popular misconception that healthy and sustainable food choices are for the wealthy Trolley Stop Market has many meals under \$10 and their economically and ethnically diverse array of customers, of all ages, reflect their welcoming attitude. I have seen young families, teenage girls, scruffy-looking 20-somethings and older couples come to Trolley Stop Market to enjoy their tasty food made from ingredients that have been grown with care. Trolley Stop Market consciously supports the local community while inherently creating a community of its own.

**1:54 PM** *Buried in Burke's Books: An Ethnography*

**Jacob Powers**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

As a student of anthropology and sociology I utilized the ethnographic method of participant-observation to gain a closer understanding of a local cultural scene that I was unfamiliar with prior to the study. My cultural scene was Burke's Bookstore, a secondhand bookshop in the Cooper Young community of Memphis, Tennessee. Through participant-observation, I situated myself within the bookstore as a customer in order to observe the cultural scene from the inside. As a customer in the store, I observed the interactions between people and the effects the physical setting and material culture have on their behavior by noticing patterns and looking for social norms within the setting. This presentation will focus on the use of bookstore space by customers, considering the customer's perspective as well. It is my intention to examine which areas of the shop customers gravitate toward and how these areas may be linked to their age, race, gender, and class.

**2:06 PM** *Laughing with the Locavores: An Ethnographic Study of the Cooper Young Community Farmers Market*

**Helen Huettner**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Commercialization of farming operations and the subsidizing of crops such as corn and tomatoes have taken modern Americans away from former more healthy eating practices. The benefits of eating locally have only recently begun to be explored by both food experts and social scientists. What encourages and what discourages us from eating organically and from purchasing local produce? I sought to answer these questions by volunteering at the Cooper Young Community Farmers Market. By using the ethnographic method I hope to gain an understanding of the culture there and its practices through participant observation. By interacting with fellow volunteers, customers, and farmers at the Cooper Young Farmers Market, I have come to better understand the cultural scene of "locavores", that is, individuals who eat foods grown locally whenever possible, and the challenges a city such as Memphis presents for those who want to eat a healthy diet. My presentation is also intended to bring awareness to Rhodes Campus about the farmers market which lies at our fingertips.

**2:18 PM** *Cat Got Your Tongue?: An Ethnographic Study of House of Mews*

**Katie Ogden**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

The House of Mews is a cat sanctuary located on South Cooper in the heart of the Cooper Young district. It currently has 136 cats up for adoption and has adopted over 8,500 cats since 1994. For fourteen weeks I volunteered by cleaning cages, interacting with other volunteers and the owner, and interacting with potential new family

members for the cats. During this time, I became part of a very small, intimate, community that looked out for each other's well being as well as the well being for the cats. I did this by using the ethnographic method. The ethnographic method involves the use of participant-observation in order to achieve a better understanding of a certain culture or cultural setting. It allows the ethnographer to become a part of a tight-knit group and understand the value of community. House of Mews is a very special shelter that takes in strays of all shapes and sizes and gives them a place to call home.

**2:30 PM** *Keep Calm and Eat Donuts: An Ethnography of Gibson's Donuts*

**Ieshia Hoye**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

My presentation concerns my findings from ethnographic research conducted at Gibson's Donuts shop. Considered a rare gem in Memphis, Gibson's Donuts is a local twenty-four hour doughnut shop known for its uniquely flavored doughnuts and friendly service. It has been around since the 1970s and is well known by thousands of native Memphians and tourists alike. My research at Gibson's Donuts involved the ethnographic method; rather than having a narrow research question in mind, over the course of the semester, I have observed both Gibson's customers and workers as they normally behave and interact. I have gathered my information by observing, as well as conducting formal and informal interviews with customers, workers, and the owner. My presentation will focus on the multiple ways people make use of Gibson's. I have observed that people not only come to enjoy doughnuts and a cup of coffee, they come for different reasons such as to study, to play a game of chess, to have conversation, etc. My presentation will explore the various reasons why people continue to come back to Gibson's and the multiple ways they utilize this doughnut shop that keeps it a vibrant part of the Memphis Community.

**2:42 PM** *Brewing an Understanding: An Ethnographic Study of Starbucks*

**Meredith Coulis**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Through the anthropological research method of ethnography, the anthropologist is able to gain a fuller understanding of another culture with participant observation. The data collection process of participant observation allows the ethnographer to become familiar with a culture's customs, not only by observing a cultural scene, but also by taking part in its practices. I utilized the ethnographic study of participant observation while being a customer at the Starbucks on Union Avenue. For several weeks, I purchased a food or drink item, situated myself in the provided seating area, and attempted to gain a feel for the material, cultural, and social scene of the environment. My goals for my research were to gain an understanding of and to become comfortable with ethnographic method while appreciating the cultural scene of Starbucks. In the process I was able to further call into question facile stereotypes of those who frequent and those who work at a "coffee house."

**2:54 PM** *Cultivating Stillness of Mind: Seeking Ethnographic Enlightenment at Pema Karpo Meditation Center*

**Nathan Redman**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Only through interaction can we hope to understand others, and this interaction is best expressed in the ethnographic method which stresses active participation and careful observation as ways of forming a greater appreciation for, and understanding of, others. During my ethnographic study of Pema Karpo Meditation Center, I have learned a great deal about Tibetan Buddhism in general and Memphis Buddhism in particular. In the beginning, I had many expectations and assumptions about who would attend a Memphis meditation center. I assumed that most of the practitioners would be younger "hipsters," who saw Buddhism as a "cool" countercultural religion in a sea of Christianity. However, when I took the time to actually interact with people, I realized that my assumptions had been entirely unfounded. Most of the people were older than I had expected, and all of them took Buddhism very seriously. While many people at the center did migrate to Buddhism as a countercultural religion, they did not do so for trendy reasons; rather, they had genuine grievances with Christianity, and a sincere interest in Buddhism's teachings. Through my ethnography, I hope to enlighten others about Pema Karpo and practicing Buddhism in the buckle of the Bible belt.

**3:21 PM** *Building Community One Donation at a Time: An Ethnographic Study of Repeat Boutique*

**Chelsea Prince**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Ethnography allows a researcher to study an unfamiliar cultural scene through participant observation. For my ethnography, I have been working as a volunteer at Repeat Boutique, a local second-hand store run by the Junior League of Memphis. The store is the main fundraiser for the League, and almost everything in the store is donated by members of the organization. The store attracts a wide range of people from professionals to those on a budget. Through this ethnography, I expected to learn more about how a second-hand store operates, as well as the different types of people who frequent the store, but I quickly realized that there was much more to learn. Repeat Boutique is not just a store: it is a community. By participating in this cultural scene, I have been able to discover how the store fosters relationships that could not be found in any department store. In my presentation, I will present my ethnographic findings about this unique community thrift store.

**3:33 PM** *At the Intersection of Poplar and Culture: Ethnography of MATA Bus Line #50*

**Bethany Larkin**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Many Rhodes students engage in the larger Memphis community through service activities, work, and internships. However, I wanted to go a step further to experience Memphis in a way that would stretch the typical Rhodes-Memphis engagement in order to understand Memphis's vast cultural diversity. For this reason, I conducted an ethnography of the MATA bus. Ethnography builds understanding and appreciation of the world's diversity through the engagement and observation of another culture. Through ethnography, the researcher examines her subjective foregrounding in light of the other. This project explores the culture of MATA bus line 50 (Poplar Ave) in order to gain an appreciation of the everyday lives of Memphians through participant-observation and social interaction. In order to become an active member of the MATA bus community, I used the bus as a means of transportation to run errands around town. Through this ethnography, I learned that the MATA bus is an intersection of Memphis's cultural diversity. It is a moving waiting room in which bus riders wait as they transition from one cultural scene to another. Through this ethnography, I transitioned with them and gained an understanding of my own subjectivity in light of Memphis' vast diversity.

**3:45 PM** *Walking Galleries: An Ethnography of No Regrets Tattoo Shop*

**Chiamaka Ugorji**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

The ethnographic method allows us to appreciate the culture of those referred to as "others". This method of participant observation broadens our view of cultural variation beyond our immediate cultural scene, while helping us to understand the daily routines of the culture being studied. The purpose of my ethnography was to discover and come to understand the complexity of tattooing and piercing as both "business" and "art." The cultural scene I focused on was No Regrets tattoo shop in the mid-town Memphis area, which is frequented by many college students, including those from Rhodes, as well as people of different backgrounds. I observed both the business and social atmospheres surrounding the artists and the clientele in the establishment. The skills of the artists come from at least three years of experience and bring clients from out of town to have tattoos done. In this presentation I hope to take you past the front window and beyond the waiting room to show you the "softer" side of tattoos and piercings, that participant observation has allowed me to appreciate.

**3:57 PM** *Stretching through the Sweat: An Ethnographic Study of a Bikram Yoga Studio*

**Sarah Bitler**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Ethnography allows us to study cultural scenes and how people interact with and within those spaces. Ethnographers attempt to enter different cultural scenes with no previous biases and record their findings. With these findings, they are able to make inferences and draws conclusions that help the population to appreciate and understand cultures different from their own. I chose to practice the ethnographic method at Bikram Yoga Memphis. Bikram Yoga is a special type of endurance-cultivating yoga that is practiced in a 105 degree- room for 90 minutes. I participated in these classes, where I was able to socially engage with other students as well as partake in the practice of yoga itself. Through my research I was able to learn and appreciate the perseverance and dedication students must have in order to truly engage in Bikram style yoga. My research led me to the conclusion that yoga is more than just a physical practice; perseverance and personal dedication play major roles in the process of becoming a yogi, in turn influences all aspects of a practitioner's life.

**4:09 PM** *Talking in Silence: A Cultural Exploration of American Sign Language and Deaf Culture*

**Annika Wuerfel**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Understanding and appreciating different cultures is a crucial aspect in learning about one's own life. Employing the ethnographic method allows anthropologists to observe, interview, participate within a cultural scene, and consequently gain appreciation for cultures that are different from their own. In my ethnography, I studied American Sign Language and attended Sunday church services at a deaf church in Memphis in order to explore deaf culture. The purpose of my study was to learn how to sign and, through participant observation, gain a better understanding of the daily lives of people who are deaf. Throughout my study, I came to realize the sheer number of complexities and intricacies that are present in sign language versus that of spoken English. I also formed bonds with several of the deaf church members and gained a greater understanding for what it is like to be deaf. Through this experience, not only have I learned about a different cultural scene but I have also begun to look at and analyze my own cultural situatedness using a newfound perspective.

**4:21 PM** *"The Deli" Serves More Than American Fare: An Ethnographic Study of a Community Gathering Spot*

**Huntley Hudgins**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

I have always known Young Avenue Deli to be a popular restaurant in Midtown Memphis's Cooper Young neighborhood. Not until I practiced ethnography at Young Avenue Deli did I understand how it had achieved its popularity. Ethnography is a research method primarily used by social scientists to collect data about a cultural scene. The method seeks to intimately know a culture and provide a holistic picture of the cultural scene. I employed participant observation at my cultural scene, Young Avenue Deli, simultaneously occupying the space of a customer and an observer writing field notes. Through participant observation, I found that the Deli's multi-use large space and neighborhood location gives it the wide appeal that it maintains with much of Memphis. A bar, dining room, recreation area, and stage allow Young Avenue Deli to surpass serving sandwiches. The Deli, as I have come to learn, is a popular gathering spot where customers come not only to dine and unwind, but also to create community.

**4:33 PM** *Stretch your Understanding of What Yoga Can Do: Ethnography of Midtown Yoga Studio*

**Kelsey Wilson**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

The ethnographic method is a powerful tool used in anthropological research, which allows people to examine the culture of the "other" in relation to their own. Employing this method, one becomes a participant observer in a cultural scene by actively observing and interacting with people in order to gain a better understanding of their space. This method is beneficial, allowing individuals to look beyond preconceived notions and develop an enriched understanding about a cultural phenomenon. This ethnography of Midtown Yoga Studio appreciates the art of yoga as a stress-relief and relaxation tool and how it can lead to a change and empowerment. This ethnography focuses on people's experience with yoga and how it has affected them throughout their participation. This semester I have immersed myself in the field of Midtown Yoga attending several weekly classes in order to gain an understanding and appreciation of the practice of yoga. During my time in the field I have observed the teaching styles, the students, the unique yoga language, and the physical and sensory aspects of the culture. This ethnography allows us to begin to appreciate yoga as one of the most useful relaxation skills.

**5:00 PM** *Fit to Form: An Ethnographic Study of Zumba Fitness*

**Tyler Compton**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Ethnography is a tool used in the discipline of anthropology as a way to bridge cultural gaps that exist among groups of people. By employing participant observation consistently over a prolonged period of time in a site, the ethnographer can come to know the "other" in a way that provides a nuanced and meaningful understanding of the ways in which a group operates. I conducted my ethnography over three months at the Zumba fitness classes held weekly at Evergreen Presbyterian Church. Zumba is a dance-based fitness program that provides an energetic and exhilarating workout; the popularity of these classes has been growing steadily in the past several years. This ethnography has allowed me to explore the importance and navigations of space in a fitness class such as this, and how the familiarity and comfort with one's surroundings can contribute to interactions with fellow students. Through this ethnography, I have also come to a deeper understanding of the ways in which fitness classes can

create strong bonds between its participants, and how a familial ambiance can be a source of support and encouragement to its members.

**5:12 PM** *Once Upon A Farm: An Ethnographic Study of the Memphis Zoo Farm and Bird Exhibits*

**Emileigh Pope**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

The ethnographic method, the backbone of fieldwork in anthropology, attempts to integrate a person into the culture of another, through participant-observation, and to allow him or her to take the time to appreciate the other culture's complexities, beliefs, and attitudes, through the lens of that specific culture. While people may assume that fieldwork must be done in exotic places that is not necessarily true for we are continuously surrounded by others in contemporary society. I undertook an ethnographic study at the Memphis Zoo farm and birds' exhibits, and immersed myself in the daily life of a zookeeper, through acting as a regular volunteer. Many zoo visitors do not realize the dedication and work that goes on behind the scenes so that the zoo will run successfully. Throughout this semester long study, I have discovered that it is the people who have dedicated their lives to the preservation and welfare of animals that deserve the highest respect from the general public. Unfortunately, because they are "behind the scenes" they often go unnoticed. My hope is that my study properly details the zookeepers so Memphians can appreciate what they do for animals and the city of Memphis alike.

**5:24 PM** *Beyond Stereotypes of Yoga Enthusiasts, Soccer Moms, and Health Nuts: An Ethnographic Study of Whole Foods Market*

**Anne Herman**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Anthropologists, who are known to study "the other" in distant lands, would say that the "other" might be closer to us than we think. The "other" can be a group of people close to home who participate in a cultural scene in one's own society and who might hold beliefs or values different from one's own. Ethnography is an anthropological method that allows one to observe "others" through participant observation or active involvement in their cultural scene. The scene I chose to study, Whole Foods Market, challenged my preconceived notions concerning health food stores and their clientele. While I have come understand how customers of Whole Foods Market are dependent on the store for providing quality products to suit their dietary restrictions and needs, I have also been able to appreciate the employees' role in this cultural scene. By additionally attending seminars and in-store events, I have also come to understand how Whole Foods Market additionally values community outreach. My presentation will give you a "taste" of Whole Foods Market and a glimpse into a culture that values both individual and community well-being.

**5:36 PM** *Repeated Refrains of Nature: An Ethnographic Study of Overton Park*

**Mary DuBose**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Overton Park has been a central part of Midtown Memphis for over 100 years. I have only been studying the park for one semester, yet I suspect that many of the rhythms and routines I observe now have continued for those 100 years. Throughout the semester, I have been practicing the ethnographic method by spending three hours each week at the park. I have been making purposeful, detailed observations of the cultural scene and material aspects of the park. Practicing ethnography is central to anthropology; it allows ethnographers to build a picture of a place or a people from the ground up, by immersing themselves in a place to observe the details and rhythms of daily life in that place. In my time at the park, I have drawn on my observations of interactions between park visitors and the natural and human made world surrounding them, as well as interactions among park visitors. I conclude that Overton Park is a cultural scene that is vital to the city of Memphis because it allows park visitors to experience an unconfined and unrestricted interaction with their natural surroundings and with their neighbors.

**5:48 PM** *The World behind Closed Doors: An Ethnographic Study of a Reproductive Health Center*

**Kunzan Fatima**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

This semester I undertook an ethnographic study of the cultural scene at a local reproductive health center for men and women. This research method requires one to engage in participant observation and direct discussion with "insiders" of the organization in order to ultimately learn more about the cultural scene. During this semester I have been a regular volunteer at Choices, located at 1726 Poplar Avenue. My goal of sensitive observation of the culture

of this non-profit ultimately compelled me to reflect on my own cultural logic, worldviews, beliefs and values. My interactions with the volunteers, workers and patients allowed me to explore the motivations that led to their personal choice to work at a reproductive health clinic while also exposing the challenges that such work posed. I hope to give my audience the means to understand and appreciate the services that Choices offers despite the various forms of opposition it faces, as well as local involvement with this organization and the communities it has helped create.

**6:00 PM** *Kicked Into Shape: An Ethnographic Study at Memphis Judo & Jujitsu Fitness Kickboxing*

**Virginia Whitman**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

I conducted the following research using the ethnographic method, which serves as a primary tool for many anthropologists and sociologists. The ethnographic method requires an ethnographer to experience another culture or cultural scene, the purpose of which is to force the researcher into awareness of the similarities and dissimilarities of the culture studied and his or her own culture. The ethnographer must also remain in a specific ethnographic site for a long enough amount of time so as to be able to discern the particulars of said location. The ultimate goal using this method is to gain insight to and an understanding of a unique culture or cultural scene. The cultural scene for my research project is the Memphis Judo & Jujitsu Fitness Kickboxing studio. I attended several classes a week, most at varying hours. During these classes I have noticed a trend in the gender demographic of the participants: the majority of student are women, most times double the number of male students. An interesting direction for the research would be to understand why this trend occurs. My study explores this trend in terms of understanding what social, financial, and health implications compel people to attend these classes.

**6:12 PM** *The Zoo Crew: Human Culture Behind the Gates of Memphis' Own Animal Kingdom*

**Becca Martin**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Going to work takes on a whole new meaning when there are 270 other species at the office. Through the ethnographic method of participant observation, this study attempts to understand the cultural scene existing inside the Memphis Zoo. Ethnography is an essential methodology of cultural anthropology; the ethnographer gains a richer understanding of a culture or cultural scene, and by recounting her or his experience in writing or in a public presentation, others can gain a richer understanding of human cultural variation. During my study at the zoo, fieldwork consisted of both volunteering and weekly visits as a patron. Some sit in offices and answer phones, others make sure the animals get fed, but regardless of position, “the zoo crew” is characterized by true passion. I will discuss the intricate structure and organization of the zoo’s micro-society, providing a perspective of the zoo as a place of work, rather than an every-now-and-then site of entertainment. This is a cultural scene worth getting to know; after all, we are all animals.

## NATURAL SCIENCE ORAL SESSIONS

### Genetics, Biochemistry, and Molecular Biology I

**FJA**

**Session Chair: Christopher Grubb**

**2:15 PM** *Natural variation in Arabidopsis ATFH5 expression indicates an adaptive role for Polycomb regulation of the seed endosperm* ■

**Ellen Dahl**

**Faculty Sponsor: Jonathan Fitz Gerald, 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) accessions, 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. This might indicate that PcG targets, or the regulation of PcG can vary between ecotypes, suggesting an adaptive role for PcG-dependent silencing and parental genomic

imprinting. 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.

**2:30 PM** *Probing the Active Site of LpxC in Gram-negative Bacteria through the Synthesis of Natural Substrate Analogues*

**Sarah N. Malkowski, Christopher S. Grubb**

**Faculty Sponsor: Larry Peterson, Department of Chemistry**

Despite the pronounced advances in the health industry, there still remains the challenge of treating microbial diseases, such as bacterial infections. Bacterial infections can be contracted in hospitals and many are multi-drug resistant, making it imperative to develop new and effective antibacterial therapies. Among the culprits of these infections are Gram-negative bacteria, which are increasingly resistant to antibiotics due to the presence of an outer membrane. Lipid A is an integral component of the outer membrane and is responsible for the viability and growth of Gram-negative bacteria. In the biosynthetic pathway of Lipid A, the enzyme LpxC is responsible for catalyzing the committed step of the mechanism. If LpxC is inhibited, preventing the production of Lipid A, then the compromised outer membrane would reduce bacterial survival. Previous work investigating LpxC has revealed information about key features of the active site and critical residues of interaction. We are currently synthesizing natural substrate analogues as inhibitors in order to probe the active site of LpxC. Our inhibitors feature a zinc binding motif, a hydrophobic moiety, and a nucleoside that are connected through various linkers. The design and synthesis of analogues featuring triazole and ether linkages will be discussed.

**2:45 PM** *Characterization of the interaction between plant formin AtFH5 and the small GTPase ROP2*

**Phuong Le**

**Faculty Sponsor: Jonathan Fitz Gerald, Department of Biology**

Formins are actin-nucleators with conserved functions in developmental processes such as cell polarity, cytokinesis, and morphogenesis. The mechanisms for plant formin localization and activation, however, are potentially unique. In yeast and metazoans, N-terminal formin domains provide membrane localization and activation through interaction with Rho-GTPase. Plants, however, possess a distinct sub-family of Rho-like GTPases (ROPs) and the plant N-terminus is highly diverged including a membrane localization signal. To test the requirements for plant formin localization, transgenic lines carrying an AtFH5-GFP fusion protein were constructed. GFP was localized to the growing tip and the septum borders of pollen tubes, consistent with formin function. GFP localization was perturbed in pollen lacking ROP2. The severity of delocalization was correlated with the severity of the pollen tube defect. In the seed endosperm, AtFH5 transcripts localize to the posterior chalazal cyst and atfh5 mutants perturb the establishment of posterior pole. Similarly, rop2 mutants displayed a seed defect that was traced back to early organization of the endosperm. These results suggest a genetic interaction between ROP2 and AtFH5. We are currently using yeast two-hybrid to identify protein interactions between Rop2 and AtFh5 and to screen for other potential AtFh5 interacting proteins.

**Genetics, Biochemistry, and Molecular Biology II**

**FJA**

**Session Chair: Jennifer Rote**

**3:00 PM** *Interactions of boronated and non-boronated intercalants in small nucleic acid models* 

**Ashley Tufton**

**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

Intercalant molecules are aromatic molecules that bind between nucleic-acid bases in DNA. The presence of the intercalant disrupts the DNA structure, interfering with replication. It is possible that boronated intercalants may be used in the cancer treatment, boron neutron capture therapy. In this work, we examine the interaction energies between boronated and non-boronated intercalant molecules and segments of DNA. Differences in interaction energy, with respect to boronation or the particular base pairs binding the intercalant, provide information about the most likely locations for these intercalants to bind to DNA. The six complexes of four DNA bases (AT..TA,GC..CG, etc), each with the intercalant bound in between, were optimized using ONIOM(M062X/6-31G:AM1) with the DNA bases and intercalant in the upper-level and the sugar-phosphate back-bone in the lower-level. All interaction energies in the systems were calculated with MP2 and DFT with the 6-31+G\* basis set. Complexes were examined

with and without charge on the phosphate groups. The results show trends for the intercalant's preferred binding location and the effect of charge on binding.

**3:15 PM** *Synthesis of Antibiotic Peptides Analogues from Scorpion Venom*

**Michael Ascutto, Roberto de la Salud Bea, Adam Petraglia, Rhodes College**

**Faculty Sponsor: Roberto de la Salud Bea, Department of Chemistry**

Recently, bacteria have become extremely resistant to many traditional antibiotic treatments (i.e. Penicillin). Previous research shows that scorpion venoms are a source of natural antibiotic peptides. These peptides work by disrupting and breaking the bacterial cell wall, a mechanism based on the peptide structure and polarity that has low resistance from bacteria. By synthetically creating short peptides analogues (13 residues each) mimicking these natural antibiotic peptides, there is the potential to increase the peptides' antimicrobial properties and minimize their toxic effects. These peptides analogues will have specific positions of their sequence substituted with fluorinated and non-fluorinated amino acids to modify peptide polarity and activity. Since commercial fluorinated amino acids are racemic mixtures they must be separated first to acquire the desired form (L) used for peptide synthesis. The synthesis of these peptides, along with the separation of racemic amino acids, will be discussed.

**3:30 PM** *An MP2 and DFT study of the selectivity of NADP binding sites for novel ligands* ■

**Rachel Sanders**

**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

Statin drugs moderate blood cholesterol levels by acting as competitive inhibitors for 3-hydroxy-3-methylglutaryl-coenzyme-A (HMG-CoA) reductase, thereby blocking the biosynthesis of cholesterol early in the synthesis pathway. 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, which is adjacent to the active site. 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 for our small molecule inhibitors. 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.

## **Conservation and the Environment**

**FJA**

**Session Chair: Sarah Boyle**

**4:00 PM** *Assessment of flooring changes on African Elephant behavior* ■

**Stephen E. Leavelle, Margaret R. Blake, Jennifer J. Marshall, Brittany Pope, Sarah A. Boyle, Rhodes College; Beth Roberts, Andrew Smith, Amanda Hadicke, Fields Falcone, Katrina Knott, Andrew J. Kouba, Memphis Zoological Society**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

In November 2011, the Memphis Zoo replaced the concrete floor of their three elephants' indoor enclosure with a soft-composite resilient flooring. We collected behavioral data to determine if this environmental change altered the elephants' activity levels and sleeping patterns. From May 2011 to May 2012, daytime outdoor data of elephants' activity and movements were gathered. We collected nightly indoor activity and sleeping data from video (377 hours over 26 nights) before and after the flooring installation. Post-installation, the elephant Asali increased time spent sleeping on the ground at night (from 30.6% to 38.5% of activity). The elephant Tyranza decreased time spent lying down, but increased time in standing rest (from 46.5% to 67.4% of activity). All three elephants appeared to be more active (resting less) in the daytime; this change may be related to increased time resting at night. These behavioral changes are expected to increase the elephants' overall well-being.

**St. Jude's Summer Plus Fellows** ■

**FJB**

**Session Chair: Ann Viano**

**1:15 PM** *The Investigation of AF9, a Potential Regulator of HSC Specification, in Definitive Hematopoiesis*  
**Harrison Daniel, Shannon McKinney-Freeman, Department of Hematology, St. Jude Children's Research Hospital**

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

The capability of embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs) to differentiate into various progeny has powerful implications clinically. The generation of hematopoietic stem cells (HSCs) from ESCs could greatly enhance the donor pool for bone marrow transplants by increasing the availability of HSCs for clinical use. In order to effectively derive transplantable HSCs from ESCs, key aspects of hematopoietic development, particularly definitive hematopoiesis, must be recapitulated in culture. In this study, a systematic serum free differentiation protocol was established in order to evaluate AF9, a novel regulator of HSC specification, in definitive hematopoiesis through overexpression at different developmental steps. The Tet-On inducible system was utilized to evaluate AF9's role in hematopoietic development. Prior to evaluating AF9's role, we attempted to confirm the presence of human AF9 cDNA in the parental Ainv15 parental ESC line. Due to issues with the tool, the Tet-On system was redesigned using the A2lox.cre ESC line and the p2lox plasmid. This system provides enhanced targeting efficiency in comparison to Ainv15 ESC line. Currently, we are in the process of redesigning the Tet-On system to evaluate AF9's potential role in regulating HSC specification.

**1:30 PM** *Evaluation of Salidroside Analogs as Potential Anticancer Therapeutic Agents*

**Maggie Cupit, Adaris Rodríguez-Cortés, Taotao Ling, Fatima Rivas, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital**

**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

Heightened cell migration is a hallmark of metastatic cancer cells. Metastasis is the process whereby cancer cells leave primary tumors and form secondary tumors at a distant site on the body. Cancer cells acquire the ability to metastasize by transitioning from an epithelial to a mesenchymal cellular phenotype. Some of the known transition triggers are intra-tumor hypoxia, growth factor signaling and cell-cell interaction, among others. This biological process intensifies the aggressiveness of a tumor, and is the leading cause of recurrence and death in cancer patients. Therefore, the development of drugs that specifically inhibit tumor metastasis is crucial for the improvement of cancer treatment. *Rhodiola crenulata* is a medicinal plant containing phenylpropanoids and monoterpene glycosides, which have shown antitumor properties. One of its main components is a tyrosol glucoside known as salidroside. Herein, we disclose our studies on *Rhodiola crenulata* extracts, and our focus salidroside compound library whose biological activity has been tested using a cellular monolayer scratch wound migration assay. Biologically active fractions and synthetic compounds were purified and characterized utilizing column chromatography, UPLC-MS, and NMR techniques. Our promising findings as well as our future synthetic studies will be discussed.

**1:45 PM** *Evaluation of *Jatropha Isabelli* Natural Products and their Synthetic Analogs as Potential Antimalarial Therapeutic Agents*

**Megan Hotard, Victor Hadi, Taotao Ling, Fatima Rivas, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital**

**Faculty Sponsor: Dhammika Muesse, Department of Chemistry**

Malaria, a life-threatening disease caused by the *Plasmodium falciparum* parasite, is a global health concern. Due to a lack of scaffold diversity in current treatments, drug resistance to malaria is increasing. For example, the K1 strain of *Plasmodium falciparum* is known to have resistance to the current chloroquine treatments. New molecular scaffolds are desperately needed to combat drug resistance in malaria. Due to the rich scaffold diversity found in natural products, we screened a library of fractionated terrestrial natural products to identify new potential therapeutic leads. We discovered that jatrophone, extracted from *Jatropha isabelli*, exerts significant activity against *Plasmodium falciparum* strains 3D7 and K1. A focused jatrophone-scaffold library was synthesized to evaluate jatrophone's mode of action and identify more selective analogs. Compounds 25 (imidazole-1-carbothioate jatrophone) and 32 (aromatic C-7 jatrophone) of this natural product-inspired compound library exhibited EC50

values in the micromolar range, indicating their potential as new antimalarial therapeutic agents against the 3D7 and K1 strains.

**2:00 PM** *Characterizing the Interferon Response of Gastrointestinal Epithelial Cells to Human Astrovirus Infection*  
**Teddy Huerta, Troy Cline, Stacey Schultz-Cherry, Department of Infectious Diseases, St. Jude Children's Research Hospital**

**Faculty Sponsor: Gary Lindquester, Department of Biology**

Astroviruses are positive sense, single-stranded RNA viruses and are the second most common viral cause of gastroenteritis infection. Though its virulence as an enteric virus stems from its ability to productively infect epithelial cells of the gastrointestinal tract, little work has been done to characterize the immune response to astrovirus infection in humans. The antiviral interferons (IFN) are produced during virus infection of multiple cell types and serve to limit virus replication and spread. This study aimed to characterize IFN induction in response to human astrovirus 1 (HAstV-1) infection and the sensitivity of astroviruses to the antiviral effects of the IFNs. Astrovirus infection of the intestinal epithelial cell line, Caco2, induced IFN- $\beta$  and IFN- $\lambda$ , with IFN- $\lambda$  being the dominant IFN subtype. However, IFN induction was delayed, suggestive of a virally-encoded IFN antagonist. Consistent with the requirement of a viral IFN antagonist, HAstV-1 replication was dramatically inhibited by pre-treatment of Caco2 cells with IFN- $\beta$ . These results indicate that the IFN response is an effective defense against the spread of astrovirus infection and that astroviruses may establish infection, in part, by preventing early IFN induction. Future studies will focus on delineating which viral protein serves this antagonistic function.

**2:15 PM** *Pharmacokinetics of Dexamethasone in Mice with Acute Lymphoblastic Leukemia*

**Katherine Robinson, Laura Ramsey, Mary Relling, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital**

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

Dexamethasone is a corticosteroid used to treat acute lymphoblastic leukemia. One of the most serious side effects of dexamethasone treatment in children is osteonecrosis, or bone death. A discontinuous regimen of dexamethasone has been shown to decrease the risk of osteonecrosis in patients and in murine models (compared to a continuous regimen). We studied leukemic mice treated with continuous or discontinuous dexamethasone; the continuous dexamethasone group received 4 mg/L, while the discontinuous group received two cycles of 8 mg/L for the first 3.5 days and no dexamethasone for the following 3.5 days. We analyzed plasma dexamethasone concentrations and liver CYP3A expression at four time points during treatment (days 3.5, 7, 10.5, and 14). Plasma dexamethasone concentrations varied by dose and were similar to those observed in patients receiving dexamethasone during ALL treatment. In humans, CYP3A is involved in dexamethasone clearance, and is also induced by dexamethasone. We observed induction of CYP3A by dexamethasone in both treatment groups in the C57BL/6 mice, with a positive correlation between the plasma dexamethasone concentration and the hepatic CYP3A expression level ( $R^2=0.2251$ ,  $p=0.001$ ). There was no difference in the induction of CYP3A in continuous versus discontinuous dexamethasone regimens. We will verify the association between plasma dexamethasone concentration and the CYP3A expression level in other strains of mice.

**2:30 PM** *Degeneration of s113 Zebrafish Photoreceptor Cells in Relation to Modern Times (mti) and p53 Mutation*

**Briana Xu, Hannah Henson, Robyn Umans, Michael Taylor, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital**

**Faculty Sponsor: Ann Viano, Department of Physics**

The treatment of vision loss could benefit from a better understanding of the underlying genetic causes. Zebrafish provide a valuable model for studying blindness, because their visual system is similar to humans and large-scale genetic screens can easily be performed. In this study, we investigate photoreceptor degeneration in a zebrafish mutant called modern times (mti). Our goal is to determine if degeneration is dependent on the p53 gene, because p53 plays a major role in programmed cell death (i.e. Apoptosis). Thus, photoreceptor degeneration in mti mutants may be a result of normal p53 function. We will compare the degree of photoreceptor degeneration by immunohistochemistry (IHC) staining among (s113 +/-; p53 -/-), (s113 -/-; p53 -/-), and (s113 -/-; p53 +/-) animals. We also plan to clone the defective gene in the mti mutant. Genetic mapping has previously identified the region carrying the mti mutation, and one of the genes in this region, dynein heavy chain 10 (dnah 10), is a strong candidate. Our study will shed light upon the genetics mechanisms of photoreceptor degeneration.

## **Quantitative and Computational Science I**

**FJC**

**Session Chair: Betsy Sanders**

**2:30 PM** *Digital Event Management Application for Android and iPhone*

**Sydney Howard, Jeremey Key, Rui Liu**

**Faculty Sponsor: Betsy Sanders, Department of Mathematics and Computer Science**

In this talk we discuss the creation of the Rhodes Event Management System. In recent years there has been an increase in demand for mobile applications. Due to this trend there is developing niche for collegiate application development. We are capitalizing on the market by developing a cellular application for the Android and iPhone designed to facilitate a larger participation rate for Rhodes College Campus events. The application will showcase current events on the Rhodes campus via a priority queue, which is based off of administrative pull, date, and time. The application's data is mainly driven by student input but can be manipulated by administrator codes and common mutator functions keyed to an individual's R-number.

**2:45 PM** *The Creation of a 3D Game Environment*

**Matthew Isom, Clayton Moore, Ye Zheng**

**Faculty Sponsor: Betsy Sanders, Department of Mathematics and Computer Science**

We created an instructive 3D video game that aims to accurately represent subsistence techniques and survival challenges. Players forage for food and develop methods to combat a hostile environment while interacting with the landscape around them. By making a fun and challenging game that models these systems realistically, we hope to provide a framework for players to learn about basic survival strategies and develop a better understanding of our relationship to the land. The process of creating our own game has been a learning experience for us as well, and as part of our presentation we will discuss the design challenges inherent in creating complex 3D game environments. While presenting the results of our project, we will discuss the particular techniques we used to approach these challenges as well as strategies useful to a new game developer.

**3:15 PM** *A Set Partition Analog of the Erdős-Szekeres Theorem*

**Rui Liu**

**Faculty Sponsor: Eric Gottlieb, Department of Mathematics and Computer Science**

The monotonic subsequence problem has been studied in depth. Mathematicians and computer scientists have found and proved various results such as the Erdős-Szekeres Theorem and the algorithms to find the longest monotonic subsequences. However, sequence is nothing more than a permutation on a set. Instead of considering permutations, I am more interested in exploring the existence of similar properties on the partitions of a set. The objective of my project is to establish counterparts of the results mentioned above in the context of set-partition. In this talk, I will first introduce the concepts such as "subpartition" and "freeness" (the counterpart of "monotonicity" in the context of set partitions). Then I will present related results and algorithms.

## **Quantitative and Computational Science II**

**FJC**

**Session Chair: David Rupke**

**3:30 PM** *Study of Galactic Outflow using Voronoi Tessellation*

**Matthew Miller**

**Faculty Sponsor: David Rupke, Department of Physics**

Many galaxies produce outflows of gas that cause by either star formation or accretion to a supermassive black hole at the galaxies nucleus. Understanding this outflow of gas is important for understanding the evolution of the galaxy. The basic technique used to study these winds is integral field spectroscopy (IFS), which measures the amount of light at different wavelengths coming from different parts of the galaxy. However, the signal to noise ratio peaks while looking at the center of a galaxy and is much lower in the surrounding area. To gain more spectral information from the area around the center of a galaxy, we use voronoi tessellation. Voronoi tessellation is a method which adaptively bins data to increase the signal to noise ratio at the expense of spatial information. I will discuss how I used this technique of voronoi tessellation to better analyze outflows in several galaxies.

**3:45 PM** *Enhancing Atomic Current in Energetically-Gapped Optical Lattices*

**Jake Magness, Ronald A Pepino**

**Faculty Sponsor: Ronald Pepino, Department of Physics**

The interference of counterpropagating laser beams forms standing waves of light. These standing waves make up what is known as an optical lattice, a perfect, defect-free "light crystal" capable of trapping ultracold atoms. Due to quantum tunneling phenomena, these ultracold atoms can be transported from one lattice site to another. As such, under the condition of a driving potential, atoms can flow through lattice systems in a manner reminiscent of electrons in a solid-state electronic circuit. When a homogeneous optical lattice is coupled to reservoirs of neutral, ultracold atoms held at a chemical potential difference, an atomic current can be observed through the lattice system. However, if there exists an energetic gap between lattice sites, the reversible nature of the optical lattice leads to a significant reduction of the overall current. We show, both analytically and numerically, that the current through custom-tailored optical lattices can be greatly enhanced by oscillating the tunneling barrier between specific lattice sites. We also examine the possibility of current enhancement through optical lattices featuring both homogenous and non-homogenous energy gap differences. This work is relevant to a growing field of Quantum Optics known as Atomtronics, where transport through off-resonant lattice junctions may be needed, as well as other fields where the control of atomic currents is of interest.

**4:00 PM** *Numerical Simulation of Na I D Absorption-Line Profiles Formed By Galactic Outflows*

**Duan Yutong**

**Faculty Sponsor: David Rupke, Department of Physics**

Galactic outflows may help explain the regulation of star formation and black hole activity, energetics of the intergalactic medium, the elemental composition of galaxies, and the problem of missing matter on galaxy scales. The Na I D doublet absorption feature ( $\lambda = 5890, 5896$ ) is ideal for studying galactic outflows. The feature remains present in the visible spectrum after being redshifted (up to  $z \sim 0.5$ ), sodium is abundant in the interstellar medium, and the doublet lines resolve the degeneracy in optical depth and covering fraction. We developed a computational model which simulates Na I D for a model galaxy with any given wind structure along any line of sight. IDL is used to simulate the galaxy, in which the light is emitted from the galactic disk and passes through the galactic wind. As it passes through the wind, it is absorbed in two upward atomic transitions. The galaxy and outflow are characterized by radius, inclination, number density, temperature, velocity and turbulent profile. Line-of-sight synthetic spectra of regular wind structures, such as spherical, biconical, and unfilled biconical winds, are generated as spaxel and equivalent-width maps. By exploring the dependence of simulation results on underlying wind structure and relating theoretical simulations to observational data, we seek to gain insights into physical properties of the galactic outflows.

## **FINE ARTS ORAL SESSIONS**

### **Research in the Fine Arts**

**Clough 410**

**Session Chair: Bailey Heldmar**

**1:30 PM** *The Chicano Movement: Music in Social Revolutions*

**Meagan Keller-Fowler**

**Faculty Sponsor: James Cornfoot, Department of Music**

The Chicano Movement of the 1960s and 1970s originated in the American Southwest along the Tex-Mex border in reaction to the racism and exploitation of Mexican citizens in the United States. Within this movement, music was often used as a voice for the grievances and dreams of the people fighting for change. Activist leaders used the concept of Aztlán, a Mexican nationalist symbol, and other references to Chicano culture and history in songs to create a Chicano identity around which Mexican citizens could unite and fight for change. The Chicano Movement typically employed traditional musics such as corridos, which are narrative songs that were used in the Mexican Revolution to describe heroes such as Pancho Villa and Emiliano Zapata, and rancheras, which are emotional songs of love and the countryside. By analyzing specific corridos and rancheras that were written and performed during this time period, I determine why the use of music, especially traditional musics that harkened to Mexico's past

struggles and glory, was so integral to the bettering of social and economic conditions for Mexican peoples and re-constructing a Mexican identity within the United States.

**1:45 AM** *Comic Books: The Stage of the Page*

**Chase Robert Ring**

**Faculty Sponsor: Dave Mason, Department of Theatre**

The theatre of today is too caught up in tradition to actually make anything of itself. Audience members show up, are asked to unwrap their candy, turn off their phones, and be quiet for the next two hours while they watch what they have defined as “theatre.” With this project, I am determined to open up the idea of what “theatre” is by exploring the medium of comic books. By combining colorful characters and inaudible dialogue, the comic book tells a narrative that, nevertheless, manages to tell one coherent story despite being broken up into panels. The comic book has taken the idea of allowing its audience to “fill-in-the-blanks” in order to create a story that flows nicely and neatly, and allows its readers to formulate their own discussions, ideas, and theories surrounding the art. If theatre can take a page from comic books, I believe that much will be accomplished in the field of “new theatre.”

### **Johann Sebastian Bach’s B-minor Mass**

**Hassell 100**

**Session Chair: Mona Kreitner**

**2:15 PM** *Current Scholarly Research Concerning Bach's B Minor Mass*

**Annie Hohlt**

**Faculty Sponsor: Mona Kreitner, Department of Music**

When one listens to Johann Sebastian Bach’s B Minor Mass, there is hardly a doubt that this piece was composed of various components that flow together musically to create a unified work. My research addresses and analyzes the musical aspects of the individual sections that Bach composed for the B Minor Mass, as well as his motivation for compiling this work. While musical scholars research and debate about this topic today, I will present analytically the current philosophies and positions regarding Bach’s B Minor Mass. Because musical scholars still debate this topic today, it is interesting for me, as a student, to be able to examine this research and develop opinions and questions of my own based upon both facts and philosophies of other researchers. In addition, this year it is particularly rewarding to study this work, as the Rhodes community will be able to see and hear this piece performed live by the Rhodes MasterSingers Chorale in April.

**2:30 PM** *The Bach B Minor Mass: Understanding the Compositional Process and Purpose*

**Chelsey Thompson**

**Faculty Sponsor: Mona Kreitner, Department of Music**

My research on Bach’s Mass in B Minor explores the construction of the piece with regards to the timing of when the individual movements were written as well as for what purpose they were written. The specific question to be examined through the course of my research is whether Bach—in compiling this Mass so near to the end of his life—intended it to be performed in its entirety or if he simply intended it to showcase his compositional abilities. This is a question actively being debated within the community of Bach historians as there is substantial evidence supporting both claims. Collections of primary sources from the period as well as musical scores and analyses from professionals in the music history field are used to explore this question of how Bach intended his Mass in B Minor to be performed.

**2:45 PM** *A Love Letter to J.S. Bach: C.P.E Bach's role in transforming his father's Mass in B minor*

**Sarah Catanzaro**

**Faculty Sponsor: Mona Kreitner, Department of Music**

My research addresses Carl Phillip Emanuel's propagating his father's masterpiece, Johann Sebastian Bach's Mass in B minor after the composer's death in 1750. I will explore C.P.E. Bach's pivotal role in deciphering and editing his father's work, his motivations and preparations for performing the "Credo" of the mass, and the nature of the performance itself, which took place at a charity concert in Hamburg. C.P.E. Bach being a famous composer in his own day, it appears that he greatly emulated his father's compositions. His wish to perform J.S. Bach's virtually unperformed work tells us that Carl Phillip Emanuel Bach had an incredibly personal relationship with his father's work. His countless hours editing J.S. Bach's sometimes incoherent notation and working with publishers to produce

an unknown certainly indicate his personal investment. But C.P.E. Bach's efforts to produce the Mass in B minor also involve a desire to establish his father's legacy as one of the greatest composers of his or any generation. Thus, C.P.E. Bach's performance of the Mass in B minor in many ways becomes his love letter to his father.

## **Bach's B-Minor Mass POSTER SESSIONS**

### *#1 Bach's B Minor Mass: Form and Context*

**Lumina Waters, Zachary Wolfe**

**Faculty Sponsor: Mona Kreitner, Department of Music**

The Mass in B Minor is considered by many to be one of Bach's greatest works, and even one of the greatest classical pieces of all time. Analysis of this collection of pieces can give us a window to help us understand not only music and life in the time it was composed, but music itself. In our research, we plan to analyze the compositional and structural elements of the piece. We will discuss theoretical form, the context of the piece at its time of creation, its relation to the social, political, and cultural climate, and its relationship with other church music. We will also be discussing the changes in compositional style between each part, as its individual pieces were written over a large portion of Bach's life.

### *#2 Motive and Purpose: J.S. Bach's B Minor Mass*

**Elisabeth Peel**

**Faculty Sponsor: Mona Kreitner, Department of Music**

Johann Sebastian Bach is well-known for his compositions, including his Mass in B Minor, which he finished writing only months before his death in 1750. As a Lutheran, the composition of a Catholic Mass was an unusual choice for Bach, and his motivation and purpose for writing such a piece is the topic of debate amongst musicologists. This project will provide a possible explanation for the composition of the Mass. To do so, I not only examine the Mass in chronological context with Bach's other works but also place the B Minor Mass in historical context beside pieces written by Bach's contemporaries. Also taken into account are personal documents and letters written by and to Johann Sebastian Bach during his later years. By investigating personal documents, musical trends, and significant historical forces of the early 18th century, I will conclude with my own interpretation of Bach's motive behind the composition of his Mass in B Minor.

### *#3 Connections between compositional decisions in J.S. Bach's B Minor Mass and his external influences*

**Lauren Smith**

**Faculty Sponsor: Mona Kreitner, Department of Music**

This project attempts to explain the reasons behind which the formerly individual segments of the B Minor Mass were chosen to be associated with one another in a single work. Explored are the overlapping trends between political, social, and theological events in Bach's life and the notable compositional choices he made at these times. The project brings to light such decisions as stylistic deviations corresponding to different periods of his life as well as strategic placement of individual portions of the Mass. Also addressed are conflicting opinions on the presence of a plan to create the B Minor Mass. These theories include beliefs that Bach possessed a long-term mental blueprint of the Mass, put together by the onset of his elderly years, and those that claim he never actually intended to compile the segments into one master work.

### *#4 Bach's B Minor Mass*

**Kevin Sierra, Connor Cain**

**Faculty Sponsor: Mona Kreitner, Department of Music**

We examine the compositional changes from Bach's B minor mass between the earlier selections that Bach wrote, such as the Kyrie, Gloria, Credo, and Sanctus, and the later selections that were written just before Bach's death. In these pieces, we will look at harmonies, rhythms, and motifs and see if there were any significant ensemble changes between sections. We look at the purpose of why Bach composed the B minor mass and if he had any help in constructing the mass.

### *#5 The Origins of Bach's B minor Mass*

**Rebecca Thompson**

**Faculty Sponsor: Mona Kreitner, Department of Music**

My research concerns the origin and construction of Bach's B minor Mass, BWV 232. The entire mass was completed in 1749; some parts of this mass were taken from previous works of Bach, while other sections were newly composed specifically for this mass. My research is an attempt to discover which pieces of the Mass are borrowed and why they were used, and show how all of these were put together for one large-scale piece of music.

**#6 *Bach's Mysterious B Minor Mass***

**Carolyn Baker**

**Faculty Sponsor: Mona Kreitner, Department of Music**

Bach's B minor Mass is one of the most highly revered large works of his career. However, his motives for writing this work are not fully understood even today. As a Lutheran church composer, he had no reason to write sections of the Catholic mass other than the four sections preserved in the Lutheran service in the 18th century. Unlike all other works Bach produced in his lifetime, the B minor Mass was not a commissioned work for a patron, nor was it a composition for his position as a church composer. The purpose of this paper is to explore the order in which each section of the mass was written, look at primary source material for clues as to why he wrote each section, and develop a theory of why the piece as a whole was written.

**#7 *Bach's B Minor Mass***

**Kevin Sierra, Connor Cain**

**Faculty Sponsor: Mona Kreitner, Department of Music**

We examine the compositional changes from Bach's B minor mass between the earlier selections that Bach wrote, such as the Kyrie, Gloria, Credo, and Sanctus, and the later selections that were written just before Bach's death. In these pieces, we will look at harmonies, rhythms, and motifs and see if there were any significant ensemble changes between sections. We look at the purpose of why Bach composed the B minor mass and if he had any help in constructing the mass.

**#8 *Analyzing the Method of Construction on Bach's B Minor Mass***

**Betsy Dee**

**Faculty Sponsor: Mona Kreitner, Department of Music**

Johann Sebastian Bach's B Minor Mass was composed in 1749, near the end of his musically accomplished life. Bach used a Baroque technique called "parody" to construct this mass, making it one of the most interesting and complex compositions. This common technique involves adapting and rewriting bits of existing music to a new text. Bach's B Minor Mass has a total of 8 original movements, and the remaining 17, are movements considered parodies— including past works completed by Bach. After identifying these parodied movements, the question forms as to why he parodied certain movements within the piece, while others were written as original movements. By furthering research in Baroque trends, Bach's previous works, and the B Minor Mass itself, I hope to give insight as to Bach's method of construction.

**Art 166: Videos**

**FJB**

**Session Chair: Elizabeth Daggett**

**Iris Chen, Eric DeWitt, Austin Dixon, Pauline Dyer, Lara Johnson, Zach Karlan, Alix Knight, Aaron Nussdorf, Hayley Rosenfield, Katie Stich, Charlie Sun, Westray Tackett, and David Zhang**

Students from ART 266 Digital Arts: Video Production will present their short final projects, which can be animation, narrative, documentary, or experimental. Popcorn will be served. The program concludes with announcement of the winner of the students' "best of show" pick.

**POSTER SESSION I**

**Multisports forum of the Bryan Campus Life Center**

**11:30am- 1:30pm**

**Poster Numbers are listed with each title.**

### **St. Jude Summer Plus Fellowships ■**

**# 1 *Identifying [11C] Choline or [11C] Acetate as a Molecular Marker for Lipid Biosynthesis in Prediction of Local Tumor Growth and Long-term Survival of Cancer Patients***

**Anna Stachura, Elizabeth Butch, Scott Snyder, Department of Radiological Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Terry Hill, Department of Biology**

Positron Emission Tomography (PET) is a diagnostic scanning method that measures physiological processes by tracing a biologically active molecule. Currently, Fluorodeoxyglucose (FDG) is the only commercially available radiotracer available for monitoring the ability of cancer cells to utilize glucose; this is also referred to as the Warburg effect. However, it is hypothesized that a better marker of proliferation in cancer cells may be lipid biosynthesis. This study aims to evaluate the ability of [11C]choline or [11C]acetate to serve as a potential molecular marker in predicting local tumor control and long-term survival in cancer patients. Assays were performed to compare the expression of Ki-67 protein, amount of total fatty acid synthase, and amount of acetyl CoA carboxylase in different tumor cell lines in order to characterize the aggressiveness of these particular cancers. The data obtained from these assays will later serve a role in performing correlational studies of radiotracer uptake with tumor aggression, response to therapy, survival in animal models, and eventually cancer patients.

**# 2 *Understanding the Second Victim Phenomenon and Developing Tools to Assess Its Effects on Healthcare Professionals***

**Sierra Thompson, Jonathan Burlison, James Hoffman, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital**

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

Healthcare professionals often have to deal with the consequences of preventable medical errors that lead to patient harm. When such instances occur, the first victims are clearly the patients and their families, but the healthcare providers who performed the errors also carry the weight of their mistakes and may display certain physical and psychological symptoms. This reaction on the part of the medical community is now called the “second victim” phenomenon. Though research in this area is relatively new, one thing that research has made clear is that second victims experience intense and multi-layered emotional trauma such as guilt and self-doubt, as well as physical symptoms such as fatigue and extreme headaches. These reactions can occur even when there is no fault on the physician's part, for instance when a patient unexpectedly dies or another unanticipated adverse event occurs. It is thus important to be able to recognize and respond to second victims on an institutional level. This study focuses on the background and history of the second victim phenomenon. A questionnaire was also developed after analyzing the various methods and techniques used in previous research to assess second victim effects and reactions. The goal of the questionnaire is to lead to a validated survey that could be used by institutions to uniformly measure and respond to second victims.

**# 3 *Immunomodulatory TLI/ATS Conditioning Facilitates Engraftment and GVHD Protection in a Murine Model of Beta-thalassemia***

**Matthew Sommers, Aman Seth, Marie Van Der Merwe, Department of Bone Marrow Transplantation and Cellular Therapy; Peter Vogel, Department of Pathology; Asha Pillai, Department of Bone Marrow Transplantation and Cellular Therapy, St. Jude Children's Research Hospital**

**Faculty Sponsor: David Kabelik, Department of Biology**

Beta-thalassemia is a hemoglobin disorder (hemoglobinopathy) that results in reduced or absent production of beta-globin chains. This leads to premature death of blood cells in the bone marrow causing early mortality. The only curative treatment for Beta-thalassemia is bone marrow transplantation (BMT). Application of BMT has been limited due to the lack of human leukocyte antigen-matched donors, as well as severe immune complications such as graft rejection and graft-versus-host disease (GVHD). Methods to limit graft rejection and GVHD rely on altering both recipient and donor immune systems to minimize recipient-donor reactivity. One such method is using a Total Lymph Irradiation (TLI) and rabbit Anti-Thymocyte Serum (ATS) based regimen. Based upon prior favorable clinical data, we pre-clinically assessed a regimen of TLI/ATS and cyclophosphamide (CTX) in curative unrelated donor BMT for hemoglobinopathies using a major histocompatibility complex-mismatched murine model of human Beta-thalassemia. Our data indicate that TLI/CTX/ATS facilitates recipient-donor transplantation tolerance with robust engraftment, GVHD protection, correction of Beta-thalassemia, and provides pre-clinical support for application of TLI/ATS/CTX regimen prior to curative unrelated donor BMT for hemoglobinopathies.

**# 4 Location and Visual Features of Medulloblastoma Molecular Subtypes by MRI**

**Lauren Stokes, Robert Ogg, Matt Scoggins, Translational Imaging Research, Department of Radiological Sciences, St. Jude Children's Research Hospital; Amber Owens, School of Dentistry, The University of Tennessee Health Sciences Center; A. Gajjar, Department of Oncology, St. Jude Children's Research Hospital**  
**Faculty Sponsor: Darlene Loprete, Department of Chemistry**

Medulloblastoma is the most common malignant brain tumor in children. There are four molecular subtypes of medulloblastoma. Research has uncovered the developmental origins of two of the four subtypes, Sonic-hedgehog and Wnt, but little is known about Groups 3 and 4. A previous study comparing Sonic-hedgehog and Wnt subtypes showed that these tumors exhibit different localization patterns in the posterior cranial fossa based on different developmental origins. This research project focused on quantitative analysis of tumor localization in subtypes 3 and 4, based on landmark coordinates in a standard brain space. Analysis of the localization features of these subtypes did not reveal any significant differences so a qualitative approach was taken to further analyze each subtype based on visual appearances of the tumors. This qualitative approach resulted in the definition of multiple subgroups for each subtype based on visual appearance of the tumors. These results show that each subtype has unique characteristics that may be linked to differences in developmental origins. Ongoing research is investigating the relationships between localization, molecular markers, and developmental origins using mouse models for Group 3 and 4 medulloblastomas.

**# 5 Regulation of Copper Homeostasis is Required for *Streptococcus Pyogenes* Survival**

**Tina Dao, Michael Johnson, Jason Rosch, Department of Infectious Diseases, St. Jude Children's Research Hospital**

**Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry**

Metals serve as cofactors of many crucial proteins in various cellular processes. Copper, in particular, is not only an essential trace element found in most eukaryotes and some prokaryotes, but it also possesses antimicrobial properties. The mammalian host exploits copper's antimicrobial properties to kill bacteria during the innate immune response. Thus, copper efflux mechanisms have been highly conserved in bacterial systems to export copper to minimize toxicity. Previous studies have shown that *Streptococcus pneumoniae* becomes increasingly susceptible to excess intracellular copper in the absence of the copper export gene *CopA*. Being from the same genus, *S. pneumoniae* and *Streptococcus pyogenes* share many similarities such as the ability to cause pneumonia, bacteremia, and lyse blood. Currently, there are no published studies on the role of the copper efflux pump and the mechanism of copper-mediated toxicity in *S. pyogenes*. In this study, we predicted the copper efflux pump based on homology to other *CopA* genes (*CopA*, SPY\_1715) in *S. pyogenes*, and made the corresponding mutation in the HSC5 strain by making an in-frame deletion. We then used several *in vitro* assays to examine this mutant for copper sensitivity. Based on our findings, we found that  $\Delta$ SPY\_1715 universally showed increased sensitivity to copper as compared to the wild type strain and thus can be labeled as the *CopA* gene.

**# 6 A Systematic Evaluation of an Auto Regressive Moving Average (ARMA) Model for Fat-water Quantification**

**Hannah Lin, Axel Krafft, Brian Taylor, Ralf Loeffler, Claudia Hillenbrand, Department of Radiological Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Ann Viano, Department of Physics**

Quantitative magnetic resonance (MR) imaging offers a non-invasive method to measure hepatic iron content. However, the presence of lipids in hepatic steatosis (fatty liver disease) confounds the MR signal. This study investigates the lipid contribution to the MRI signal. An autoregressive moving average (ARMA) analysis quantifies water and fat content in tissue by fitting lipid resonance peaks. The effectiveness of the ARMA technique was compared to MR signal magnitude fitting techniques for data from phantoms made with varying concentrations of fat. We compared 2-, 3-, and 4-peak ARMA models to 2-, 3-, and multi-peak magnitude fitting scenarios. Overall, fat fractions estimated through ARMA and magnitude fitting closely agree with the theoretical values at all but the lowest fat concentrations. The 2-peak ARMA model and magnitude fitting show nearly identical fat fractions, but both underestimate the fat fraction as they do not account for all lipid species. 3-peak ARMA fails for fat concentrations under 25% due to insufficient signal and requires iterative corrections. Our results show that ARMA can be used for simultaneous water and fat analysis. This will enable separation of signals due to fat and iron and therefore a better quantification of iron for patients at risk of steatosis.

**# 7 Clinical Pharmacogenetics Implementation Consortium: Translating Genetics into Personalized Care**

**Matthew Cannavo, Kelly Caudle, James Hoffman, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Kim Gerecke, Department of Psychology; Neuroscience**

Serious adverse drug reactions result in over 100,000 deaths each year, and genetic predisposition remains a major cause of these adverse events. Pharmacogenetics ties genetic variants to drug response, allowing clinicians to utilize a patient's genetic information when making therapeutic decisions. The Clinical Pharmacogenetics Implementation Consortium (CPIC), a collaboration between PharmGKB and NIH's Pharmacogenomics Research Network, was established to provide standardized, freely available guidelines to aid in the adoption of pharmacogenetics into patient care. Consortium members make therapeutic recommendations based on extensive literature review, with standardized systems for grading evidence and strength of recommendations. This evidence is then translated into explicit guidelines for clinicians to understand and implement into care. Each guideline is written for a single drug or drug class/gene pair, utilizing a tiered scale for phenotypic classification of the genetic variation with each accompanied by dosing recommendations. Currently, 16 guidelines are completed or in process (<http://www.pharmgkb.org/page/cpicGeneDrugPairs>). CPIC guidelines are also written from the viewpoint that genetic tests are already in hand, making them instrumental in the shift towards preemptive genotyping away from the current, reactive standard. My involvement is to assist in summarizing of the evidence supporting pharmacogenetic dosing of ivacaftor in cystic fibrosis for use in a CPIC guideline.

**# 8 Parenting Stress in Long-Term Survivors of Childhood Acute Lymphoblastic Leukemia**

**Adele Malpert, Tara Brinkman, Kevin Krull, Department of Epidemiology and Cancer Control, St. Jude Children's Research Hospital.**

**Faculty Sponsor: Jenny Vaydich, Department of Psychology**

Acute lymphoblastic leukemia (ALL) is the most common form of childhood cancer. With cure rates exceeding 90%, there is a growing population of long-term survivors who are at-risk for treatment-related late effects including organ dysfunction, neurocognitive impairment, and emotional distress. These morbidities may be a source of stress for parents. While parenting stress at diagnosis and during treatment has been documented, few studies have assessed parent functioning in long-term survivors. This study examined the prevalence of stress in parents of long-term survivors of childhood ALL. Parents (79% mothers) of 169 childhood ALL survivors, treated at St. Jude Children's Research Hospital, completed measures of post-traumatic stress (PTS), psychological distress, and family environment. Survivors were, on average, 7.8 years post-diagnosis and 14.3 years of age at time of study. 7% of parents reported clinically significant symptoms of anxiety and 7% endorsed symptoms consistent with post-traumatic stress disorder. Nearly half of parents (48%) reported intrusive thoughts or re-experiencing symptoms related to their child's cancer. Parent PTS symptoms were correlated with family conflict ( $r=0.22$ ,  $p=0.007$ ), cohesion ( $r=-0.19$ ,  $p=0.017$ ) and independence ( $r=-0.25$ ,  $p=0.002$ ). These results suggest that further investigation of the association between late effects of childhood ALL and parent and family functioning is warranted.

**Natural Sciences**

**# 9 Evaluation of the Simplexa Flu A/B & RSV Direct Assay™, Prodesa Proflu+™ Indirect Assay, and Rapid Influenza Antigen Test for Detection of Influenza and RSV.**

**Jordan Infield, Dr. Anami Patel, Le Bonheur Children's Hospital, Chirag Patel, Le Bonheur Children's Hospital**

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

The symptoms of influenza and respiratory syncytial virus (RSV) plague hundreds of thousands of Americans every year. Treating these sicknesses begins with a timely and accurate diagnosis. It is greatly disputed which diagnostic test maximizes accuracy of diagnosis and efficiency. The two most common types of tests used by molecular diagnostic laboratories to diagnose influenza and RSV include rapid influenza diagnostic tests (RIDT) and real time polymerase chain reaction tests (PCR). We measured the specificity, sensitivity, and inhibition of these tests by running over 200 clinical patient samples. We found that the sensitivity and specificity of two real time PCR tests was significantly greater than the rapid influenza antigen test. Among real time PCR diagnostic tests are direct and indirect assays. We found that an indirect real time PCR test suffered much more inhibition, as the direct assay was able to report results on 75% of the samples that the indirect assay was unable to diagnose. However, the direct real time PCR test also reported significantly lower sensitivity than the indirect real time PCR method on samples positive for flu A, flu B, and RSV. We discovered that by extracting the nucleic acid during the indirect assay, PCR was performed on a greater concentration of the desired target product, which resulted in greater sensitivity. In addition, an indirect assay provides more exposure to RNases causing greater inhibition. These findings reveal the strengths and weaknesses of three diagnostic tests. This allows laboratories to choose which test best suits their specific sample population.

**#9b** *Breast Tumor Kinase (Brk/PTK6) and HIF-1 $\alpha$  are co-expressed in human triple negative breast tumors*

**Alexander Croft**

**Faculty Sponsor: Gary Lindquister, Department of Biology**

Triple negative breast cancers are known to be more aggressive and are typically associated with a poor prognosis when compared to hormone receptor positive breast cancers. These tumors are shown to abundantly express Met receptors and contain high constitutive levels of hypoxia inducible factor 1-alpha (HIF-1 $\alpha$ )—a key mediator of cellular hypoxic stress that is known to be indicative of higher metastasis risk and is clinically predicative of patient relapse. Breast tumor kinase (Brk; protein tyrosine kinase 6) is a soluble tyrosine kinase that is over expressed in a majority of triple negative breast tumors and is crucial in the mediation of anchorage independent tumor growth and Human Growth Factor (HGF)-induced cell migration. Although previously studied, there are few immunohistochemical studies investigating the potential co-expression of Brk and HIF-1 $\alpha$  in human triple negative tumors. Herein, immunohistochemistry is utilized to probe for co-expression between Brk and HIF-1 $\alpha$  by cross-examining triple negative tumor sections that we know to express both Brk and HIF-1 $\alpha$  and sections in which one or both factors are knocked down. Co-expression between Brk and HIF-1 $\alpha$  may provide new effective approaches for the treatment of triple negative breast cancers by targeting Brk or HIF-1 $\alpha$ .

**Social Sciences**

**# 10** *Evaluating the consequences of teaching white students about white privilege on their awareness of privilege for others, privilege for themselves personally, and their justifications for the existence of privilege*

**Harrison Adams**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would influence students' awareness of privilege, either personally or for others, and their use of justifications for privilege. I randomly assigned white students to either watch a video of a speech on privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I predict that the computer game will increase awareness of privilege and decrease system justifications for privilege relative to the video conditions.

**# 11** *Examining the consequences of teaching white students about white privilege on feelings of depression and negative feelings*

**Julia Price**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned social advantages people receive from having a white ethnicity/race. White Privilege does not necessarily result from racism or discrimination, and it can occur in the absence of racial oppression. I compared a computer game to two educational videos on how they would impact students' emotional reactions, particularly feelings of depression (sadness, despair, depression, helplessness) and negative feelings (upset, bothered, uneasy, and distressed). A five-point, Likert scale ranging from "very slightly or not at all" to "extremely" was used to determine to what extent participants were experiencing each feeling. I randomly assigned white students to either watch a video of a speech on white privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege.

**# 12** *Evaluating the consequences of teaching white students about white privilege on social dominance, objections toward affirmative action, and the Belief in a Just World*

**Zach Wolfe**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would impact a person's feelings toward three race-related issues: Social dominance (feelings that some groups are superior to others), objections to affirmative action, and beliefs that the world is just and affords equal opportunities. I randomly assigned white students to either watch a video of a speech on racial privilege by Tim Wise, watch video of interviews with people who participated in the white Privilege conference, or to play a computer game illustrating privilege. I predict that the computer game will be lower on all three attitudes than the two video conditions.

**# 13** *Examining the consequences of teaching white students about white privilege on white Disadvantage General, white Disadvantage Personal, and white Pride*

**William Whipple**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would influence attitudes about whites being disadvantaged by race, which measures the perceptions whites have on systematic, reverse discrimination, Personal white Disadvantage, which measures the individualistic perceptions of reverse discrimination, and white Pride. I randomly assigned white students to either watch a video of a speech by Tim Wise on white privilege, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I anticipate that the computer game will induce less favorable attitudes on all three measures than the video conditions.

**# 14** *Evaluating the consequences of teaching white students about white privilege on measure of colorblind racism, modern racism, and explicit prejudice.*

**Brenna O'Sullivan**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would influence measures of colorblind racism, modern racism, and overt prejudice. Color-blind racial attitudes refers to the belief that race should not and does not matter. With modern racism, people express their hostility towards minorities indirectly by claiming racial disadvantage results from a lack of a work ethic or the devaluing of education, and that racism is a thing of the past so compensatory programs such as Affirmative Action are unnecessary. These, along with explicit prejudice, were measured by self-report scales. I randomly assigned white students to either watch a video of a speech on white privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I predict that the computer game will lower all three measures of prejudice compared to the video conditions. My findings will be presented in my poster.

**# 15** *Examining the consequences of teaching white students about white privilege on Support for Affirmative Action programs such as equal opportunity, compensation, and the expansion of welfare.*

**Elizabeth Nelson**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they might impact attitudes about Affirmative Action. Such programs take race, gender, and religious differences into account and attempt to correct for any past discrimination by giving privileges to the underrepresented group. I randomly assigned white students to either watch a video of a speech on white privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I predict that the computer game will result in more favorable attitudes towards all 3 aspects of affirmative action.

**# 16** *Examining the consequences of teaching white students about white privilege on empathy, positive interpersonal feelings, and positive affect*

**Andrew Najder**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from belonging to the white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos to observe how they would impact Empathy (opposition to racism and desire to help the oppressed), positive interpersonal feelings (showing sympathy and feeling connected), and positive affect (feeling hopeful, enthusiastic, grateful). I randomly assigned white students to either watch a video of a speech on privilege by Tim Wise, watch a video of interviews of people who participated in a conference on white privilege, or play a computer game illustrating privilege. I predict that the computer game will have higher ratings on all three dependent variables compared to the videos. My findings will be presented in my poster.

*# 17 Evaluating the consequences of teaching white students about white privilege on white guilt, personal remorse, and collective remorse*

**Fred Lankford**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. White guilt is the result of individuals learning about either their advantages or others' disadvantages, and it's accompanied by feelings of shame and remorse. Collective guilt is guilt over how one's racial group has behaved, whereas personal guilt is a feeling of remorse for one's actions or for being so advantaged over others. I compared a computer game to two educational videos on how they would influence these 3 related attitudes. I randomly assigned white students to either watch a video of a speech by Tim Wise on racial privilege, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I expect to find that the computer game induces lower guilt and personal remorse but higher collective remorse than the two video conditions.

*# 18 Examining the consequences of teaching white students about white privilege on their self-esteem and their beliefs in gender, socioeconomic status and sexual orientation privilege*

**Noor Eltayech**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I randomly assigned white students to either watch a video of a speech on white privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I investigated how these three educational efforts would differ in the extent to which they would indirectly induce awareness of other kinds of privilege besides race, such as gender, socioeconomic, and sexual orientation privilege. I also examined whether the three conditions would lead to differing levels of self-esteem. I expect to find that the computer game will induce higher self-esteem than the video conditions, but that it will not differ in awareness of the other kinds of privilege.

*# 19 Examining the consequences of teaching white students about white privilege on their fears of non-whites and worries about losing privilege.*

**Zeina Soued**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would influence white undergraduate students' emotional reaction of fear and the fear of losing privilege. I randomly assigned white students to either watch a video of a speech on white privilege by Tim Wise, watch video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. I expect to find that the privilege game results in less fear and worry about losing privilege than the two video conditions.

*# 20 Examining the consequences of teaching white students about white privilege on their realization that privilege and discrimination are linked, that discrimination results from White actions, and that discrimination victimizes Blacks*

**Samantha Anscher,**

**Faculty Sponsor: Chris Wetzel, Department of Psychology**

White Privilege refers to the unearned advantages people receive from having a white ethnicity/race. It does not necessarily result from racism or discrimination, and it can occur without racial oppression. I compared a computer game to two educational videos on how they would alter awareness of white privilege, the belief that whites are to blame for discrimination, and the acknowledgment that Blacks are victims of racial discrimination. I randomly assigned white students to either watch a video of a speech on racial privilege by Tim Wise, watch a video of interviews with people who participated in a conference on white privilege, or to play a computer game illustrating privilege. My findings will be presented in my poster; I hope to find that the computer game increases awareness on all three measures relative to the videos.

**# 21 Rhodes College HOPE VI Evaluation Team: Senior Residents and Phase One of Cleaborn Pointe**

**Anne Herman, Helen Huettner, Rachel Kauffman**

**Faculty Sponsor: Heather Jamerson, Department of Anthropology and Sociology**

HOPE VI (Housing Opportunities for People Everywhere) was launched in 1992 as one of the nation's most comprehensive programs for the renovation of public housing in the U.S. Since 1996, Memphis has been awarded five HOPE VI grants, totaling almost \$148 million, to replace severely distressed public housing units with mixed income housing communities and to provide relocation and case management services to displaced residents. The primary purpose of this evaluation is to meet the objectives of the Housing and Urban Development (HUD) requirements of all HOPE VI-related redevelopment. The specifics of this project include an analysis of the Cleaborn Pointe redevelopment site, a senior building in Memphis, Tennessee, and the seniors from Cleaborn Homes, who are eligible to live in this building. We will assess the needs and goals of both Memphis Hope and Urban Strategies and senior citizens by conducting interviews with these seniors (making note that the seniors who lived in Cleaborn Homes were reassigned to either Section 8 housing, public housing, or have moved into a private residence in the interim time).

**# 22 The Language of Learning: Cultural insight into the system of Education in Dakar, Senegal**

**Rebecca Ouellette,**

**Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology**

Living in a country with seven official national languages, communication barriers are inevitable. My experience studying for four months in Dakar, Senegal allowed me to see the ways in which this nation, formerly colonized by France, has adapted and developed into political and economic stability while still maintaining a fascinating pre-colonial cultural identity. During my time in Senegal, I had the opportunity to teach English in a public elementary school. While French is the major national language, the majority of students in Dakar speak the native language of Wolof in their households. Through this internship, as well as my travels throughout the country, I was able to perform an informal study of the system of education as a reflection of the relationship between pre and post-colonial Senegal. Though I focused mainly on the public educational system in Dakar, I also had the opportunity to better understand the contribution of Koranic schools to the religious education in the community. My experience in classes as well as living with my host family and everyday interactions allowed me to see that education of language and culture comes not only from a classroom, but in observing, questioning, and going outside of one's comfort zone.

**# 23 Shelby County Public Defender Internship**

**Danielle Rassoul,**

**Faculty Sponsor: Anna Smith, Department of Political Science**

The Jericho Project is a division of the Shelby County Public Defender's Office that is an intervention and reentry program for convicted criminals with serious mental illness and substance abuse issues. This program attempts to end the pattern that many convicted criminals face (serving their sentence, returning to society, then being convicted and sentenced again) by getting to the core of the problem. I worked with current inmates applying for the program as well as Shelby County judges. All of my work was hands-on and in the center of the courtrooms and jails. The Jericho Project has had a high success rate and is nationally recognized, and its advocates are pushing for more states to adopt the program in an effort to ease the growing problem of rising imprisonment in the US. Through my internship at the PD's Office I worked with staff attorneys and judges to help, advise, and analyze the conditions of current inmates applying for the program. All of my work was hands-on and in the center of the courtrooms and 201 jail. The knowledge I gained from this internship is irreplaceable, and I am excited to share such an incredible experience and educate others on the Jericho Project.

**# 24 After School Programs: The Effectiveness of CrossTown Arts' Story Booth in Fostering Passion for Writing**

**Jasmine Gilstrap, Leigh Allison, and Treshain Norfleet**

**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**

Following the introduction of child labor laws and a federally regulated school system, after school programs soon became a method for assisting children in healthy development by focusing on the developmental needs that schools and parents do not meet. This project focuses on evaluating the CrossTown Arts Outreach program and its role in developing passion for and a better understanding of writing stories through one of their "special projects" called Story Booth at a local Memphis middle school. The evaluation process includes evaluating the program's use of elements from participatory approach to creating programs and the inclusion of children in order to foster a passion

for writing, along with how the children view the program and their willingness to participate for future sessions. Suggestions for future “special projects” aimed at increasing interest and knowledge of writing are offered to improve the nature of the program and the process of teaching according to best practices and feedback from the participants of the program.

**# 25 *Narrative Coherence as a Buffer against Victimization among Children Rejected by Peers* ■**

**Bhavna Kansal, Cara Guthrie, Rollins College Faculty co-sponsor: Alice Davidson, Department of Psychology, Rollins College**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Failure to form peer relationships leaves children vulnerable to adjustment problems during middle childhood, and children not successful in establishing positive ties are at risk for victimization. The ability to create a coherent narrative account is critical for drawing one into a shared narrative practice and for holding one’s own in the world of shifting alliances that characterize children’s peer relations. We examined whether children rejected by peers experienced different levels of victimization depending on narrative skills in stories about peer conflict. A sample of elementary school children wrote stories about “a conflict with a classmate that really happened to you,” and narrative coherence was assessed according to a coding scheme widely used in narrative research (Baker-Ward et al, 2007). Social preference and peer victimization were assessed by asking classmates to nominate children they liked, disliked, and those often teased or picked on. Hierarchical linear regression models indicated that children with relatively low preference scores but high coherence were less likely to be victimized compared to children who were similarly disliked, but had low coherence. Findings support the view that narratives draw children into a shared practice of evaluating conflict, which may be especially important for children who are disliked.

**# 26 *Evaluation of the Cypress Middle School Guitar Club***

**Anne Rhynes, Jasmine Tate**

**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**

We have designed and are conducting a participatory evaluation of the Cypress Guitar Club which was founded three years ago by Rhodes Professor and Director of The Curb Institute, Dr. John Bass. Here, Rhodes students work with students at Cypress Middle School in an afterschool program focused on building interest and skills in music. We will be addressing the following initial questions: How do Rhodes students understand their role as teachers/mentors in the guitar club? How does their participation contribute to their personal development and goals for the future? Why do middle school guitar club members participate? What do the club members experience and what difference does it make in their lives? How can Rhodes sustain and build the guitar club over time at Cypress Middle School? What are the core features of the program that could be replicated at other schools in Memphis? We will answer these questions after observing and participating in the Guitar Club in order to learn how the program operates and to see first-hand how the club is run. We will conduct interviews with the students, instructors, and program director to understand their feelings about the program, expectations of the program, and to hear suggestions for possible improvements to the Guitar Club. Using a participatory research method, we will allow students to conduct co-interviews with us and to assist with making some of the questions for an interview of the instructors of the Guitar Club. We will code all interviews for common themes and answers. In the end, we will have a report that can be used by The Curb Institute to sustain and build the program, and that will contribute to music outreach and education in Memphis.

**# 27 *An Evaluation of the Parenting with Hope Program***

**Jasmine Tate, Amy Handleman, and Anne Rhynes**

**Faculty Sponsor: Janet Panter, Department of Psychology**

Perea Preschool provides an active learning environment where children become self-confident, creative and socially well-adjusted. This environment prepares children for academic success through readiness, health and safety, and spiritual awareness. To best prepare these children for future endeavors, Perea requires the parents to volunteer at the school for a minimum of three hours a month. One optional component of the parent volunteer hours is a Parenting with Hope class taught by Ms. Alicia Norman and Ms. Allison Garneau. The purpose of this study was to assess the effectiveness of the class using a survey we created to examine the attitudes of participants toward the class, its influence on their parenting practices, and whether teachers see changes in parent attitudes and/or behavior

**# 28 *The Cypress Walkability Project: Understanding Students Active Transportation***

**Nicholas Gilgenbach, Ryan Landry, Annika Wuerfel, and Megan Zann**

**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**

The Cypress Walkability Project facilitates collaboration with Livable Memphis in hopes of improving children's access to public transportation and active transport throughout schools and neighborhoods. Specifically, the goal of the project is to address the walkability issues that students at Cypress Middle school encounter on a daily basis. Many of these students walk to school, and there are a number of challenges, including potential injury from motorized vehicles, ambiguously marked crosswalks, and sidewalks in disrepair. In order to address these concerns, this participatory research project utilizes mapping, surveys, and informal interviews with three sixth-grade students who actively commute to and from school. The information from these interviews allows for alterations to The Livable Memphis Walkability Toolkit. These revisions make the toolkit more functional and more usable for children. GIS mapping is also used in order to graphically represent data for the school district and make comparisons between neighborhoods. We aim to present our findings to the Board of Directors for Livable Memphis and to the city of Memphis at the project's conclusion in order to reveal how resourceful children can be in research, to raise awareness regarding the issues of walkability, and to apply our findings to the Memphis community.

*# 29 The influence of post-stress food anticipation and consumption on psychophysiological recovery from mental stress in women with binge eating disorder: preliminary findings*

**Liz Bigus, Annika Wuerfel, and Rebecca Klatzkin**

**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**

Although the underlying mechanisms of binge eating disorder (BED) have not been determined, stress has been implicated as a major contributor. It has yet to be elucidated whether stress-induced binge eating aids in physiological recovery from stress in BED women. Given prior support for the moderating effects of reward on stress-induced eating and studies showing brain reward center activation in response to food cues, but not actual intake in bulimia nervosa, the present study sought to determine the distinct effects of food anticipation and consumption on post-stress recovery in women with BED. Cardiovascular factors of systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were assessed at baseline, during the Trier Social Stress Test, and throughout stress recovery. Food anticipation occurred at minute 45 and food consumption occurred at minute 60 of stress recovery. While all groups showed similar cardiovascular levels at baseline and in response to mental stress, women with BED showed higher SBP levels during stress recovery than obese non-BED women. Trends also emerged for greater SBP and DBP levels during recovery in women with BED compared to obese non-BED women, but only during food consumption. Thus, only obese BED women failed to show continued physiological recovery following food consumption. Women with BED consumed more food post-stress than non-obese controls and moderately more so than obese controls. Thus, food consumption was used as a covariate in the analyses. Since prior studies assessing cardiovascular factors report failure to recover from stress in BED, our data suggests that comfort food anticipation may normalize cardiovascular recovery post-stress and that food consumption may not, in fact, serve as a stress-relieving reward for BED women.

*# 30 "She Said I'm not stopping till the whole 3rd grade know!". Communication Awareness as a Predictor of Peer Relations*

**Elle Wiggins, Ellen Alpaugh, Josie Kisalus**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Previous research has indicated that important developments in communication awareness occur during middle childhood. Our research seeks to discover if a relationship exists between these skills and the success children have in establishing positive peer relationships. Children's awareness of communication and perspective-taking abilities are demonstrated in their use of reported speech. Participants included 3rd, 4th, and 5th grade students attending a university-affiliated public elementary school. The children were given 30 minutes to write a personal narrative about a conflict they had with a peer. Additionally, each student was given a likeability rating by their peers that identified the number of friends each child had in their classroom. We coded for instances of direct, indirect, or mixed reported speech and determined whether the speech was attributed to the self, an adult, or another child. We anticipate that children who use direct quotation of their peers will have more positive peer relations, as it is an indicator of children's attentiveness to language. We believe that these specific variables indicate an increased ability to take on different perspectives, which would allow the child to negotiate peer conflicts and maintain friendships.

*# 31 Emotion Moderates Phonological Facilitation in Picture-Word Interference* 

**Lauren LaBat, Anne Rhynes**

**Faculty Sponsor: Katherine White, Department of Psychology**

This research investigated the role of emotional valence in speech production using a picture-word interference task. Participants named target pictures superimposed with distractor words whose valences were taboo, negative, positive, or neutral. Distractor words were either phonologically-related or unrelated to the target picture. Neutral filler pictures were presented after every target to investigate potential carryover effects from emotional trials. Picture naming times were slowest when target pictures were accompanied by taboo words relative to all other distractors. Distractor valence also interacted with phonological relatedness, where target pictures were named faster when accompanied by phonological compared to unrelated distractors, and phonological facilitation was largest when distractors were taboo words. These findings suggest that strong emotional words slow speech production and that emotion can also specifically influence the phonological encoding stage.

**# 32** *Perception of Parent Volunteer Program at Perea Preschool*

**Hannah Chimowitz, Danielle Lenz, Emily Jordan, Rhodes College**

**Faculty Sponsor: Janet Panter, Department of Psychology**

Parental involvement in children's schools is closely associated with student's academic achievement, improved attendance and positive attitudes towards school. The implementation of and perceptions of parental involvement programs are currently critical issues. This study examined parent and teacher perceptions of parent participation at Perea Preschool. Perea, a ministry of the Church Health Center, is a private preschool for children ages 3 and 4. Each child's parent/guardian is required to volunteer at the school a minimum of three hours a month. This participation requirement is not typical of private or public schools and may be one of the main reasons for Perea's success in preparing children for kindergarten. To assess the effectiveness of the parent participation requirement, we will survey parents and teachers regarding their experiences with the parent volunteer program and their perceptions of its influence on children's academic performance. We anticipate parents and teachers to express different views on this program, including its purposes, implementation, and outcomes.

**# 33** *Predicting Kindergarten Readiness with the Bracken School Readiness Assessment-3 and the Early Screening Inventory-Revised*

**Elizabeth Cavner, Jayme Smith, Chloe Lainhart**

**Faculty Sponsor: Janet Panter, Department of Psychology**

A study conducted in the spring of 2013 compared the predictive utility of the Bracken School Readiness Assessment (BSRA-3) with that of the Early School Inventory-Revised (ESI-R). Both tests are designed to screen children and determine whether they need more comprehensive assessments, require special services and to assist in instructional planning. The tests are also valuable for program evaluation. For this study, we administered the ESI-R at Perea Preschool, a ministry of the Church Health Center, to two classes of four-year old students and compared those results to the BSRA-3 given in the fall. Kindergarten readiness was measured by asking teachers to complete a brief survey regarding students' academic preparation and level of preparation for kindergarten. It is expected the BSRA-3 will better predict teacher ratings than the ESI-R, though the ESI-R is likely to better predict some aspects of academic preparation with greater accuracy than the BSRA-3.

## **Humanities**

**# 34** *Newfound Friends: America's Asian Allies in World War II Propaganda*

**Paul Domer**

**Faculty Sponsor: Etty Terem, Department of History**

War is a source of immense human suffering, but it can also be a catalyst for immense social change. Societies must forget old prejudices against newfound allies in order to create a united front against the common enemy. To achieve these changes in public perception, governments will call on their propaganda arms. Such was the case in the Second World War, when the United States of America faced a titanic struggle against Imperial Japan. For decades, Asian Americans suffered rampant discrimination in all fields of life. When World War II erupted, China suddenly became one of America's most important allies in the fight against Japan. The need to distinguish the Chinese and other non-Japanese East Asian peoples became a crucial part of the American war effort. Propaganda posters told the American public who was an enemy and who was a friend. The change in public perception of Asian Americans was not total; discrimination remained, and the situation only worsened for Japanese Americans. Still, official propaganda reflected a changed tune in American government policy. Racial exclusion had run up

against the necessities of war, and in the battle for national survival, the United States had to minimize racial tensions at home in order to achieve victory abroad.

**# 35** *La Crisis: Teaching Survival English in Spain's failing Economy*

**Maria Raffanti**

**Faculty Sponsor: Alberto del Pozo Martinez, Department of Modern Languages and Literatures**

Spain's ongoing economic turmoil has left the country with a staggering unemployment rate. In the spring of 2012, I had the opportunity to travel as an exchange student in Murcia which suffered some of the highest rates of unemployment in the country. The economic woes, often referred to as "la crisis," influenced daily dialogue, led to multiple general strikes throughout the country, and served as a painful reminder to the different sectors of the population which were most affected by the economic climate. Rising insecurities and anxieties propelled many of the resulting strikes where students and professionals rallied to voice their concern for the future. During my time in Murcia, I worked at a community center to provide English lessons to locals where I observed a direct link between the English classes and the failing economy; individuals were eagerly signing up for lessons as a preventative measure in job security. Some wanted to learn English in order to appear more marketable in a competitive employment market while others wanted to add to their skill set in an attempt to keep jeopardized jobs. It was immediately apparent that attaining English language skills was one more way very desperate people could try to improve their chances of surviving an economic disaster.

### **International Programs**

**# 36** *Yo soy #132: The Rebirth of Student Movements in Mexico under the Institutional Revolutionary Party* ◼

**René Sánchez**

**Faculty Sponsor: Katherine Richardson, Department of Director of International Studies**

The Institutional Revolutionary Party (PRI) has dominated Mexican politics since 1921 until 2000 and again in 2012 in consequence of the 2012 elections under the candidate, now President, Enrique Peña Nieto. The PRI has been tainted by corruption, violence, drug cartels, and less noticeably, civilian and student oppression. This study focuses on how the "Yo soy #132" or the I am #132 movement has paved the road student run movements to be reborn. Student movements in Mexico had been obsolete after the tragic event of the Tlatelolco massacre, also known as The Night of Tlatelolco, where the federal government under the PRI killed student protesters and bystanders at a protest on October 2, 1968. The three main focuses: 1) The events and consequences of the Tlatelolco Massacre; 2) The PRI and its return to power; 3) The origins and consequences of the "Yo soy #132" movement.

**# 37** *An examination of health and healthcare inequality and disparities in Santiago, Chile* ◼

**Caroline Elbaum**

**Faculty Sponsor: Katherine Richardson, Department of Director of International Studies**

Chile is troubled by inequality in its quality and accessibility of education, salaries, and healthcare. During my time abroad in Santiago, I examined the healthcare system, public health, and the administration of care. This presentation will elaborate on the experiences I had during a semester long internship and seminar. Beginning with the Chilean healthcare system, I learned about insurance, facilities, coverage, and medical laws. Furthermore, the same series of seminars expanded on prevalent health problems, disparities within the system, and future reform options. I will describe how I became aware that socioeconomic variables have an immense impact on health. Additionally, I will account my enlightening observations in clinical settings ranging from public palliative and primary care clinics to a large-university associated hospital. This opportunity enabled me to witness an improving quality of care and technology along side disadvantaged facilities and substandard care. Finally, I will describe how I realized that my three academic interests--medicine, public health, and neuroscience-- are more strongly interconnected than I originally thought and elaborate on how the vicious circle of lack of education and resources, unemployment, poverty and poor health is the center of many socioeconomic and healthcare problems that Chile presently faces.

### **Natural Sciences**

**# 38** *The Extent to which Shows Influence Behavior of California Sea Lions (*Zalophus californianus*)*

**Roberta Moore, Madison Marullo**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Captive animals in zoos often exhibit stereotypical behaviors and have higher cortisol levels than their wild counterparts, and California sea lions (*Zalophus californianus*) are no exception. A variety of research has shown enrichment activities and objects significantly decrease cortisol levels and the display of stereotypical behaviors in captive animals. We collected behavioral and location data of two California sea lions, Chloe and Callie, housed at the Memphis Zoo, in order to investigate to what extent a sea lion show influences California sea lion behavior. During shows, Chloe spent the majority of her time (mean  $\pm$  standard error) performing show behaviors ( $0.53 \pm 0.01$ ), while Callie spent her time between three activities: swimming underwater ( $0.25 \pm 0.05$ ), sitting ( $0.27 \pm 0.09$ ), and performing show behaviors ( $0.30 \pm 0.01$ ). Before and after shows, both sea lions spent most time swimming underwater: Chloe ( $0.49 \pm 0.04$ ) and Callie ( $0.59 \pm 0.06$ ). We also found exhibit use differed before and after shows when compared to exhibit use during shows. On the whole, the variety and frequency of behaviors exhibited before and after shows appeared fairly random, which suggests the sea lions do not suffer from chronic stress.

**# 39** *Aggression, altruism, and sexual behavior in the captive vampire bat (*Desmodus rotundus*) at the Memphis Zoo.*

**Allison Julien, Matthew Roberts, Sarah Boyle**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

We collected affiliative, aggressive, and sexual behavioral data on the common vampire bat (*Desmodus rotundus*) population at the Memphis Zoo to determine 1) the influence of location on the expression of these behaviors and 2) whether or not captive behavior paralleled behaviors of wild vampires. In the wild, vampire bats display affiliative behaviors rarely found in other bat species and are among the only bats that are capable of agile, coordinated terrestrial movements in order to better compete for resources in the wild. When bats were terrestrial,  $2.8\% \pm 0.2$  of behavioral scans were of aggressive behavior, while values were  $0.2\% \pm 0.02$  when the vampires were perched. Affiliative behavior represented  $0.1\% \pm 0.01$  of terrestrial behavior and  $11.9\% \pm 1.5$  of perched behavior. Sexual behavior represented  $1.2\% \pm 0.3$  of terrestrial behavior, and  $2.7\% \pm 0.2$  of perched behavior. In conclusion, our findings suggest that in captivity, natural vampire bat behaviors are retained.

**# 40** *Phylogenetics and species delimitation of the southwest Australian endemic wildflower genus *Anthotium* (Goodeniaceae)*

**Eden A. Johnson**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

A preliminary phylogenetic analysis of evolutionary relationships among species of *Anthotium*, a genus of Goodeniaceae wildflowers endemic to Southwest Australia, is presented. This research was conducted in part to provide accurate plant taxonomy 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 an 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 geographical 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 region trnL-trnF and nuclear ribosomal region ITS was sequenced, aligned and analyzed with phylogenetic programs. Preliminary 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.

**# 41** *Immunocytochemical localization of catecholamine activity in the brain after social interactions.*

**Caroline Elbaum, Piper Carroll, Shelley Choudhury, Alyssa Johnson**

**Faculty Sponsor: David Kabelik, Department of Biology**

Presently, the relationship between vertebrate behaviors and neural activity is poorly understood as most brain regions are involved in multiple behavioral processes, homeostatic regulation, and physiological operations. Furthermore, the activation of a single brain region does not necessitate specific behavioral changes, as behaviors are thought to be the result of multiple neural networks functioning conjointly. A detailed map of behaviorally relevant neural activation throughout the brain would facilitate a better understanding of the behavior-brain state relationship. Here, the neural activity involved with aggression and courtship in brain regions in male Brown Anole (*Anolis sagrei*) lizards was examined using immunocytochemical detection of Fos (an immediate early gene product indicative of recent neural activity) and tyrosine hydroxylase (TH; an enzyme involved in the production of the catecholamines dopamine, norepinephrine, and epinephrine). Analyses revealed increased neural activity in

forebrain and midbrain regions of males involved in behavioral interactions (no behavior, copulation, or biting) relative to control males. Within-group analyses showed increased neural activity in similar regions for male-female sexual interactions, but only in the ventral tegmental area for male-male aggressive interactions. Further analyses of additional catecholaminergic brain regions are ongoing to determine their involvement in social behavior regulation.

**# 42 *Synthesis of Dopamine Analogues to Investigate the Selectivity of Human Cytosolic Sulfotransferase SULT1A3***  
**Noah Brown, Gabrielle E. Bailey**

**Faculty Sponsor: Larry Peterson, Department of Chemistry**

Human cytosolic sulfotransferases (SULTs) are responsible for the metabolic deactivation and excretion of endogenous and xenobiotic substrates. The 13 identified human SULTs have broad overlapping substrate specificity but have been demonstrated to possess strict regioselectivity for particular substrates. SULT1A3 is responsible for sulfonating both endogenous catecholamines (dopamine) and simple phenols and carcinogens. To investigate the chemical features of dopamine that allow for this selectivity, a series of seven analogues were synthesized with different substituents at the 6-position. These analogues were chosen for their varying resonance and inductive effects. The electron donating analogues synthesized in addition to the purchased 6-hydroxydopamine were 6-ethenyldopamine and the cyclized 1,2,3,4-tetrahydroisoquinoline. For electron withdrawing properties dopamine analogues with iodo, carboxyl, cyano, and nitro substituents were synthesized. The synthesis of these analogous compounds and preliminary sulfotransferase activity will be discussed.

**# 43 *Qualitative chemical analysis of pigments from Olmec pictographs in southern Mexico*** ■

**Joseph McPeak**

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

Pictographs in the Middle Formative site of Oxtotitlán were systematically analyzed using a portable XRF system to determine the primary pigment materials. Additionally, small paint chips from selected artifacts under a National Geographic /Waitt research grant were collected for additional analyses. A lack of manganese suggested that charcoal was used to produce the pigment. Several black paints at the site were considered viable for C-14 dating. Additional analysis indicated that charcoal is probably not used in the production of the pigment, but instead bitumen may contribute to the sample makeup. If bitumen is present, then this could be the first evidence of bitumen usage in the production of ancient parietal rock art. Another possible source of organic material may be guano from insect-eating bats that inhabit caves near the sample collection site due to the slight presence of aminated compounds within the sample as indicated by FT-IR analysis.

**# 44 *Modeling Rhodes Zombie Apocalypse***

**Josh Berkey, Devin Cochrane, Kevin Starnes, Shelby Scott, K. Lars Monia**

**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 (twice) a real time zombie apocalypse restricted to Rhodes Campus through the popular residential campus game, Humans vs. Zombies (HvZ). HvZ is essentially a game of tag, where players designated as zombies attempt to tag and convert players designated as humans into zombies. Zombies who fail to make a tag within 48 hours are removed from the game. The game ends when there are only humans or only zombies left. The first simulation had 124 participants and lasted 188.3 hours; the second simulation had 67 participants and lasted 263.6 hours. Each game began with a single zombie. Data on the time and player ID #s of each tag were recorded for each simulation. We present a summary of the data collected from each simulation, and provided evidence of “super zombies”, a proportion of zombies who are responsible for a disproportionately high share of the total number of tags. The presence of the super zombies allows the zombie apocalypse to take hold in the population, even if the humans are ultimately victorious over the zombies. The data presented here will be used in further research to parameterize an agent-based model which will be used to conduct numerical simulations of zombie apocalypses.

**# 45 *Social Dynamics of a Giraffe Family***

**Amelia Phelps**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Going to work takes on a whole new meaning when there are 270 other species at the office. Through the ethnographic method of participant observation, this study attempts to understand the cultural scene existing inside the Memphis Zoo. Ethnography is an essential methodology of cultural anthropology; the ethnography gains a richer

understanding of a culture or cultural scene, and by recounting her or his experience in writing or in a public presentation, others can gain a richer understanding of human cultural variation. During my study at the zoo, fieldwork consisted of both volunteering and weekly visits as a patron. Some sit in offices and answer phones, others make sure the animals get fed, but regardless of position, “the zoo crew” is characterized by true passion. I will discuss the intricate structure and organization of the zoo’s micro-society, providing a perspective of the zoo as a place of work, rather than an every-now-and-then site of entertainment. This is a cultural scene worth getting to know; after all, we are all animal.

**# 46 *The Effect of Increasing Sea Surface Temperature on the Intensity of Coral Bleaching Events***

**Madison Marullo**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Coral reefs cover less than 1% of the Earth; however, they produce complex, limestone structures that are home to 25% of all marine life. Due to the global increase in sea surface temperatures caused by global climate change, mass coral bleaching events threaten these reefs. Just an increase of 2 degrees C is enough to trigger a mass bleaching event. Bleaching events cause the coral to release zooxanthellae, algae that control the pigment of the coral and provide the coral with up to 90% of its energy requirements. When this algae evades the coral it causes the coral to turn white, and can result in reduced growth rates, decreased reproductive capacity, and increased susceptibility to diseases. I used ArcGIS 10.1 software to analyze mean average sea surface temperatures during a period of 12 years around the world. In addition, I analyzed the intensity of coral bleaching events around the world. By combining these two sets of data, I can determine the areas that have been most greatly affected by these bleaching events, and make predictions as to where coral bleaching events may become more prevalent in the future.

**# 47 *Analysis of Lead Concentration in Paint Throughout Rhodes College Using AAS and XRF***

**Michael Ascutto, David Jeter, Jon Russ, Rhodes College**

**Faculty Sponsor: David Jeter, Department of Chemistry**

Before 1978, lead(II)chromate and lead(II)carbonate were the main bases in virtually all paints sold across the United States. Unfortunately, traces of lead paint may still be found on the walls of older buildings. If lead concentrations are above government standards, lead can be extremely harmful to students coming in contact with these intoxicated walls. Lead affects the oxygen distribution from red blood cells, prevents absorption of calcium in bones, and disrupts many sulfur linkages in the body. If left untreated, lead poisoning can be fatal. Therefore, the purpose of this study was to determine the presence of lead residues in buildings at Rhodes College, and to determine if any lead found is in concentrations above the government standards of contamination of 600 parts per million. Using X-Ray Fluorescence (XRF) and Atomic Absorbance Spectroscopy (AAS), presence of lead residue was determined by two methods on paint samples. The results of this study will be discussed.

**# 48 *A Non-Euclidean Geometrical Analysis of Music***

**Michael Todd**

**Faculty Sponsor: Christopher Seaton, Department of Mathematics and Computer Science**

Topology is essentially the study of continuous functions. When analyzing musical properties in various ways, topology is not necessarily the first thing that comes to mind; however, this branch of mathematics is useful in observing the symmetries already present in music. Using the recent studies of Dr. Dmitri Tymoczko, this poster focuses on the use of manifolds to observe the mathematical and spatial interpretation and characteristics of music. I will display the basic properties and foundations of my topological spaces used to perform analysis on music. Furthermore, I will be presenting the works I am analyzing as well as my observations and data gathered from my examples in this musical application of topological principles.

**# 49 *Incorporating the Allee effect into the predator population of a predator-prey system***

**Rebecca Olivarez, Elly Hassen, Courtney Haller, Aditya Biswas, Aashray Singareddy**

**Faculty Sponsor: Erin Bodine, Department of Mathematics and Computer Science**

The Allee effect is 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 higher the changes that the population grows. Conservation strategies for threatened species can heavily depend on the population dynamics of that species, and upon its interaction with other species. In this project, we add the Allee effect to the predator population in the classic predator-prey model to examine the impact of the Allee effect on both the predator population and its prey source. We present an analysis of the model equilibria demonstrating under what conditions each equilibrium is stable. Additionally, we present several numerical simulations to demonstrate the different

qualitative types of interaction dynamics, and how the dynamics of each population depends on the model parameters.

**# 50 *Finding the Resistance of Strings and Fibers Using a Faraday Ice Pail***

**Tyler Andrews, Dr. Shubho Banerjee, Dr. Brent Hoffmeister, Zain Kinnare, and Cameron Thurston**

**Faculty Sponsor: Brent Hoffmeister, Department of Physics**

"Many materials such as polymer fibers have ultra-high resistances. We are developing a system to measure such ultra-high resistances. In our system, a charged metal sphere is suspended by a fiber in a Faraday Ice Pail apparatus connected to a instructional-grade electrometer. Data are collected as the sphere discharges through the fiber to ground over a period of several seconds to determine the RC time constant. The resistance R of the fiber can be determined if the capacitance C of the system is known. Preliminary data suggest that the system can measure resistances greater than 1000 teraohms."

**# 51 *Electrostatic Force Between a Charged Sphere and a Grounded Plane***

**Stefan McCarty, Dr. Shubho Banerjee, Evan Nelsen, Rhodes College**

**Faculty Sponsor: Shubho Banerjee, Department of Physics**

When a charged sphere is relatively far away from an infinite grounded conducting plane, the electrostatic force between them can be accurately described using Coulomb's Law. When the sphere is very close to the plane, however, the actual force becomes much larger than what Coulomb's Law predicts. We constructed an approximate formula for this electrostatic force that is accurate to within 0.4% at all distances. Our approximate formula compares favorably to the best approximate formula found in literature which is accurate to within 5.2% at all distances.

**# 52 *Pack hierarchy of captive wolves utilizing behavior and spatial analysis***

**Phillip Lyons, Kimber Jones, Sarah Boyle, and Andy Kouba**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Wild wolves (*Canis lupus*) maintain a hierarchy between pack members via ritualized fights and body language. Captive wolves devote more time to resting and exhibit less of the diversity of behaviors than wild wolves. The relationship between behaviors and exhibit area remains largely unexplored. The Memphis Zoo houses a pack of 4 Grey Wolves. Behavioral data were collected in accordance with an ethogram and locational data were recorded on an exhibit map created using ArcGIS. Both data types were collected from September 2012 to March 2013 for 160 hours. All occurrences of ritualized aggression and dominance were recorded. A pack hierarchy was observed that will be confirmed by calculating the dominance coefficient. Analysis of GIS data points will determine how each wolf utilized the exhibit and reveal any possible relationship between dominance coefficient and exhibit use. This will inform understanding of aggression and improve the housing of pack animals.

## **Biology II Laboratory**

**# 53 *Does Color of Substrate Affect Agonistic Behavior in Crayfish?***

**Natasha Main, Regan McCormick, Sarah Shore, Emily Smithers, Diana Bigler**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 58 *Does a Female Presence Affect Male's Display of Dominance?***

**Tina Tran, Jyssa Simmons, Gabe Laurence, Amanda Fuller**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 59 *The Effects of pH and Auxin on the Growth and Density of Duck Weed Roots***

**Alexanser Frye, Lance Myers, Sam Robertson, Mason Childers**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 54 *Cricket Preference Between Natural Sugar and Artificial Sweetener***

**Liz Bittner, Gene Lamanilao, Tay Wilson**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 55 *Do the Caterpillars of the White Cabbage Butterflies (*Pieris rapae*) Have a Preference for Particular***

**Jordan Kugler, Hannah Darrow, Evy Royther, Jessica Gatewood**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 56** *The Effect of Different Light Wavelengths on Stomata Width of Pansy Plants*

**Gizman Abdijabar, Morgan Fuller, Mohib Khan, Mariko Krause, Monali Lipman**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

**# 57** *Differences in Activity of Crayfish due to Manipulated Circadian Light Cycles*

**Pauline Dinh, Arishna Patel, Nathan Sharfman**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

**# 58** *The Effects of Coloring and Sweeteners on the Food-Source Preferences of *Pieris rapae**

**Ellemore Craine, Ally Limmer, Samantha Ouyang, Jane Shin, Chiamaka Ugorji**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

**#59** *The Effects of Additional Male Crayfish on Copulation Rates*

**Eliot Blatt, Eric Ly, Adam Petraglia, John Selberg**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

**#60** *The Effects of Temperature on Stomatal Aperture between *Viola wittrockiana* and *Agave attenuate**

**Casey Brottman, Chloe Hundman, Andrea Lombardi, Blakeley Ramirez**

**Faculty Sponsor: Rachel Jabaily, Department of Biology**

**#61** *Do Crayfish Prefer Deeper Waters?*

**Omair Arain, Lauren Wenzel**

**Faculty Sponsor: Gary Lindquenter, Department of Biology**

**#62** *Will the Size of Stomata Change With Varying Amounts of Sunlight and Water?*

**Chandler Bryant, Mariam Ebeid, Celeste Lake, Fei-Lin Scruggs**

**Faculty Sponsor: Gary Lindquenter, Department of Biology**

**#63** *Will Male-Male Interactions Exhibit More Occurrences of Aggressive Behaviors Than Male-Female Interactions in Crayfish?*

**Quentin Buck, Alyssa Tews, Emma Jackson, Andrew Kadesky**

**Faculty Sponsor: Gary Lindquenter, Department of Biology**

**#64** *Assessing the Fungicidal Properties of *Mentha spicata* and *Mentha piperita* on *Saccharomyces cerevisiae**

**Saunders Alpaugh, Jonathan Go, Daniel Magruder, Mitchell Tracy**

**Faculty Sponsor: Gary Lindquenter, Department of Biology**

**#65** *Do Higher Concentrations of Auxin Cause Greater Increases in the Number of Leaves on Duckweed Plants?*

**Emily Cerrito, Claire Coulter, Harrison Donahoe, Caroline Sumner**

**Faculty Sponsor: Gary Lindquenter, Department of Biology**

## **POSTER SESSION II**

**Multisports forum of the Bryan Campus Life Center**

**4:30pm- 6pm**

**Poster Numbers are listed with each title.**

### **St. Jude Summer Plus Fellowships**

**# 1** *Identifying [11C] Choline or [11C] Acetate as a Molecular Marker for Lipid Biosynthesis in Prediction of Local Tumor Growth and Long-term Survival of Cancer Patients*

**Anna Stachura, Elizabeth Butch, Scott Snyder, Department of Radiological Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Terry Hill, Department of Biology**

Positron Emission Tomography (PET) is a diagnostic scanning method that measures physiological processes by tracing a biologically active molecule. Currently, Fluorodeoxyglucose (FDG) is the only commercially available radiotracer available for monitoring the ability of cancer cells to utilize glucose; this is also referred to as the Warburg effect. However, it is hypothesized that a better marker of proliferation in cancer cells may be lipid biosynthesis. This study aims to evaluate the ability of [11C]choline or [11C]acetate to serve as a potential molecular marker in predicting local tumor control and long-term survival in cancer patients. Assays were performed to compare the expression of Ki-67 protein, amount of total fatty acid synthase, and amount of acetyl CoA carboxylase in different tumor cell lines in order to characterize the aggressiveness of these particular cancers. The data obtained from these assays will later serve a role in performing correlational studies of radiotracer uptake with tumor aggression, response to therapy, survival in animal models, and eventually cancer patients.

*# 2 Understanding the Second Victim Phenomenon and Developing Tools to Assess Its Effects on Healthcare Professionals*

**Sierra Thompson, Jonathan Burlison, James Hoffman, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital**

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

Healthcare professionals often have to deal with the consequences of preventable medical errors that lead to patient harm. When such instances occur, the first victims are clearly the patients and their families, but the healthcare providers who performed the errors also carry the weight of their mistakes and may display certain physical and psychological symptoms. This reaction on the part of the medical community is now called the “second victim” phenomenon. Though research in this area is relatively new, one thing that research has made clear is that second victims experience intense and multi-layered emotional trauma such as guilt and self-doubt, as well as physical symptoms such as fatigue and extreme headaches. These reactions can occur even when there is no fault on the physician’s part, for instance when a patient unexpectedly dies or another unanticipated adverse event occurs. It is thus important to be able to recognize and respond to second victims on an institutional level. This study focuses on the background and history of the second victim phenomenon. A questionnaire was also developed after analyzing the various methods and techniques used in previous research to assess second victim effects and reactions. The goal of the questionnaire is to lead to a validated survey that could be used by institutions to uniformly measure and respond to second victims.

*# 3 Immunomodulatory TLI/ATS Conditioning Facilitates Engraftment and GVHD Protection in a Murine Model of Beta-thalassemia*

**Matthew Sommers, Aman Seth, Marie Van Der Merwe, Department of Bone Marrow Transplantation and Cellular Therapy; Peter Vogel, Department of Pathology; Asha Pillai, Department of Bone Marrow Transplantation and Cellular Therapy, St. Jude Children's Research Hospital**

**Faculty Sponsor: David Kabelik, Department of Biology**

Beta-thalassemia is a hemoglobin disorder (hemoglobinopathy) that results in reduced or absent production of beta-globin chains. This leads to premature death of blood cells in the bone marrow causing early mortality. The only curative treatment for Beta-thalassemia is bone marrow transplantation (BMT). Application of BMT has been limited due to the lack of human leukocyte antigen-matched donors, as well as severe immune complications such as graft rejection and graft-versus-host disease (GVHD). Methods to limit graft rejection and GVHD rely on altering both recipient and donor immune systems to minimize recipient-donor reactivity. One such method is using a Total Lymph Irradiation (TLI) and rabbit Anti-Thymocyte Serum (ATS) based regimen. Based upon prior favorable clinical data, we pre-clinically assessed a regimen of TLI/ATS and cyclophosphamide (CTX) in curative unrelated donor BMT for hemoglobinopathies using a major histocompatibility complex-mismatched murine model of human Beta-thalassemia. Our data indicate that TLI/CTX/ATS facilitates recipient-donor transplantation tolerance with robust engraftment, GVHD protection, correction of Beta-thalassemia, and provides pre-clinical support for application of TLI/ATS/CTX regimen prior to curative unrelated donor BMT for hemoglobinopathies.

*# 4 Location and Visual Features of Medulloblastoma Molecular Subtypes by MRI*

**Lauren Stokes, Robert Ogg, Matt Scoggins, Translational Imaging Research, Department of Radiological Sciences, St. Jude Children's Research Hospital; Amber Owens, School of Dentistry, The University of Tennessee Health Sciences Center; A. Gajjar, Department of Oncology, St. Jude Children's Research Hospital**

**Faculty Sponsor: Darlene Loprete, Department of Chemistry**

Medulloblastoma is the most common malignant brain tumor in children. There are four molecular subtypes of medulloblastoma. Research has uncovered the developmental origins of two of the four subtypes, Sonic-hedgehog and Wnt, but little is known about Groups 3 and 4. A previous study comparing Sonic-hedgehog and Wnt subtypes showed that these tumors exhibit different localization patterns in the posterior cranial fossa based on different developmental origins. This research project focused on quantitative analysis of tumor localization in subtypes 3 and 4, based on landmark coordinates in a standard brain space. Analysis of the localization features of these subtypes did not reveal any significant differences so a qualitative approach was taken to further analyze each subtype based on visual appearances of the tumors. This qualitative approach resulted in the definition of multiple subgroups for each subtype based on visual appearance of the tumors. These results show that each subtype has unique characteristics that may be linked to differences in developmental origins. Ongoing research is investigating the relationships between localization, molecular markers, and developmental origins using mouse models for Group 3 and 4 medulloblastomas.

*# 5 Regulation of Copper Homeostasis is Required for Streptococcus Pyogenes Survival*

**Tina Dao, Michael Johnson, Jason Rosch, Department of Infectious Diseases, St. Jude Children's Research Hospital**

**Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry**

Metals serve as cofactors of many crucial proteins in various cellular processes. Copper, in particular, is not only an essential trace element found in most eukaryotes and some prokaryotes, but it also possesses antimicrobial properties. The mammalian host exploits copper's antimicrobial properties to kill bacteria during the innate immune response. Thus, copper efflux mechanisms have been highly conserved in bacterial systems to export copper to minimize toxicity. Previous studies have shown that *Streptococcus pneumoniae* becomes increasingly susceptible to excess intracellular copper in the absence of the copper export gene CopA. Being from the same genus, *S. pneumoniae* and *Streptococcus pyogenes* share many similarities such as the ability to cause pneumonia, bacteremia, and lyse blood. Currently, there are no published studies on the role of the copper efflux pump and the mechanism of copper-mediated toxicity in *S. pyogenes*. In this study, we predicted the copper efflux pump based on homology to other CopA genes (CopA, SPY\_1715) in *S. pyogenes*, and made the corresponding mutation in the HSC5 strain by making an in-frame deletion. We then used several in vitro assays to examine this mutant for copper sensitivity. Based on our findings, we found that  $\Delta$ SPY\_1715 universally showed increased sensitivity to copper as compared to the wild type strain and thus can be labeled as the CopA gene.

*# 6 A Systematic Evaluation of an Auto Regressive Moving Average (ARMA) Model for Fat-water Quantification*

**Hannah Lin, Axel Krafft, Brian Taylor, Ralf Loeffler, Claudia Hillenbrand, Department of Radiological Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Ann Viano, Department of Physics**

Quantitative magnetic resonance (MR) imaging offers a non-invasive method to measure hepatic iron content. However, the presence of lipids in hepatic steatosis (fatty liver disease) confounds the MR signal. This study investigates the lipid contribution to the MRI signal. An autoregressive moving average (ARMA) analysis quantifies water and fat content in tissue by fitting lipid resonance peaks. The effectiveness of the ARMA technique was compared to MR signal magnitude fitting techniques for data from phantoms made with varying concentrations of fat. We compared 2-, 3-, and 4-peak ARMA models to 2-, 3-, and multi-peak magnitude fitting scenarios. Overall, fat fractions estimated through ARMA and magnitude fitting closely agree with the theoretical values at all but the lowest fat concentrations. The 2-peak ARMA model and magnitude fitting show nearly identical fat fractions, but both underestimate the fat fraction as they do not account for all lipid species. 3-peak ARMA fails for fat concentrations under 25% due to insufficient signal and requires iterative corrections. Our results show that ARMA can be used for simultaneous water and fat analysis. This will enable separation of signals due to fat and iron and therefore a better quantification of iron for patients at risk of steatosis.

*# 7 Clinical Pharmacogenetics Implementation Consortium: Translating Genetics into Personalized Care*

**Matthew Cannavo, Kelly Caudle, James Hoffman, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital**

**Faculty Sponsor: Kim Gerecke, Department of Psychology; Neuroscience**

Serious adverse drug reactions result in over 100,000 deaths each year, and genetic predisposition remains a major cause of these adverse events. Pharmacogenetics ties genetic variants to drug response, allowing clinicians to utilize a patient's genetic information when making therapeutic decisions. The Clinical Pharmacogenetics Implementation

Consortium (CPIC), a collaboration between PharmGKB and NIH's Pharmacogenomics Research Network, was established to provide standardized, freely available guidelines to aid in the adoption of pharmacogenetics into patient care. Consortium members make therapeutic recommendations based on extensive literature review, with standardized systems for grading evidence and strength of recommendations. This evidence is then translated into explicit guidelines for clinicians to understand and implement into care. Each guideline is written for a single drug or drug class/gene pair, utilizing a tiered scale for phenotypic classification of the genetic variation with each accompanied by dosing recommendations. Currently, 16 guidelines are completed or in process (<http://www.pharmgkb.org/page/cpicGeneDrugPairs>). CPIC guidelines are also written from the viewpoint that genetic tests are already in hand, making them instrumental in the shift towards preemptive genotyping away from the current, reactive standard. My involvement is to assist in summarizing of the evidence supporting pharmacogenetic dosing of ivacaftor in cystic fibrosis for use in a CPIC guideline.

**# 8 Parenting Stress in Long-Term Survivors of Childhood Acute Lymphoblastic Leukemia**

**Adele Malpert, Tara Brinkman, Kevin Krull, Department of Epidemiology and Cancer Control, St. Jude Children's Research Hospital.**

**Faculty Sponsor: Jenny Vaydich, Department of Psychology**

Acute lymphoblastic leukemia (ALL) is the most common form of childhood cancer. With cure rates exceeding 90%, there is a growing population of long-term survivors who are at-risk for treatment-related late effects including organ dysfunction, neurocognitive impairment, and emotional distress. These morbidities may be a source of stress for parents. While parenting stress at diagnosis and during treatment has been documented, few studies have assessed parent functioning in long-term survivors. This study examined the prevalence of stress in parents of long-term survivors of childhood ALL. Parents (79% mothers) of 169 childhood ALL survivors, treated at St. Jude Children's Research Hospital, completed measures of post-traumatic stress (PTS), psychological distress, and family environment. Survivors were, on average, 7.8 years post-diagnosis and 14.3 years of age at time of study. 7% of parents reported clinically significant symptoms of anxiety and 7% endorsed symptoms consistent with post-traumatic stress disorder. Nearly half of parents (48%) reported intrusive thoughts or re-experiencing symptoms related to their child's cancer. Parent PTS symptoms were correlated with family conflict ( $r=0.22$ ,  $p=0.007$ ), cohesion ( $r=-0.19$ ,  $p=0.017$ ) and independence ( $r=-0.25$ ,  $p=0.002$ ). These results suggest that further investigation of the association between late effects of childhood ALL and parent and family functioning is warranted.

## **Social Sciences**

**# 9 Tracking Hunnic Cultural Influences Through Cranial Deformation**

**Kelsey Wilson**

**Faculty Sponsor: Jeanne Lopiparo, Department of Anthropology and Sociology**

At the apex of their power, the Huns' cultural influences reached many parts of Europe that their armies had not, including the Roman city of Histria, located along Lake Sinoe near the Black Sea within the Roman Empire. Due to a lack of written accounts, a new approach must be developed to track the spread of the Huns' cultural influences that stretched past their empire. Through discoveries at Histria it is possible to apply cranial analysis demonstrating shared cultural practices indicative of wider networks. Excavations of Histrian burial sites revealed crania dating between 400 and 500 A.D. that exhibit cranial modification, a distinct Hunnic tradition. Analysis of the crania show evidence that the skulls had undergone artificial deformation due to circular bandages, which were placed around the heads at birth. These bandages resulted in the flattening of the frontal bone causing the skull to have a unique shape. This type of cultural modification seen in the Histrian skulls is consistent with that of the Huns who use deformation in order to symbolize domination. This study uses cranial deformation as a new line of evidence to explore and document the spread of Hunnic influences well beyond the boundaries of their empire.

**# 10 How Students Choose Leaders for their Organizations at Rhodes College**

**Olivia Menick, Monica Costello, Tess Fairbanks, and Samantha Hankins**

**Faculty Sponsor: Dee Birnbaum, Department of Commerce and Business**

The authors conducted a survey of students at Rhodes College in organizations including, but not limited to Honor Council, Greek Life, Varsity Sports, and A Capella groups to try to determine, when selecting a leader, what criteria students used. The authors expected selection criteria to follow Weber's three types of authority; traditional, legal-rational, and charismatic. Through a Q-sort, the authors discovered that, although many of the answers did fall

within the three categories, many answers did not. The implications of this are that criteria for leadership are probably far more complex than what Weber suggested.

**# 11 Internship Experience at the Memphis Child Advocacy Center**

**Allison Yu,**

**Faculty Sponsor: Anna Smith, Department of Political Science**

The Memphis Child Advocacy Center is a non-profit organization that serves the Shelby County area and provides services to children and their families to receive counseling, interviews, and a team review when an allegation of child sexual abuse or neglect has been made. The MCAC uses a team approach where they have been able to house personnel from the TN Department of Children's Services (DCS), Memphis Police Department, and the District Attorney General's Office all under one roof in a Victorian house on 1085 Poplar Avenue. The MCAC staff joins forces with those agencies to make up the Child Protection Investigation Team (CPIT) and work together to make sure their vision of a community "where children are safe, families are strong, and victims become children again" is possible. During the course of my internship at the MCAC, I have been able to partake in several projects and tasks that have bridged my classroom experiences to real-world experiences, such as helping with National Children's Alliance accreditation, compiling research on Tennessee state legislators, and connecting the MCAC and Rhodes College by providing students the opportunity to receive Stewards of Children prevention training.

**# 12 Narrative Coherence and Attention to a Landscape of Consciousness Predict Peer Adjustment in Middle Childhood** ◼

**Annika Wuerfel, Bhavna Kansal, Marsha Walton, Robert Cohen, Department of Psychology, University of Memphis**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Piaget emphasized the role of peer conflict in social and moral development in middle childhood, noting that resolution of inevitable clashes among age-mates promotes the development of perspective-taking skills, and sensitizes children to intentions and motives of self and other. Bruner proposed that the ability to participate in a shared narrative practice allows children to negotiate a world of shifting alliances that characterize middle childhood peer relations. The present research asks whether narrative coherence and attention to the landscape of consciousness predicts peer preference and peer adjustment in middle childhood. As part of a longitudinal study of peer relations, children attending a university-affiliated public school wrote narratives and filled out surveys and self-reports about their peer experiences. A series of cross-lagged correlations assessed the relationship between the narrative measures and peer adjustment in the following school year. Children who told coherent stories, and included landscape of consciousness, were less likely to be lonely and less likely to be described by peers as victims or aggressors in the next school year. These findings encourage us to believe that the development of narrative skills and the encouragement of a practice of story-sharing in elementary school may protect against peer victimization and may facilitate healthy peer relations.

**# 13 Predicting School Readiness with the Bracken School Readiness Assessment-3**

**Joseph Mroz, Joseph Barlia, and Morgan Scott**

**Faculty Sponsor: Janet Panter, Department of Psychology**

Kindergarten screening prior to school entry is common practice in most locations and helps school personnel determine a child is readiness for school (Panter, 2009). We administered the Bracken School Readiness Assessment-3 (BSRA-3) to approximately 64 students at Perea Preschool on four occasions: fall and spring of their 3-year-old year and again in their 4-year-old year. Perea Preschool, a ministry of the Church Health Center, provides children from low-income families with a high quality preschool experience. Using these data, we examined the students' basic concept acquisition, monitored their progress over time as it relates to school readiness and program efficacy (from fall of their 3-year-old year to spring of their 4-year-old year), and examined the reliability of the BSRA-3 across gender, age, and subtests. Given the historical success of Perea's curriculum, we expect to find high growth scores, which will indicate an effective preschool intervention that assists students in their academic development.

**# 14 Neighborhood Development & Social Media** ◼

**Andrew Kochanski**

**Faculty Sponsor: Elizabeth Thomas, Department of Psychology**

A couple weeks ago I helped launch Nextdoor in the Vollintine-Evergreen Neighborhood Association. Nextdoor is a private social networking site that is open exclusively to neighborhood residents. My project will serve to highlight

current benefits Nextdoor gives to the neighborhood as well as provide a loose action plan or future ideas that will help Nextdoor become more incorporated into the VECA community. First and foremost, Nextdoor provides a medium for instantaneous interaction between community members. Nextdoor can help organize neighborhood block events, update neighbors on crime reports, serve as a localized Craigslist, and integrate local businesses into the community. All of these functions will increase connectivity between community members resulting in a stronger, healthier neighborhood association. The poster itself will include screen shots and accompanied directions to provide a “How-to” guide for new Nextdoor users. I will also translate this into a small booklet to put in the VECA office.

**# 15 *Poverty and Livability in the Vollintine Evergreen Neighborhood* ■**

**Andrew D. Tait**

**Faculty Sponsor: R. Elizabeth Thomas, Department of Psychology**

The Vollintine Evergreen Neighborhood, located in North Memphis, has been touted by scholars and Memphians as one of the city’s most racially and socioeconomically diverse communities. However, despite the neighborhood’s historical roots and growing affluence, the many members of the community are isolated from viable resources (government services, fresh produce, affordable afterschool programs, etc.) that would improve the livability of the neighborhood. The research synthesizes GIS (Geographic Information Systems) mapping of the relationship between resource location and census tract income with an exploration of the neighborhood’s livability for community members working a minimum wage job. By locating existing resources for the neighborhood and collaborating with community leaders, I identify strengths and areas of improvement to the livability in Vollintine Evergreen. The final results of this project will be used to provide volunteers and employees at the Vollintine Evergreen Community Association (VECA) a resourceful guidebook to assist members of the neighborhood and suggest initiatives to prioritize in VECA’s future. This study represents research through an Urban Social Problems course, a GIS course, and a Plough Community Development Fellowship.

**# 16 *Evidence for binge eating disorder and obesity as distinct clinical entities with regard to cardiovascular and psychological responses to stress: preliminary findings.* ■**

**Sierra Gaffney, Kathryn Cyrus, and Rebecca Klatzkin**

**Faculty Sponsor: Rebecca Klatzkin, Department of Psychology**

As the obesity epidemic continues to grow, it becomes more imperative to determine the underlying mechanisms of obesity and its correlates. Binge eating disorder (BED) occurs predominantly in obese individuals, particularly women. Physiological stress dysregulation has been documented in both obesity and BED, and stress has been shown to be the most common trigger of binge eating. It has been postulated that in BED, stress dysregulation can be attributed to obesity rather than the disorder itself. However, recent studies show neuroendocrine and autonomic dysregulation in obese BED compared to obese non-BED women. The current study investigated cardiovascular stress reactivity in BED women and furthered previous work by including both obese and non-obese control groups and by using a valid and reliable mental stress task involving social-evaluative threat. Five obese women meeting DSM-IV-TR criteria for BED, 15 obese non-BED women, and 15 non-obese non-BED women were assessed for cardiovascular reactivity to, and recovery from, mental stress during the first seven days of the menstrual cycle. Cardiovascular factors of systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) as well as self-reported mood and anxiety were assessed at baseline, during the Trier Social Stress Test (TSST), and throughout 60 minutes of stress recovery. BED women showed greater baseline depression scores and perceived stress compared to obese and non-obese controls, and thus, these measures were included as covariates in the analyses. Repeated measures ANCOVAs with Time as the repeated factor showed a significant effect of Time for all cardiovascular measures ( $p < .05$ ), indicating that the TSST successfully elicited a stress response. Obese BED women showed an overall more negative mood compared to obese controls ( $p < .05$ ) as well as heightened SBP compared to both obese and non-obese controls ( $p < .01$ ). Time x Group effects were seen for anxiety ratings ( $p < .05$ ), DBP ( $p = .06$ ), and HR ( $p < .05$ ). Obese BED women displayed heightened DBP and HR compared to obese and non-obese controls and reported greater anxiety than obese controls only at baseline and stress recovery. These preliminary analyses indicate that stress dysregulation in BED is a function of the disorder, not obesity, given the differentiation in stress reactivity and recovery between BED women and both obese and non-obese controls. Ongoing research aims to further support BED and obesity as distinct clinical entities by investigating these effects in a larger sample and by including neuroendocrine measures of stress reactivity.

**# 17 *“She Said I’m not stopping till the whole 3rd grade know!”: Communication Awareness as a Predictor of Peer Relations***

**Elle Wiggins, Ellen Alpaugh, and Josie Kisalus**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Previous research has indicated that important developments in communication awareness occur during middle childhood. Our research seeks to discover if a relationship exists between these skills and the success children have in establishing positive peer relationships. Children's awareness of communication and perspective-taking abilities are demonstrated in their use of reported speech. Participants included 3rd, 4th, and 5th grade students attending a university-affiliated public elementary school. The children were given 30 minutes to write a personal narrative about a conflict they had with a peer. Additionally, each student was given a likeability rating by their peers that identified the number of friends each child had in their classroom. We coded for instances of direct, indirect, or mixed reported speech and determined whether the speech was attributed to the self, an adult, or another child. We anticipate that children who use direct quotation of their peers will have more positive peer relations, as it is an indicator of children's attentiveness to language. We believe that these specific variables indicate an increased ability to take on different perspectives, which would allow the child to negotiate peer conflicts and maintain friendships.

**# 18 *Implementing Film and Media in the Classroom***

**David Bergen**

**Faculty Sponsor: Jeanne Wilson, Department of Psychology; Education**

The current generation of middle and high school students is growing up in an increasing technological society. As film has shown to be psychologically capable of penetrating the human mind by communicating with its audience, filmmakers and scholars alike have begun to develop educational and analytical value to the medium. We now have the technology to use moving images to tell a story, convey themes, and cause discussion. For my study I entered two different schooling environments, one being a middle private school and the other being a 12th grade English classroom at a charter school, implementing the use of media literacy and film studies in order to broaden the students' understanding of certain skills. Throughout, I challenged the students, involving them in production assignments, written assignments, and discussion. Many students are not competent in their reading abilities by the time they enter high school, so there is no point in allowing their low self-efficacy to hold them back from the potential writing, analytical, and creative skills they may already have. The final step is to simply raise awareness of the academic value and importance of my study, and to encourage schools to offer more programs like this.

**# 19 *HOPE VI Employment***

**Aubrey Kearney, Andrew Tait, Katie McDougal, Rhodes College Urban Studies Program**

**Faculty Sponsor: Heather Jamerson, Department of Anthropology and Sociology**

Rhodes College was granted a contract with Memphis Housing Authority (MHA) to evaluate the Cleaborn Homes HOPE VI project in 2010. As a part of this ongoing contract, under the direction of principle investigator Dr. Heather Jamerson, our research sub-team will be specifically exploring the effectiveness of employment related case management services of Memphis-Hope. We will evaluate the success of these Community Supportive Services by interviewing former Cleaborn Homes residents with a focus on satisfaction of services received, the resulting outcomes in relation to said received or non-received services, and the responsiveness of Memphis-Hope to any specific, expressed interests in receiving employment-related services. This study will compare residents who have received employment-related services with those who have expressed interest in receiving but have yet to receive any employment-related services. Residents in each sample will be compared on the following three outcomes: employment status, type of employment and enrollment in or completion of employment related services such as job training or educational programs. The results of this research will be provided to relevant stakeholders with the goal of improving job related employment services and increasing employment rates among former Cleaborn Homes residents.

**# 20 *Preserving Oral History of VECA* ■**

**Sophie Osella**

**Faculty Sponsor: R. Elizabeth Thomas, Department of Psychology**

The Vollintine-Evergreen neighborhood, the location in which Rhodes College is situated, has roots back to the days of dairy farms and plantations. The area became increasingly populated with families and eventually became known as Vollintine-Evergreen, or VECA. The modern era of VECA (beginning in the 1980s) has seen a growth in schools, an increasing amount of businesses, and the dynamic power of a community association. At the center of the neighborhood, off of Jackson Avenue, one can find the Volintine-Evergreen Community Association and a group of individuals who are committed to making and maintaining positive changes in the neighborhood. While many

volunteers come and go, there are a few individuals who have been involved since the 1970s. It is necessary to capture the stories of individuals such as Dr. Mike Kirby and Mary Wilder so generations to come can understand the efforts made by these individuals to better VECA. I will be constructing and filming interviews with interesting and prominent figures in both the community association and the neighborhood. In the end, I hope to present these interviews in a visually creative manner which could potentially be used to show new neighbors or individuals interested in the history of the neighborhood.

**# 21** *“And now he knows what it feels like to get left out”*: Psychological Mindedness in Children’s Narratives about Aggression and Victimization

**Cuyler Hines, Abby May, Destiny Smith**

**Faculty Sponsor: Marsha Walton, Department of Psychology**

Narratives are a useful tool for gaining insight in the way children think about themselves, others and their environment. Children use narrative to express their psychological mindedness, or their understanding of the self and others’ thoughts and emotions, and to position themselves as an aggressor or victim. Our research will examine children’s narratives collected over a period of two years to understand how the children’s psychological mindedness relates to their levels of peer aggression and victimization. Participants of this study included one hundred and fifty children from 3rd-5th grade attending a university-affiliated public school. We asked children to write stories about a time in which they experienced conflict. We also had the children complete self-report and peer nomination surveys about social-emotional behavior and peer relationships. We coded the narratives for psychological mindedness which included the number of subject-predicate units in each story containing at least one report of the author’s or others’ thoughts, emotions, or psychological traits. These were counted separately for those attributed to the self, the other, or the collective ‘we’. We predict that results will show that high psychological mindedness helps children manage peer aggression and serves as a buffer against victimization.

### **Fine Arts**

**# 22** *Harp Ensemble: Harps from around the world*

**Annika Wuerfel, Maura Angel, Leérin Campbell, Piper Carroll, Kelly Dodson, Jillian LaBranch, Sidney Long, Charlie Sun, Eve Zheng**

**Faculty Sponsor: Gina Neupert, Department of Music**

The harp is a musical instrument that is played and enjoyed throughout the world. This semester, the Rhodes Harp Ensemble has been exploring and learning about harps played in Ireland, China, Africa, Greece, Israel, Brazil, and the United States. While the instrument may have similar qualities in all of these countries, the sound, design, and cultural significance vary from location to location. Because several of our Harp Ensemble members participate in and come from different cultures, we found it fitting to explore the cultural variations of the harp. The work of the Harp Ensemble has encouraged diversity and passion for learning this ancient instrument.

### **Humanities**

**# 23** *Deaf Family Literacy I: The Rise of Black ASL* ◼

**Mary Catherine Cadden**

**Faculty Sponsor: Lori Garner, Department of English**

As in all natural languages, variations exist within sign language based on gender, age, race, and countless other factors (Mulroney, 2010). The separation of black and white Sign Language began with the segregation of schooling systems, where students were completely isolated from one another, allowing for sign variations to arise (Woodward, 2012). Even after desegregation when whites and blacks began using the same signs at school, variations continued to develop in the home, especially where deaf parents were involved. Unlike white ASL, Black ASL typically involves larger hand gestures, more frequent use of two hands instead of one, and different sign placements. Until recently, little research has existed for Black ASL; however, the Black ASL Project, started at Gallaudet University in 2007, has sought to change the lens through which Black ASL is viewed. Through this new research initiative, researchers, funders, and signers alike have come together to legitimize Black ASL. Because of these collective efforts, Black ASL is gradually gaining recognition as a valid and important variation of ASL, solidifying the culture and the language in history and giving Black ASL the recognition and respect it deserves (The Black ASL Project).

**# 24 Deaf Literacy 2: ASL in Undergraduate Education** ■

**Chloé Smith**

**Faculty Sponsor: Lori Garner, Department of English**

As Sherman and Phyllis Wilcox have shown, “although ASL has a long and rich history in America, and scholarly research on ASL is in its fourth decade, ASL has been slow to garner any degree of status in the academic community” (Jacobowitz, 2005). However, ASL has now become the 5<sup>th</sup> most taught foreign language in United States undergraduate institutions, and student interest rose from 1,602 enrollments in 1990 to 11,420 in 1998 alone (Welles, 2004). Meanwhile, there remains the problem of ensuring continuation and expansion of programs already in place and building new programs with the debated status of ASL in academia (Jacobowitz, 2005). Research from the early 1990s till now shows the need for further understanding the status ASL holds in academia and how to further this status, ensuring the presence and effectiveness of ASL, as a language, at the undergraduate level (Cooper et al., 2008; Welles, 2004). With these goals in mind, this project explores ASL programs that flourish in undergraduate institutions with regards to their resources, infrastructure, and student interest. (Jacobowitz, 2005; Thoryk, 2010).

**# 25 Deaf Literacy 3: The Complex Issues Surrounding Cochlear Implants** ■

**Sierra Thompson**

**Faculty Sponsor: Lori Garner, Department of English**

Cochlear implants (surgically implanted electronic devices that provide deaf and hard-of-hearing individuals with a sense of sound) are now safely available to children as young as four months old (Hardonk et al., 2011). The advent of this new technology presents a unique ethical and practical decision for parents of young, deaf or hard-of-hearing children who are eligible for cochlear implantation (Hyde & Power, 2006). My research focuses on issues surrounding the decision-making process of implantation of pre-lingually deaf children, who rarely acquire the spoken language skills of hearing children even after extensive post-surgery language habilitation (Easterbrooks et al., 2000). The project raises important ethical questions regarding implantation: for instance, whether or not the surgery deprives the child of acceptance into the Deaf world or is even a form of eugenics (Lane & Grodin, 1997). My investigation includes viewpoints from a variety of perspectives—the Deaf and hearing communities, teachers, physicians, and implanted children. Hearing parents of deaf children in particular could benefit from understanding the Deaf perspective on cochlear implants so that they may make a more informed decision. However, this research area is important to everyone, since it demonstrates a much more complex view of the cochlear implant which is often seen by the hearing world as a panacea for deafness.

**# 26 Deaf Literacy 4: Intersectionality of Feminist Disability Theory and Deaf Theory** ■

**Xany Moore**

**Faculty Sponsor: Lori Garner, Department of English**

Even amongst those who deal primarily in social justice work, disability remains a minority identity that is often forgotten in the mix of gender, race, and class (Garland-Thomson 2005). Spring boarding from Judith Butler’s body theory, feminist disability studies investigates some of the ways in which mainstream culture oppresses bodies that are different (Samuels 2002), including the oppression of Deaf culture by a mainstream society that doesn’t always recognize that individuals identifying as Deaf (upper-case) share an identity beyond being deaf (lower-case). Rather than viewing deafness and Deaf culture in terms of “lacking,” feminist disability studies shows that common traits within a minority identity can lead to a strong sense of community (Shotwell 2005). As has been highlighted in the wealth of Deaf literature and scholarship, Deaf culture builds a stronger sense of community based on a minority identity (Smith and Bienvu 2007). Using feminist disability theory and Deaf theory in conjunction, we can shift the perspective that privileged individuals have of Deaf individuals and their culture, thus further opening disability studies to political consciousness and emphasizing that being physically deaf does not have to be seen as a deficit (Lane 2002).

**# 27 Applying Aristotle’s Theory of Rhetoric: Mapping Out of the Melian Dialogue**

**Robert DeBusk**

**Faculty Sponsor: Kenny Morrell, Department of Greek and Roman Studies**

Aristotle’s Rhetoric gives students a path to break down speeches into basic elements like the enthymeme, which is an informally stated syllogism that has an inferred clause or conclusion that is considered true. This path has been applied to the Melian Dialogue to figure out which assumptions were used by both the Athenians and the Melians to come to the historical conclusion of the Melians rejecting the Athenians’ offer of “peace” despite the overwhelming military forces of the Athenians. The significance of this project with regards to modern day is that this pathway of

rhetorical analysis can be put to any modern speech as well as ancient speech, calculating “logical” versus “illogical” pathways with regards to each side while bypassing bias. Therefore while this paper is designed to help others analyze the Melian Dialogue directly, it is also designed to aid in one’s thought process when objectively looking at any speech.

**# 28 *Abriendo Puertas: Latino Student Success***

**Maria Raffanti**

**Faculty Sponsor: Elizabeth Pettinaroli, Department of Modern Languages and Literatures**

Latinos are the fastest sector of student population growth in the United States. In order to build stronger communities and achieve success, it is imperative to increase high education attainment of Latino students. Latino Memphis is a nonprofit organization dedicated to serving the Hispanic community in Memphis. Recently, Latino Memphis became a part of a collaborative action committee dedicated to advancing Latino student success. Their latest initiative, Abriendo Puertas [Opening Doors], is a mentoring program aimed at increasing the number of Latino students in post-secondary education. Abriendo Puertas has chosen to work with Latino students at Kingsbury High School. Many of these students face considerable obstacles including undocumented immigration status and financial difficulties. Nonetheless, these students are dedicated to achieving success through higher education. Working with Abriendo Puertas, I had the unique opportunity to see how a nonprofit program is able to address the needs of a particular community. The program has organized College Fairs, financial aid informational meetings, and ACT tutoring sessions. Current efforts to establish a link between Rhodes student volunteers and Kingsbury High students through ACT preparation courses is ongoing. The establishment of this collaboration with Kingsbury High will allow future Rhodes students to participate in a meaningful program addressing the needs of promising Latino students.

**International Programs**

**# 29 *Study Abroad in Denmark* ☐**

**Jiawen Li**

**Faculty Sponsor: Scott Garner, Department of Director of Fellowships**

In this poster, I intend to present my learning and observations during my study abroad experiences in Copenhagen. I would present my main academic argument, which suggests that what makes Danish education unique is its value of Danish traditions. I would also introduce some key components of Danish education such as the concept of good childhood and various types of schools I have observed in the trip. In addition to the academic parts, I would also present my living experiences in Denmark—interesting stories, cultural anecdotes, etc.

**External Programs**

**# 30 *Memphis City Schools and Charter Schools: a study on school systems in the Vollintine Evergreen Community***

☐

**Elise Hastings**

**Faculty Sponsor: Travis Lux, Post Grad Fellow**

The Vollintine Evergreen neighborhood has experienced many of the same issues faced by urban neighborhoods across the country, such as fluctuating poverty levels, resources leaving the community, and an increase of dilapidated areas. The schools in the area have correspondingly suffered, and thus they have undergone a series of structural changes in attempts to bolster student achievement. The neighborhood encompasses 3 schools in its borders, two Memphis City Schools, Vollentine Elementary and Snowden Elementary, and Cypress Middle School, a Memphis City School that is currently awaiting transition into charter school. This study represents research on the structures of these three schools, and the implications the Cypress school merger has for the Vollintine Evergreen community. By using Vollentine Elementary, Snowden, and Cypress as a case study, this study analyzes the distinctions between Charter schools and Memphis city schools, and creates a guide for parents in the Vollintine Evergreen neighborhood to understand and be involved in their children’s education.

**Natural Sciences**

**# 31 *Behavioral Observations of Social Interactions Between Nile Hippopotamuses (*Hippopotamus amphibious*) in Captivity***

**Madison Marullo, Roberta Moore**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Although female hippopotamuses (*Hippopotamus amphibius*) are known to form companionships in the wild, little is known about their social behavior. There were two hippopotamuses at the Memphis Zoo during the course of our observational research: Julie (51 years old) and her daughter Splish (24 years old). The Memphis Zoo is planning to construct a new hippopotamus exhibit (expected completion date in spring 2015), where additional hippopotamuses will be housed. We analyzed the behavioral interactions between the two female hippopotamuses from August 2012 to April 2013 at the Memphis Zoo in order to establish a baseline of behavioral interactions as preliminary data prior to the completion of the new exhibit. We collected behavioral data in one-hour shifts for a total of nine hours a week using scan sampling at two-minute intervals in order to determine an activity budget. We plan to compare these data to behavioral data collected in the future in order to determine the social interactions when a female hippopotamus is introduced to new hippopotamuses in the new exhibit.

**# 32 Characterizing the molecular mechanism of cytoskeleton rearrangement in red blood cells triggered by the *Plasmodium falciparum* protein EBA-175**

**Christopher Perkins**

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

Malaria is a human disease that kills one million people every year and half of the world's population is at risk of contracting the disease. *Plasmodium* spp. is the causal agent of malaria and while in the human host it will invade red blood cells (RBCs). Little is known about the molecular mechanism of RBC invasion by the parasite. To characterize the interactions between RBCs and the parasite, we use Erythrocyte Binding Antigen-175 (EBA-175), a sialic-acid dependent surface protein of the *P. falciparum*. We expressed and purified wild-type EBA-175 and mutant EBA-175 (R422E). The mutation at arginine 422 to glutamic acid is believed to interfere with the binding of EBA-175 to the sialic moieties of glycophorin A. The recombinant proteins were used in a binding assay with RBCs. Changes in phosphorylation state of RBC cytoskeletal proteins were monitored by western blot and anti-phospho Serine/Threonine antibodies. To tie those changes to cytoskeletal rearrangements we followed the location of the cytoskeletal protein Ankyrin by confocal microscopy. Understanding the molecular mechanism of red blood cell invasion by the *Plasmodium* parasite can lead to the identification of potential targets for drug therapy and can improve our current ability to control this disease.

**# 33 Loggerhead Shrikes (*Lanius ludovicianus*): GIS Analysis of Population Decline Across Arkansas**

**Alix Matthews**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

The Loggerhead Shrike (*Lanius ludovicianus*) is a North American songbird commonly noted for the way it kills its prey—it uses its hooked beak to kill and impale its prey on thorns or barbed wire. This bird significantly declined throughout the late 20th century, primarily as a result of habitat loss. *L. ludovicianus* prefers grassland habitats with shrubs and low trees for nesting and perching. This habitat is threatened as grasslands are increasingly being converted into row crops and urban areas. Using ArcGIS 10.1 software, I analyzed the population trends of *L. ludovicianus* from 1992-2006 using the National Audubon Society's Christmas Bird Count data. I examined these population trends as a function of land use/land cover change in 5 sites in Arkansas, which cover the northwestern, northeastern, central, southeastern, and southwestern areas of the state. Further investigation may include grassland habitat restoration, habitat or species conservation, and ecological impacts.

**# 34 Morphological and molecular characterization of *Hepatozoon* spp. from naturally infected snakes in Overton Park**

**Alex Yu, Adiha Khan, Emily Hayward**

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

Hepatozoon are obligate parasites found in the blood of vertebrates, particularly amphibians and reptiles. While many species of this genus have been characterized, some have not been identified. One such parasite was previously found in snakes living in Overton Park (Memphis, TN) but the species has yet to be determined. The goal of this project is to characterize this unidentified species of *Hepatozoon* sp. through morphological and molecular analysis. Using existing micrographs of infected blood smears, the length, width, area, ratio, and position of each gamont nuclei was measured. These characteristics were then compared to known literature values. Following statistical analysis of comparisons, it was found that our sample shared a greater homology with African rather than American *Hepatozoon* sp. We then proceeded to sub-clone multiple parasites from collected blood samples and sequenced the 18S gene. Sequence alignment with deposited sequences in GenBank confirmed the genus but yielded

no match for species. A phylogenetic analysis of the DNA sequences will be constructed to further characterize this unknown Hepatozoon species. If the species is found to be closely related to the African parasite, this could indicate that an exotic species was introduced through an unknown mechanism to Overton Park.

**# 35** *The Prevalence of Gambierdiscus sp. in the Caribbean Sea*

**Patricia Pyda, Keara Fenzel, Hamilton College**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Ciguatera Fish Poisoning (CFP) is a foodborne illness caused by the consumption of certain contaminated reef fish. Symptoms affect the gastrointestinal and neurological systems and can persist for weeks or years. The ciguatoxin, produced by the benthic dinoflagellate *Gambierdiscus sp.*, bioaccumulates in the adipose tissue of carnivorous fish. The toxin is colorless, odorless, tasteless, and cannot be killed by exposure to extreme temperatures. The purpose of this study was to evaluate whether environmental factors, specifically temperature, salinity, and the concentration of nitrates (NO<sub>3</sub><sup>-</sup>) and phosphates (PO<sub>4</sub><sup>3-</sup>) in water have an impact on *Gambierdiscus sp.* growth and distribution. Four live samples of *Dictyota* algae were collected from three locations in the Caribbean Sea. The ciguatoxins' abundance was assessed by filtering and counting each sample. Temperature and salinity were measured using the YSI meter while NO<sub>3</sub><sup>-</sup> and PO<sub>4</sub><sup>3-</sup> concentrations were determined using spectrophotometry. Salinity and NO<sub>3</sub><sup>-</sup> were the only factors to have significant relationships with the *Gambierdiscus sp.* concentrations. This study serves to contribute to a greater data set in hopes of understanding the ciguatoxins' sporadic propagation in tropical and subtropical waters, which may ultimately affect reef and public health, as well as fishing economies.

**# 36** *Synthesis of Natural Substrate Analogues to Probe the Active Site of LpxC in Gram-negative Bacteria*

**Christopher Grubb, Sarah Malkowski**

**Faculty Sponsor: Laryn Peterson, Department of Chemistry**

With the rise of nosocomial infections, it is becoming increasingly more important to discover new methods for combating bacterial infections, especially those caused by Gram-negative bacteria. The viability and pathogenicity of Gram-negative bacteria depends on lipid A, a component of lipopolysaccharide found in the outer membrane. Lipid A is synthesized by a biosynthetic pathway, where LpxC catalyzes the first committed step. When LpxC is inhibited, lipid A cannot be produced; this results in a dysfunctional outer membrane that reduces bacteria survival and virulence. LpxC has been crystallized, providing substantial information about the active site residues and key interactions. In this work, analogues of the natural substrate have been designed and synthesized to further investigate the active site of LpxC. Like the natural substrate, these analogues contain a zinc binding motif, a hydrophobic moiety and a nucleoside. The synthesis of these molecules will be discussed.

**# 37** *MP2 and DFT analysis of the ligand selectivity of two sulfotransferase enzymes* ■

**Diana Bigler, Hallie Weems**

**Faculty Sponsor: Mauricio Cafiero, Department of Chemistry**

We have studied the substrate selectivity of several sulfotransferase enzymes (SULT1A1 and SULT1A3) by identifying important protein-ligand interactions in the active-sites 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 SULTs 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\*. Optimizations were performed to allow flexibility of the amino-acid residue side-chains in the active-site and interaction energies were calculated for these complexes as well. Differences in ligand binding between the two SULT enzymes suggest a preliminary pharmacophore model.

**# 38** *Modeling the Seasonality of Influenza Outbreaks in the United States*

**Meagan Mansfield**

**Faculty Sponsor: Erin Bodine, Department of Mathematics and Computer Science**

The outbreak of Influenza in the United States fluctuates according to the seasons, and mainly occurs in the winter due to a higher ratio of human-to-human contact rate, drier air, and colder temperatures with relatively low humidity. We use the SIR model to show the outbreak according to the different seasons, in order to compare the results and see in which season, the outbreak of Influenza is more likely.

**# 39** *Avian Health and Parasite Incidence in an Urbanized Landscape*

**Ashlyn Cahill, Matthew Grisham, Laura Luque de Johnson**

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

Urban environments are increasingly more common than natural habitats. Parasites have complex life cycles that can be disrupted by urbanization. In this study we look at the effects of urbanization on avian parasites and the effects to avian health. We focus our efforts on three genera of blood parasites; Haemoproteus, Plasmodium, and Leucocytozoons that infect avian hosts. Blood samples were collected from various local bird species. These samples were then analyzed by using both microscopy and molecular assays. Images of blood smears were captured via light microscopy and scanned for the presence of parasites. Corresponding samples were then assayed using DNA extraction and amplification of the mitochondrial cytochrome B gene via a nested PCR to identify the parasite's species. Together, these techniques will evaluate the presence or absence of parasites within the local avian population. Analyzing parasitic episodes and assessing their impact on local avian species would help understand how urbanization is affecting avian health.

**# 40 *Development of Religious Congregations in Manhattan Over 100 Years***

**Sherrie Lemons, Evan Clingan**

**Faculty Sponsor: Sarah Boyle, Department of Biology**

Our project shows the establishment of religious congregations over a century within Manhattan through plotted map points. We examined the number of different religious initiations on the island of Manhattan since 1910. We created six maps total, showing the expansion of religious congregations in 20-year segments: 1910, 1930, 1950, 1970, 1990, and 2010. The maps illustrate the growing number of places of worship as well as the changes in diversity, such as Catholic cathedrals, Muslim mosques, Jewish synagogues, Buddhist and Hindu temples. Different genres of religious buildings were georeferenced on maps of Manhattan consistent with the time frame that we studied. Finally, we conducted density analysis of the congregations and compared these results with populations of ethnic groups in Manhattan. We hope to show a consistent growth in the variety of religious structures in the city over the past century. This project allows us to show how our Religious Studies majors are applicable to GIS and vice-versa.

**# 41 *Modification in the genome of Aspergillus nidulans and its effect on localization of PKC to hyphal tips and septa during the development of the organism***

**Justin Shapiro, Claire Beldove, Rhodes College**

**Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry**

The cell wall is an essential organelle for growth and metabolism of fungi. Absence of a cell wall in mammalian cells makes it a good target for anti-fungal treatments. Understanding the processes involved in cell wall development is the foundation for developing such treatments. A number of proteins have been identified as being integral to the assembly of cell wall material in the fungus *Aspergillus nidulans*. One of particular interest in protein kinase C (PKC), a serine/threonine kinase. The *A. nidulans* homologue of PKC (PkcA) localizes to growing hyphal tips and septa, both sites of cell wall construction. This suggests that PkcA plays a role in manufacturing cell wall material in the developing organism.

**# 42 *Experimental Treatment for Parkinson's Disease Using GM-1 Ganglioside***

**Michael Ascuitto, Larryn Peterson, Rhodes College**

**Faculty Sponsor: Larryn Peterson, Department of Chemistry**

Repeated, improperly treated concussions potentially increase the risk of developing Parkinson's Disease (PD) in early life. PD is characterized by misfolded alpha synuclein proteins to form Lewy bodies. These Lewy bodies create superoxide radicals in the substantia nigra that lead to the destruction of the brain, exemplified by the progression of PD symptoms. The current and only treatment for PD is L-dopa, an intermediate in the biosynthesis of dopamine. However, L-dopa is not an effective long-term treatment for PD because the body builds a tolerance for the drug. To investigate potential long-term therapies, PD symptoms are recreated by intoxicating animals with 1-methyl-4-phenyl 1,2,3,6 tetrahydropyridine (MPTP) and experimentally treating them with GM-1 Ganglioside. GM-1 Ganglioside, naturally found in the human body, is a polysaccharide with a long hydrocarbon tail that is used for encapsulating nerve cells. Thus, the goal is to use synthetic GM-1 Ganglioside as a neuro-protecting agent that encapsulates the dopaminergic neurons and protects them from MPTP, and potentially Lewy body, destruction. The potential of GM-1 Ganglioside as a therapy for the new generations of athletes being diagnosed with PD at an early age will be discussed.

**# 43** *A Model Representing the Changing Viewpoints of the US Population on Same –Sex Marriage in terms of Political Affiliations*

**Rachael Ward, Elysia Hassen, Nathan Berry**

**Faculty Sponsor: Erin Bodine, Department of Mathematics and Computer Science**

Same-sex marriage has been a prevalent topic in media sources and a highly debated topic in politics in the United States. Due to this topic becoming more relevant in the media and politics, we have developed a mathematical model and run numerical simulations which allow us to estimate the general trend of same-sex marriage acceptance or opposition over time within the Democratic and Republic parties and among independents. We observe specific components of the media's influence on political stances. In observing alternating opinions towards same-sex marriage, we predict the general direction in which the dynamics of these opinions are headed.

**# 44** *An ultrasonic backscatter difference technique for detecting osteoporosis*

**Mark E. Sellers, P. Luke Spinolo, Joseph A. McPherson, Morgan R. Smathers, Brent K. Hoffmeister, Rhodes College**

**Faculty Sponsor: Brent Hoffmeister, Department of Physics**

Ultrasonic backscatter techniques may offer a useful approach for detecting changes in cancellous bone caused by osteoporosis and other diseases. 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 will cause cancellous bone to lose structural integrity, which leads to an increased chance 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 these microstructures in cancellous bone and reflect back to the transducer. The goal of this study was to investigate the utility of a backscatter difference technique for bone assessment. Measurements were performed on 35 cube shaped specimens of human cancellous bone using a 5MHz broadband transducer. The backscatter difference spectrum  $D(f)$  was obtained by subtracting power spectra (in dB) from two different portions of the same backscatter signal. The frequency averaged mean of  $D(f)$  demonstrated good correlations with density ( $R=0.88-0.90$ ). These results suggest that parameters based on the frequency averaged mean of the backscatter difference spectrum may be useful for bone assessment purposes.

**# 45** *Finding the Resistance of Strings and Fibers using the Faraday Ice Pail*

**Zain Kinnare, Tyler Andrews, Cameron Thurston, Brent Hoffmeister, Shubho Banerjee,**

**Faculty Sponsor: Brent Hoffmeister, Department of Physics**

Many materials such as polymer fibers have ultra-high resistances. We are developing a system to measure such ultra-high resistances. In our system, a charged metal sphere is suspended by a fiber in a Faraday Ice Pail apparatus connected to a instructional-grade electrometer. Data are collected as the sphere discharges through the fiber to ground over a period of several seconds to determine the RC time constant. The resistance  $R$  of the fiber can be determined if the capacitance  $C$  of the system is known. Preliminary data suggest that the system can measure resistances greater than 1000 teraohms.

**# 46** *Optimizing an ultrasonic backscatter technique for measuring bone density*

**Morgan Smathers, Joseph McPherson**

**Faculty Sponsor: Brent Hoffmeister, Department of Physics**

Osteoporosis affects 10 million Americans. Our study seeks to develop a method for measuring bone density using ultrasonic backscatter. Ultrasonic backscatter occurs when ultrasonic pulses interact with normally porous bone tissue called cancellous bone. Cancellous bone loses density and increases porosity as osteoporosis progresses. We hypothesize that ultrasonic backscatter is sensitive to these changes in bone density. Backscatter signals were acquired from 35 cube-shaped specimens of bone prepared from 5 human femurs and one bovine femur. The signals were analyzed to determine a parameter called apparent integrated backscatter (AIB). AIB represents the frequency averaged backscatter power in a portion of the signal chosen by the user. The goal of this study was to determine which portion of the signal produces the best correlation of AIB with bone density. We found that AIB correlated negatively with density and that the correlation improved as later portions of the signal were chosen for analysis. We conclude that AIB can detect density changes in bone and that the sensitivity of AIB to density depends on the portion of the signal chosen for analysis.

**Biology II Laboratories**

**# 47** *Does Agonistic Behavior of Male Crayfish Increase in the Presence of a Female Crayfish?*

**Rachael Pewitt, Lauren Smith**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 48** *Does Stomatal Density Differ Between the Adaxial Side of Leaves On Top of a Bush and the Adaxial Side of Leaves on the Bottom of a Bush?*

**Connor Schratz, Ahmun Zafar, Lexi Perkins, Anna Stratton-Brook**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 49** *Do Crickets Show a Preference for Darker Environments?*

**Doug Fetterman, Emily Hayward, Radhika Puri, Jessica Ramey**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 50** *Home Field Advantage: Do Crayfish Become More Aggressive When Accustomed to Their Environment?*

**Alex Hooven, Kyle Jenkins, Katie Lutat, Mike Stierer**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 51** *Crawfish Preference between Sheltered and Exposed Environments*

**Chloe Meriwether, Kate Morrison, Will Murphy, Will Porter**

**Faculty Sponsor: Carolyn Jaslow, Department of Biology**

**# 52** *Does Salt Affect Duckweed Growth?*

**Brian Lenny, Rosh Rao, Cailey Wagner, John Coleman**

**Faculty Sponsor: Terry Hill, Department of Biology**

**# 53** *Does Temperature Affect the Mating Behavior of Crickets?*

**Megan Denny, Annie Hohlt, Katie Jaffe, Mallory Perry, Hayden Schill**

**Faculty Sponsor: Terry Hill, Department of Biology**

**# 54** *Will Duckweed Grown in Various NaCl Concentrations Show Effects in Stomata Aperture?*

**Maggie Jones, Corrie Moore, Michael Schoeller, Ashley Truong**

**Faculty Sponsor: Terry Hill, Department of Biology**

**# 55** *How Tolerant is Duckweed to Varying pH Levels in Water?*

**Alexandra Lasko, Ainsley Pittman, Allie Zeidan, Juhi Srivastava**

**Faculty Sponsor: Terry Hill, Department of Biology**

**# 56** *Is Cricket Chirping Affected by Temperature?*

**Martha Abbott, Connor Cook, Noor Eltayech, Andres Miller, Leah Wisniewski**

**Faculty Sponsor: Terry Hill, Department of Biology**

**# 57** *The Effect of Spatial Limitations on Crawfish Aggression*

**Judith Denham, Cydney Johnson, Brandon Smith, Caleb Herndon**

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

**# 58** *Crayfish Male Dominance Relation to Mating*

**Allison Bowen, Samory Diaby, Ross Nosaville**

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

**# 59** *Testing Sucrose Concentration Preference in *Pieris rapae**

**Mitch Trychta, Arthur Willis, Rachel Detamore, Madeline Plaster, Tony Perez**

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

**# 60** *The Effects of Pregnancy on Aggression in Female Crayfish*

**Sophie Costa, Jamie Austin, Patrick Scoggins, Oliver Davidson**

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

# 61 *The Effect of Light on Cricket (Acheta domesticus) Choice of Environment*

**Lauren Edmond, Blair Drum, Luke Newman, Charlease Cannon**

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

# 62 *Variance of Stomatal Densities of Inner vs. Outer Leaves in Varying Plants*

**Samantah Stepp, Kesley Frix, Daniella Plata**

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

# 63 *Crayfish Preference of Open Water to an Enclosed Habitat*

**Shauni Cowan, Charles Mansour, Helen Matsumoto**

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

# 64 *The Effect of Green Algae Presence on Lemna minor Growth*

**Jacob Hartline, Sarah Kim, Lauren Ulrich, Samantha Sefton**

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

# 65 *The Effects of Pregnancy on Aggression in Female Crayfish*

**Bailey Anderson, Travis Allen, Treston Norphlet, Chandler Kuhlman**

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

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