



UNDERGRADUATE RESEARCH *and* CREATIVE ACTIVITY SYMPOSIUM 2010



APRIL 30, 2010



URCAS 2010 - Schedule of Events (last names of presenters shown in parentheses for each oral session)

Location\Time	11:00	11:30	noon	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00
Fine Arts	Hassell 100	Societies & the Arts (Turner, Shedden, Baker, McCune, Holland, K. Miller)											
	Clough 417	Film Images (Dove, Smith) (11:00-11:40) Influence to Imagery (Seng, Ruiz, Bryant, Exner, Polovich, Ranson, Smith) (1:40-4:00)											
Humanities	Kennedy 205	Philosophy (Barrilleaux, Harris, Gysin, Kulkarni & Martin)	Religious Studies & Philosophy (Gregory, Sandifer, Johnson, Clapp)	Greek and Roman Studies and History (Dove, Pevy, Rieke, Gaudioso)									
	Kennedy 208	History (Garris, Gregory, Carlson, Fox)	English: Philology (Lawnin, Iwaskiewicz, Johnson, Chambers)	English and Gender & Sexuality Studies (A. Miller, Yackulics, Jones, Black, Mansfield)									
	Frazier-Jelke C	Interdisciplinary Humanities: Searching for Values (Thompson, Joyce, Groves, Brownfield)	Interdisciplinary Humanities: What is the Search Program really good for? (Lux, Kala, Zou)	Interdisciplinary Humanities: The Search for Individual Meaning (Antaya, Beasley, Carroll, Lang)	French and Francophone Studies (Taylor, Vierling, Eskew)								
	Frazier-Jelke A	"On the Line" - film presentation (Garris, Ball, Blake, Compton, Cullen, Hornaday, Maples, Paige, Smoot)											
Natural Sciences	Frazier-Jelke A	St. Jude Summer Plus (Tong, Eberly, Chiang, Chan)		Quantitative and Computational Science (Elfrink, Carroll, Sliger, Carter, Hoffo, Price)									
	Frazier-Jelke B	Conservation & the Environment (Lowery, Vandewalle, Eastlack, Goss, Cassel, Graham)		Genetics, Biochemistry & Molecular Biology (Copeland, Musgrove, Cartagena, Ward)									
Social Sciences	Buckman 214	Ethnography at Home (Gray, Pool, Robinon, Sanford, Bishop, Douglas, Wolfe, Swiger, Ryan, Levy)											
	Buckman 212	Anthropology & Sociology Research (Hammond, Campbell, Martin, Venezia, Bombardi-Mount)	Anthropology & Sociology Research (Chaisson, Brodziak, Sella, McCall, Fifer, Wheelwright, Ellison)										
	Buckman 110	Research in the Social Sciences (Fitzgerald, Eskew, Yackulics, Zanca, Fincher)	Research in Economics (Pellissier, Clarin, Orgeron, Morehead, Marksteiner, Eberle, Spirrison)	Buckman Scholars (DeLozier, Martin)									
All Divisions	Multisports forum	Poster Session I & Lunch Reception (fine arts, social sciences, community, environmental, GIS, St. Jude Summer Plus)		Poster Session II & Concluding Reception (St. Jude Summer Plus, biology, biochemistry & molecular biology, chemistry, computer science, neuroscience, physics)									

Events & Activities

April 29

3:30pm- Music: The Gladys Cauthen Competition Finals: Nicole Baker, flute; Tyler Turner, piano; Erinn Ogburn, piano (Tuthill Performance Hall)

April 30

9:00- Hardie Auditorium: Awards Convocation

URCAS Sessions

11:00am-12:15pm: Oral Sessions (varying locations- see schedule)

11:00am-1:00pm: Poster Session I & Lunch Reception (multisports forum)

1:00-4:00pm: Oral Sessions (varying locations- see schedule)

4:00-5:30pm: Poster Session II & Concluding Reception (multisports forum)

4:00-5:30pm: “On the Line” Student Film Presentation (Frazier Jelke A)

7:30pm- Art 166: Documentary Film Making Screening (Amphitheatre; rain location Frazier Jelke)

2010 URCAS Planning Committee

**Lee Boulie
Prof. Sarah Boyle
Prof. Mauricio Cafiero
Prof. Sarah Estelle
Prof. Mistie Germek
Prof. Courtenay Harter
Prof. Jennifer Houghton
Prof. Michael Kirby
Prof. Elizabeth Lucia**

**Prof. Bernadette McNary-Zak
Stephanie Milazzo ‘12
Robert Seals
Karen Thomas
Prof. Katie White
Prof. Chris Wetzel
Anne Wilson ‘12
Prof. Ann Viano, chair**

This event is made possible through the generous support of the Robert and Ruby Priddy Charitable Trust of Wichita Falls, TX.

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FINE ARTS ORAL SESSIONS

Film Images

417 Clough, 11:00-11:40am

Session Chair: Bailey Romano

11:00

Inspiring Creativity through Community Outreach: Photography Club at The Neighborhood School

Allison Dove, Shardé Chapman

Faculty Sponsor: Liz Daggett, Department of Art

The Neighborhood School is an elementary through middle school that serves students that are determined to be "the most likely to drop out of high school" in the Memphis area. It is located in the very impoverished Binghampton neighborhood. In order to bring a creative outlet to the underserved and at-risk students of TNS, CODA provided funding for an afterschool photography club where a group of students learned about photography, took photos on their own, and ultimately had an art show where they could invite family and friends to view the students' artwork. The idea for the program was to provide an opportunity for students to begin thinking creatively in general and also allow them to see that they can find creativity at home as they take photos in their homes and around their neighborhood. Otherwise for these students, this opportunity would not otherwise exist.

11:20

The Ugly One

Pieter Smith

Faculty Sponsor: Julia Ewing, Department of Theater

Have you ever noticed something so beautiful that your immediate desire is to destroy it? If so, why do we desire to destroy beauty? Can beauty become just as, or more, beautiful after it is destroyed? These are several questions that I explore in a short film entitled "The Ugly One."

Society & the Arts

100 Hassell, 1:00-3:00pm

Session Chair: Rebecca Rieger

1:00

The Importance of the Chorus in Ancient Greece

Tyler Turner

Faculty Sponsor: Mona Kreitner, Department of Music

This paper considers the importance of the chorus in society during the height of the Athenian empire. It examines the current musicological opinion towards ensemble singing in ancient Athens while proposing that this opinion is incomplete based on the evidence at our disposal. The sources used to support the paper include oratories that speak to the political and educational nature of the Athenian chorus as well as sources from distinguished Greek and Roman studies scholars. Additionally, current musicological research on the music of ancient Greece as well as Greek dramas from the time period will be examined. The case argued is that Greek choruses were a fundamental part of Athenian life in the 4th and 5th centuries BCE existing to provide education, competition, civil service, and entertainment. Much of the current musicological and philosophical research on this topic is in conflict; thus, this paper will explicate these differing views and provide information on the true importance of choral performance in ancient Athens.

1:20

Giorgione's Portrait of a Young Woman (Laura) as Lucretia

Brittney Shedden

Faculty Sponsor: Victor Coonin, Department of Art

When investigating early portraiture in Venice during the sixteenth century, one is hard pressed to concede that women portraiture in the city was nearly non-existent. There is one case though, that began an ambiguous standard for women portraiture for the rest of Venetian Renaissance art –Giorgione's Portrait of a Young Woman known as the Laura. The identity crisis of the Laura by Giorgione has been a long established controversy. Many determine the figure in the painting to be the poet Petrarch's lover Laura. Otherwise, scholars distinguish her as a Venetian courtesan or wife. Conversely, I claim to identify Laura as an allegory of Lucretia; a Roman legendary figure who maintains her chastity by committing suicide after she is raped by the king of Rome's son, Sextus Tarquinius. Historically, her death liberates Rome from tyranny, establishing a Republic by the people. By eliminating other skeptical claims to the identity of the Portrait of a Young Woman analytically, investigating other Italian Renaissance paintings of this same type of figure, and attributing certain aspects of the painting to the legend of Lucretia, one can come to distinguish her as Venice's Lucretia; a symbol of liberty for a distinct Italian society during Renaissance times.

1:40

Presbyterian Hymnody Since the Scottish Reformation

Nicole Baker

Faculty Sponsor: Mona Kreitner, Department of Music

My paper investigates the history of the Presbyterian Church at the time of the Scottish Reformation, exploring both religious and historical sources. Through this historical research the causes of the reformation and its resulting theologies and corresponding musical considerations are determined. Furthermore, I look into the movement of Presbyterianism from post-reformation Scotland to the United States. Once in North America, these theological ideas and concepts of musical practice continued to be shaped by ever-changing social factors. I am interested in what is being sung, by whom, and for what theological purpose. Secondly, I examine published hymnals and songbooks. The focus of this study is to determine how the influences of theology and social factors manifest themselves in the music and text of hymns. Moreover, I consider how these hymns may have been sung and used in the context of a worship service from the time of their publication to today. More generally, I map out the progression of various editions and how they correlate to the major theological and social issues of their time.

2:00

The Ideal in Italian Renaissance Family Portraiture

Melanie McCune

Faculty Sponsor: Victor Coonin, Department of Art

A form of Italian Renaissance portraiture that has been given less attention by art historians is that of the family. However, the family unit in sixteenth century Italy was vital as a social and political force. Therefore, one can surmise that portraits of such powerful groups carried planned compositions and intentional meanings. By studying portrait groups involving one parent and their children, a trend emerges which reflects the relationship dynamics in wealthy, traditional Renaissance families. In the fifteenth and sixteenth centuries, the father continued to provide for the family and deal with societal and political aspects as head of the household. Whereas the mother remained in more of a domestic role in which her responsibilities were raising the children and managing the daily duties of the home. By looking at a series of family portraits in which a single parent is present with his or her children, a trend emerges translating into paint the ideal family dynamics of fathers with their children versus mothers with their children. In paintings of a father with his children, usually with his male heirs, the father tends to be behind the child as if presenting his offspring to the public as his successor. Portraits of women and their children, however, differ by placing the mother in the foreground while her child peaks around from her skirt or from under her protective hand, denoting her role as the protector and source of comfort in the family. These compositional trends, which appear in portraits from several Italian cities in the fifteenth and sixteenth centuries, convey in portraiture the ideal role of the father versus the mother in an Italian Renaissance family.

2:20

Construction of the Third Reich for Cultivation of Neo-Wagnerian Values in Nazi Germany

Josie Holland

Faculty Sponsor: Mona Kreitner, Department of Music

The leaders of the Third Reich institutionalized musical aesthetics in order to exemplify a specific version of German nationalism. Wagner's music, steeped in sentiments of antisemitism, epitomized for Hitler the ultimate expression of German pride and formed a model for public and musical leaders alike. In my paper, I examine the policies which gave rise to government control over music, the composers who aligned themselves and their music with these clearly articulated Party values, and public reaction to governmentally strangled sound.

2:40

Revealing the Life and Work of Reverend Dr. William H. Brewster

Kayla M. Miller

Faculty Sponsor: Carole Blankenship, Department of Music

My work on Reverend Dr. William Herbert Brewster, a Memphis preacher, activist and gospel music composer, began the summer of 2009 as a fellow in the Rhodes Institute for Regional Studies under the mentorship of Dr. Carole Blankenship. Our leading objectives in this research were to find 'definite' information about this figure, and we hoped to recover unpublished work and primary documentation of his life and activities as a Memphis leader, gospel music composer, civil rights activist, author and reverend from the late 1930s to the early 1970s. During these eight weeks, we gathered a substantial corpus of biographical information from rare publications, archival material in Memphis and in Nashville and, most importantly, oral narrative from individuals in the community who were familiar with Brewster and his work. After discovering an untapped mine of information, music and poetry collected in the past 70 years by friends, relatives and congregation members, our project has continued and expanded to include the digitization of recorded music, sheet music and other pertinent documents into a digital archive; interviewing and re-interviewing congregants and associates of Dr. Brewster; and plans to re-introduce his music to the Memphis and larger academic community.

Influence to Imagery

417 Clough, 1:40-4:00pm

Session Chair: Amy Auginbaugh

1:40

Paper Houses

Mempheany Seng

Faculty Sponsor: Erin Harmon, Department of Art

My paper sculptures are a means to a rediscovery of my identity. As a first generation American, I was far removed from the world I had only heard of in the stories my parents told. Growing up, concrete and steel buildings instead of golden ornate temples formed my skyline. In my recent work, Cambodian architecture have come to represent what has always been a part of me but still remains foreign. Acknowledging Southeast Asian shadow puppetry, light and shadows are ways to construct my narrative. I address the ideals, traditions, and history I grew up with but never took careful detail of. Only in my paper spirit house will ancient Cambodian temple ornamentation and contemporary architectural motifs exist side by side. In my work, as well as in my search for cohesion between my two identities, I hope to create a space where two separate and distinct entities can live in conjunction.

2:00

Popular Objects

Esther Ruiz

Faculty Sponsor: Erin Harmon and Ben Butler, Department of Art

My artwork is an exploration and documentation of the way our sensory memories collect and store objects and images. The sculptures I make are derived from things most of us have seen in science, history, or religion. Usually,

I adapt a certain object into my work and alter it by adding to it some aspect of my personal interests: fashion, space operas, trendy music, modern design and parties. The forms become distorted by their marriage with my personal interests thus, producing new objects. The sculptures act as props, clues or remains from my investigation of classic forms paired with contemporary trends. I have found that in modern forms of communication and entertainment we are hardly given time to contemplate the history or development of form. My intent is to excavate and reinvent classic forms and symbols by pairing them unexpectedly in a way that the modern world can approach. In viewing these objects the audience has to search their memories to find what is familiar to them about each piece and how their altered states affects their present function. In making this work I hope to both engage and inform the viewer by bridging the gap between past and present.

2:20

A Reckless Journey: From Concept to Curtain

Lee Bryant

Faculty Sponsor: David Jilg, Department of Theater

Reckless, written in 1984 by Craig Lucas, is about the adventures of Rachel, a desperate housewife, and the absurd chain of events that becomes her life after her husband confesses to hiring a hit man to kill her. My first encounter with Reckless was last school year through my involvement as a class representative on the Playfinding Committee for the 2009-2010 McCoy Theatre season. After reading the play I was enthralled with the characters and plot and pushed to have it selected, which it was. In the fall 2009 term I chose the play for my final project in Introduction to Design and was required to develop a design concept for the show, build a ½ inch painted scale model of the set, and draw and paint six character costume sketches. My set design was selected for the McCoy's production, as were elements of my costume designs. I also auditioned for the show and was cast in the role of Rachel. The process of reading the play for a potential production, designing it for a class project, and performing in the final production was a unique experience that left me deeply connected with Reckless and exposed me to all aspects of a theatrical production. My presentation follows this experience, highlighting my design concept and how it was translated into the final production.

2:40

Comic Relief in a Land of Trash

Maggie Exner

Faculty Sponsor: Erin Harmon, Department of Art

In this presentation I will show the progression my work has taken over the past year and a half. My work explores our relationship with the world around us in all its forms: the dirty, grimy, violent, and grotesque, as well as the beautiful, exciting, humorous, and fantastic. Specifically, I am interested in a person's experience of his or her environment and how one copes with all the noise that fills our daily lives. In my drawings, imaginative characters wander through and interact with junky environments. On one hand, these environments are fun, colorful play lands with endless things to explore and consume, while on the other they are dreadful places filled with trash, decay, and death. While reminiscent of the real world, the characters, objects, and settings of my drawings are heavily illustrative, emphasizing the filter of my hand on representations of these places. In skewing proportions and giving life to inanimate objects, I set a humorous tone to how these characters grow and interact in these dark, yet fun worlds. Through these drawings, I hope to articulate those feelings that emerge from the experience of an environment and also show the mutual influence between man and the world.

3:00

Fairies and Asses: A "Green" Analysis of Shakespeare's A Midsummer's Night Dream

Michael Polovich

Faculty Sponsor: David Jilg, Department of Theater

Love runs amok in the unnamed forest as humans are turned into half-donkeys and are falling in love with fairies. So, just what did bard himself have in mind? This project combines research for final projects from two different classes into a single presentation: it is the result of a research paper on bestiality and human/animal relations in A Midsummer's Night Dream for Dr. Scott Newstok's "Green Shakespeare: Eco-criticism and Renaissance Literature" class, and a set and costume design for a "green" production of the play as the final project for Professor David Jilg's Introduction to Design course. This presentation focuses on how elements of design can be used to obscure the "line" drawn between humans and animals; it is not narrowly tailored to argue in favor of bestiality, but rather

aims to demonstrate that the relationship between humans and animals is not as limited as society traditionally defines it. Designing costumes to blur the supposedly problematic notion of love between humans and creatures in the play as well as creating an environmentally conscious set would successfully complicate the boundaries society so often creates. Ultimately falling short of an endorsement of bestiality, the play offers a “green” reinterpretation of human interaction with nature.

3:20

Whitney Ranson: Artist Lecture

Whitney Ranson

Faculty Sponsor: Erin Harmon, Department of Art

Growing up in a rural setting I learned early in life to appreciate nature and hold myself responsible for my personal impact on our planet. My current work reflects the respect for the world and its ecosystems that was instilled in me throughout my childhood. In a series of paintings made using water and clay based paints I evidence these influences. Ink, watercolor, and gouache allow me to mimic elements of the organic and chaotic in a manner that depicts the fragility and delicateness of the environment. My interest in sustainability, alternative energy, green design, and conservation serve as a catalyst for my work as I contemplate the ecological impact that humans have on the planet. In this artist lecture I propose to explain my processes for creating these works beginning with my reference materials and sources of inspiration through the actual creation of the work. This lecture will also elaborate on my beliefs that my work conveys the beauty and life of our planet in a way that evokes respect for the fragility of the environment.

3:40

Controlled Explosions in Life and Art

Noelle Smith

Faculty Sponsor: Erin Harmon, Department of Art

I approach art making as a way of meditating on my daily experiences. A common theme spanning my past and present work deals with the fragility of life, human or otherwise. In the past I used drawing, collage, and text to convey more literal representations of moments and thoughts. Currently, my work is more abstract. I think of my drawings as controlled explosions, the delicate products of turbulent emotions. I collage photographs of the natural world, borrowing the power we already recognize in rushing rivers, mountains, and landslides to accompany my own ink and paint marks. The final images evoke bursts of physical matter as well as energy and tension. Juxtapositions of grand images with tiny marks and microscopic photos allude to smallness in the face of overwhelming force.

HUMANITIES ORAL SESSIONS

Interdisciplinary Humanities: Searching for Values

Frazier-Jelke C, 11:00am–noon

Session Chair: Joshua P. Anderson

11:00

The Adaptability of Christianity Demonstrated by Martyrdom and Apostatizing

Sarah Thompson

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

Shusaku Endo's historical novel, *Silence*, describes the Japanese suppression of Christianity in the seventeenth century through the use of three characters, Rodrigues, Garrpe, and Kichijiro. These men each have a different reaction to their persecution. This paper explores how each character weighs the relative value of martyrdom and apostatizing, and how these decisions are used to demonstrate Endo's thoughts concerning the adaptability of Christianity. I investigate how each response to persecution: the martyr death of Garrpe, the repeated apostasy of Kichijiro, and the enduring of torture of Rodrigues, reflects a different sort of adaptation of the Christian religion to a Japanese context. These decisions come together to explain Endo's position on the level of Christianity's adaptability through not only the characters' actions but also the reaction and impact that they trigger. I conclude

my paper by noting the importance of Endo's ambiguous thinking. I explain how this ambiguity raises questions that apply to broader contexts and issues outside the novel, concerning the adaptability of Christianity.

11:15

The Philosophies of Fyodor Dostoevsky and Vladimir Soloviev

Thomas Joyce

Faculty Sponsor: Valeria Nollan, Department of Modern Languages and Literature

Vladimir Soloviev is considered by many to be the first original Russian religious philosopher and talented poet. The versatile nature of his philosophy has informed and guided the lives of poets, writers, sociologists, and theologians from a variety of different cultures. Similarly, serious readers consider Fyodor Dostoevsky to be one of the greatest psychologists in world literature; one scholar has described him as "the justification of Russia's existence." Together, the two had a significant impact on the development of modern Russian creative thought. This paper examines several aspects of Soloviev's philosophy and discusses its relationship to Dostoevsky's life and work. It will examine Dostoevsky's influence on Soloviev's ideas and their shared belief in a "moral revolution" and new spiritual rebirth for Russia. The analysis centers on the historic "Three Addresses" that Soloviev delivered in memorium to Dostoevsky's work. In the three addresses, he discusses the ways in which Dostoevsky's work contributed to the betterment of Russia's moral and spiritual identity. This paper attempts to synthesize the creative connections between these two major figures in world culture.

11:30

Is That You, Sophia? Variations on Sophia in Soloviev's and Blok's Sophia

Jake Groves

Faculty Sponsor: Valeria Nollan, Department of Modern Languages and Literature

The works of Vladimir Soloviev, a 19th century Russian poet, author, and philosopher, left an indelible mark on Russian culture. In particular, his development of the principle of Sophia—a protean, feminine figure which, on a very basic level, is the element of Absolute connectivity which pervades all existence—influenced the procession of Russian thinkers and artists after him. Notably among those who felt the aftershock of Soloviev's Sophic writing was the Symbolist poet Alexander Blok. Both Blok and Soloviev represent, or attempt to represent, Sophia through their poetry. This paper identifies several valences of Sophia found in Soloviev's writing and uses these as a foil to compare and contrast the poetry, and thereby the beliefs, of Vladimir Soloviev and Alexander Blok. In doing so, we arrive at a consensus about the nature of Sophia and her relationship to pre-revolutionary Russian culture.

11:45

Faith Conflicting with Organized Religion

Jenna Brownfield

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

In Aldous Huxley's *Brave New World*, the savage embodies the juxtaposition between two values: the presence of a personal faith and the absence of an organized religious worldview. The savage's inability to reconcile these two competing values leads to his untimely, yet inevitable demise. This paper explores the savage's dilemma using the theories of sociologist, Emile Durkheim, and Christian theologian, Friedrich Schleiermacher. I conclude that, despite the limitations of the application of each theory, they do offer an alternate resolution to this dilemma that can be used to explain other examples of faith conflicting with organized religion.

Philosophy

205 Kennedy, 11:00am-noon

Session Chair: Austin Freeman

11:00

Providing Justice and Peace: The International Criminal Tribunal for the Former Yugoslavia

Jane Barrilleaux

Faculty Sponsor: Leigh Johnson, Department of Philosophy

“Providing Justice and Peace: The International Criminal Tribunal for the Former Yugoslavia” uses political philosophy to analyze the establishment of an international war crime tribunal after the Yugoslav War in 1991. The growing sense of nationalism amongst Serbian intellectuals, combined with a historical precedent of deeply rooted ethnic tensions, led to a civil war in Yugoslavia that became genocidal. The International Criminal Tribunal for the Former Yugoslavia was the first of its kind to be established after the Nuremberg trials. Founded during the rise of truth commissions on the international scene, the ICTY was created by the UN Security Council in 1993 to fill the need for justice left in the wake of Serbian attempts to ethnically cleanse Yugoslavia of Muslims and non-Serbs. The ICTY provides “retributive justice,” the foundation of international law, which is concerned with proportionality, rectification, and human rights. By using Kelsen’s legal theory as a code of normative claims, such as *ius cogens* and *erga omnes*, as well as other significant political and social issues, it is clear that a tribunal was more effective and appropriate than a truth commission for the unique situation that resulted in Yugoslavia.

11:15

The Theft of Heritage: Cultural Rights and Cultural Genocide

Patrick Harris

Faculty Sponsor: Leigh Johnson, Department of Philosophy

Throughout human history cultural minority groups have suffered attempts to forcibly eradicate their cultural distinctiveness, whether to destroy them as a cohesive group or to ensure their assimilation into broader society. While attacks on culture have a long pedigree, the aftermath of the atrocities committed in Nazi-dominated Europe have led over the past several decades to the inclusion of cultural protections in the broader discourse of human rights. Yet “cultural genocide” remains a highly contentious concept in international jurisprudence and protections for the cultural heritage of vulnerable populations lag behind those put in place against more familiar “crimes against humanity”. This paper traces the history of cultural genocide, both in practice and as a legal concept, while examining the ethical foundations for a comprehensive prohibition of cultural genocide in international law. It aims to locate cultural rights within the broader family of human rights and demonstrate the intimate connection of individual human dignity with the right to a cultural heritage.

11:30

Argentinean Truth Commission: Truth, Justice, or Both?

Hannah Gysin

Faculty Sponsor: Leigh Johnson, Department of Philosophy

The atrocities that Argentina suffered during in the years of 1976-1983, under the rule of Jorge Rafael Videla, are sure to be forever remembered by the citizens. With a large number of the population subjected to torture and murder, civil unrest rode rampant in Argentina, causing the entire country to plummet into despair during this time known as the “Dirty War.” Fortunately for the broken country, through the revolutionary group “Las Madres de Plaza de Mayo,” a realization came that a truth commission was necessary for Argentina. After numerous regime changes and multiple enactments of laws against the prosecution of the people who had previously violated the country, a truth commission was created, and called the Argentine National Commission on the Disappeared. This brought with it a moral foundation not found in the previous general trials. The Argentinean truth commission effectively produced social and political justice, and it was done in a manner so that both the communities and political heads were able to retain a just and peaceful society after the commission disbanded.

11:45

Little Freedoms

Manali Kulkarni, Courtney Martin

Faculty Sponsor: Leigh Johnson, Department of Philosophy

For our existentialism class, we were given the option to create short videos that represented the ideas of existential philosophers we had studied. Courtney Martin and I took Merleau-Ponty's basic philosophy and created a stop action video of it. Merleau-Ponty expresses that freedom has to be in a field with limitations in order to fully understand freedom. We use different "little freedoms" by means of construction paper. These little freedoms can be different colors and shapes but they all are not yet aware of their freedom because it is not limited. So, we begin by presenting all these small freedoms scattered on the floor and are able to move around freely. Later we literally begin to restrict their freedom by placing wooden planks on all four sides of the small freedoms. The freedom continue to bounce on the wooden planks and always bounce off as they are finally limited and wonder what they have the ability to achieve even without having unlimited freedom. The little freedoms eventually come to realize their true freedom and they all together form a shape of a boat in water on a sunny day.

History

208 Kennedy, 11:00am-noon

Session Chair: Drew Wagstaff

11:00

Sensationalized Violence: Newspaper Coverage of Bleeding Kansas, 1854-1856

Alexandra Garris

Faculty Sponsor: Alex Novikoff, Department of History

The signing of the Kansas-Nebraska Act negated the terms of the Missouri Compromise and caused an outbreak of violence that polarized the nation. The act permitted two territories, which once banned the institution of slavery, to operate under the concept of popular sovereignty, and in turn caused vigilante violence to plague the region. As radical abolitionists and pro-slavery ruffians flocked the Kansas border, newspapers across the country began to take notice and relay the battles of "Bleeding Kansas". This paper examines the newspaper coverage of the brutal events that transpired in Kansas between 1854-1856. Through the comparison of articles written for both free and slave endorsing audiences across the country it is evident that the fighting was sensationalized. Therefore, the propaganda and biases presented to the American public through newspaper coverage intensified divisions and caused the battles of Kansas to spread eastward, causing the start of the American Civil War.

11:15

A Contingent of Deviants: The Green Corn Rebellion

Stephanie Gregory

Faculty Sponsor: Robert Saxe, Department of History

When the United States entered into World War One in 1917, there were spurts of dissent throughout the country, most of which were promptly put down and covered over with waves of propaganda. However unsuccessful these uprisings were, they bring to light many of the social difficulties facing many Americans, and reveal the varied reasons for opposition to the war. The Green Corn Rebellion took place in rural Oklahoma, and although seen more as a comic failure rather than a courageous protest, it brought together a jumble of marginalized groups who saw rebellion as the last available means of communicating their plight and dissent. If rebellion such as this is understood to be an act of desperation, then the Green Corn Rebellion and others like it should be studied in order to better understand the situations that prompted such extreme action.

11:30

“Why Is It Not A Land Bank?” The Freeway Proponents Perspective on the Interstate 40 and How This Affected the Course of the Controversy

Nick Carlson

Faculty Sponsor: Gail Murray, Department of History

During the 1950’s Memphis attempted to build a network of freeways through the use of federal highway funds. The expansion of freeways in Memphis caused a public controversy over the proposed routing of Interstate 40 through Overton Park. Based on the public statements of most persons involved in the planning, very few persons did not support the importance of green space; the difference was over the most efficient means of acquiring the green space. These two conflicting systems of thought collided over the cross-town of the Interstate 40 freeway. The freeway proponents didn’t understand or measure the attachment people had for Overton Park. The result of this was a tragedy for the city of Memphis because the cancellation of the cross-town segment of Interstate 40 left the city unprepared to deal with the changes brought by suburbanization and the increases in population.

11:45

The Importance of Skiing in World War II and the Legacy Left Behind

Stephanie Fox

Faculty Sponsor: Alex Novikoff, Department of History

Starting out as an experiment to train skiers and climbers to fight in the most difficult, mountainous terrain of Europe, the Tenth Mountain Division became one of the most important combat units in World War II. Finally entering conflict in 1945, they were quickly thrown into dangerous conditions, as the Nazis tried every attempt to wipe them from the mountains and gain passage to other parts of Europe. However, they were able to hold their ground until May 2, 1945, when the Nazis finally surrendered. While only seeing combat for four months, the Tenth had one of the highest casualty rates of any American Army division during the war with almost 1,000 dead. Although devastated by the effects of war, these men’s love for skiing and the outdoors was not deterred as they returned home. Many Tenth Mountain Division soldiers went on to found some of the most prominent ski resorts in the United States today. And overall, two thousand members of the division went on to work in the U.S. ski industry. In the end, these men took their experiences from a bloody war and brought Americans to mountains, showed them how beautiful nature is, how fragile they environment is, and thus how important its preservation.

Interdisciplinary Humanities: What is the Search Program Really Good For?

Frazier-Jelke C, 1:00-1:45pm

Session Chair: Rebecca Miller

1:00

Interdisciplinary Humanities: What is the Search Program really good for?

Travis Lux, Aaron Kala, Jiayun Zou

Faculty Sponsor: Leigh Johnson, Department of Philosophy

Our panel consists of three sophomores – Aaron Kala, Jasmine Zou, and Travis Lux. Each of us completed the Search for Values program in the Philosophy Department with Dr. Leigh Johnson, for whom we wrote a final paper concerning how the texts of the program influenced our personal set of values. Aaron: I analyze a previous philosophy paper that I wrote during high school in order to understand how the Search for Values program has actually changed my values. This analysis shows that I have adopted new values, altered old ones, and maintained others throughout the three-semester program. Jasmine: My paper concerns how faith can be understood in more ways than solely faith in God, and how people from non-religious countries would value their faith. Confucianism, for instance, provides people with many ethical rules to follow in order to make it a better community, despite the fact that it is not a traditional, Western religion. Travis: I catalogue my “search for values” chronologically – simply in the order in which I read each text over the three-semester sequence. The analysis highlights the ways in which the various texts challenged or reinforced my personal Christian faith.

Religious Studies and Philosophy

205 Kennedy, 1:00-2:00pm

Session Chair: Austin Freeman

1:00

Applying John Calvin

Stephanie Gregory

Faculty Sponsor: Ellie Bagley, Department of Religious Studies

John Calvin's *The Institutes of Christian Religion* has had a profound influence on Protestant Christian thinking, functioning as a foundation for many Protestant denominations. But how does Calvin's theology function in the personal lives of those who follow his writings? Calvin advocates a God that is meant to be in harmony with his human creation but due to humanity's sin is unable to do so. It is with this knowledge that followers of Calvin approached their God in their personal lives, as they constantly struggled to understand their place in relation to God. They had a desire to know and be close to a God who, according to Calvin, they could not be close to. Looking at Christian poetry written by those who most certainly would have been influenced by Calvin gives insight into the daily personal and spiritual lives of such Christians. The poets Anne Bradstreet, Edward Taylor and George MacDonald focus on this issue in their writings, addressing the emotion strain they feel on a daily basis. All three place their hope in heaven, in waiting for a time when things will be better, and when they will see God face-to-face. Their ability to have hope in this life is based on their hope for the next.

1:15

On Wisdom: Ethics of the Gnostic Creation Myth

Jerica L. Sandifer

Faculty Sponsor: Gail Streete, Department of Religious Studies

Gnosticism was a syncretistic religious movement influenced by the Judeo-Christian tradition as well as the other trajectories of thought which existed in Late Antiquity such as Paganism and Greek philosophy. The goal of Gnosticism is gnosis, an esoteric knowledge which enlightens the human of his or her origin and true home in the godhead. In the absence of a modern, Gnostic church, our only sources of knowledge concerning the ethics of this religious movement are the Gnostic scriptures. Before the discovery of the Nag Hammadi Library, many scholars asserted that there were no Gnostic ethics. However, with the newly discovered texts, it is clear that there are many ethical implications in the midrash, or retelling, of the Christian creation myth found in *The Secret Book of John* and *The Reality of the Rulers*, which responds to and critiques the ethics of Christian orthodoxy on matters of gender, wisdom and ignorance, the responsibility of humanity, the role of authority and hierarchy, and the presence of good and evil in the world.

1:30

Amicus, Usque Ad Aras: A Call to Spiritual Friendship

Jonathan Johnson

Faculty Sponsor: Gail Streete, Department of Religious Studies

Many scholars, including John Boswell, have claimed that the 12th century bishop Aelred of Rievaulx was gay. In addition to the claim being anachronistic because the term gay did not exist when Aelred lived and thus would not have identified himself as gay, his literature suggests only that he greatly loved his friends in a very spiritual sense. Boswell erroneously read Aelred's works because he failed to fully consider Aelred's doctrine of friendship and saw only passionate relationships between men. In our modern understanding of relations between men, these relationships might seem gay. However, Aelred believed friendships should be intense, that friends should be rigorously tested to make certain that they are true friends, and that once admitted into one's heart as friend, that friendship can never be dissolved. His style of floral writing and the passion with which he writes about friendship between men is not sufficient evidence to conclude that Aelred was gay. The conversation between Aelred and Boswell that takes place within this paper illuminates the incredible need to reconsider same-sex friendships today in order break down the stigmas associated with intense same-sex friendships.

1:45

The Veil

Walter Clapp

Faculty Sponsor: Pat Shade, Department of Philosophy

There is a veil covering the eyes of most of our nation. This is a presentation which aims to lift that veil, or at least a piece of it. The effects are seen in our backyard, the Mississippi river, and in the lines of obese and diabetic patients at the Med. This is a direct result of the policy surrounding the production of food in America. We do not realize that artificial food colorings in our food have been scientifically linked to hyperactivity in children, and while completely banned in the EU, remain abundant in much of our food supply. The U.S. government's subsidization of corn particularly is producing a diabetic epidemic that will cost every tax payer money, money which might be better spent subsidizing healthy food that would prevent the diabetes in the first place. By artificially lowering the price of sugar, in the form of high fructose corn syrup, we are shifting the availability of certain food groups in a manner contradictory to the same pyramids we are all so fond of and contradictory to their abundance in nature. In fact, our evolutionary disposition to enjoy sugar and fat is being exploited in just this manner. We are hardwired to desire sugar in quantities far greater than are normally available, and now they are more available than normal; and we are paying the price. People are not educated enough to make healthy choices, and in many cases do not have the money. It boils down to the fact that the Farm Policy of America is subsidizing the wrong calories, primarily in the form of sugars and fats. Why? There must be changes, and with the advent of nationalized health care, this is a problem which must be addressed. The exploitation of our health is at stake; the importance, and cost, of these practices must be common knowledge for change to happen. As a liberal arts college, I believe it to be our duty to address these issues.

English: Philology

208 Kennedy, 1:00-2:00pm

Session Chair: Kelsey Smith

1:00

A Philological Look into 'Liberal': "And Not the Word Only, but the Thing Itself"

Elizabeth Lawnin

Faculty Sponsor: Scott Newstok, Department of English

This essay looks at the works of John Milton and John Locke in order to assess how the word 'liberal' was understood by two of the most influential contributors to early modern liberalism. Through analyzing Milton's *The Ready and Easy Way to Establish a Free Commonwealth*, *Areopagitica*, and *Paradise Lost*, I conclude that liberalism as Milton projected it was less rooted in any sort of political ideology as it was in a unique understanding of religious obligation. If ever Milton promotes a leaning towards 'liberal' values in government or society, his endorsement is hardly founded upon a desire for the political values that we now associate with 'liberal'—inclusion, toleration, and freedom of thought. Rather, Milton's texts reveal that, oftentimes, his calls for a 'liberal' government are aimed at establishing a more religiously open state not in order to engender religious tolerance but rather to create a society in which true devotion to God requires more demanding intellectual consideration, thus ultimately strengthening the faith of those that are truly pious. John Locke employs and expands many of Milton's arguments and applies them to a strictly political argument in order to inform our current political understanding of the word.

1:15

Rewriting the Dramatic Ghost: Philological Echoes, Haunting, and the New Poetry of

Eugene O'Neill

Joel Iwaskiewicz

Faculty Sponsor: Scott Newstok, Department of English

The oft-appearing theatrical ghost takes a new form within the works of Eugene O'Neill, America's premier Twentieth-Century playwright, by manifesting itself in the haunted language of the living. While a strictly thematic survey of the plays *Mourning Becomes Electra* (1931) and *Long Day's Journey Into Night* (1955) reveals a startling ghostliness on its own, a deeper philological exploration illuminates O'Neill's unique accomplishment and

overlooked contribution to the dramatic tradition: reclaiming, through philology, the theatrical device of ghosting for a new generation of tragedians. Through the intertextual repetitions of language between his own plays and those of his predecessors—particularly Shakespeare’s *Hamlet*—O’Neill crafts a thick philological web that is complicated indefinitely by the layered usages of the words dead, haunt, rotten, and damned across texts. Amidst this web there, ultimately, emerges a new vision of the dramatic ghost—not as a device or figure of the stage, as in past plays, but rather as the voice of the dead invoked by the living. O’Neill’s creation comments on theatrical traditions of old while simultaneously defining a new dramatic era of great American tragedy and establishing the elusive poetic voice for which O’Neill spent his career passionately searching.

1:30

"It is Flawed Because it is True": McSweeney and the Style of Effort

Halley Johnson

Faculty Sponsor: Scott Newstok, Department of English

This project explores the style of a text as a way in, a “point of departure”, for a specific historical moment, focusing on the transition between postmodernism and what has been called the “new sincerity”. McSweeney’s *Quarterly Concern*, a literary journal of the late 1990s, embodies the tensions that arise in this process. Sincerity, for McSweeney, dominates as a function of its style rather than promoting a straightforward message in the way that it is hoped to; it becomes more productive as a response to the layers of irony and self-consciousness that characterized postmodernism. What results is a struggle with and against the postmodern solution to the fact that “everything has been done”. McSweeney, while certainly acknowledging, and to some point containing, its references to authors of olde, works toward sincerity as a refuge of sorts. This move is the beginning of a departure from postmodernism, but for McSweeney progression is tangled in admiration for and tendency toward the methods of its predecessors. However, this entanglement in its influences is defeated by contextualizing itself as a response to and descendant of the postmodern movement, and McSweeney emerges as a conscious example of this transition.

1:45

“Wonderfully Pneumatic:” The Empty Comforts of the Brave New World

Natalie Chambers

Faculty Sponsor: Scott Newstok, Department of English

Most futuristic narratives employ some linguistic indication that their world is a unique one. In his article “Metalinguistics and Science Fiction,” Eric Rabkin asserts that “science fiction is a peculiarly rich field in which to find examples of the metalinguistic function of language” (79). In the bleak visions of the future that dystopian fiction in particular presents, language is often used to indicate the particular problems of that society. As identified by many critics, the climate and terror of Aldous Huxley’s *Brave New World* society is that it is without substance or history, ruled by comfort and pleasure – essentially emptied of all meaning, truth, and beauty; Huxley presents these conditioned societal traits through the material and manner of the language that characters use. The word “pneumatic” serves as a prime example of this phenomenon, as it suggests emptiness in its very definition and reveals the characters’ ignorance of history and lack of precision in their use of it; a philological analysis of the word and its use reveals the aspects of society from which substance has been eradicated as well as where substance may still remain.

Interdisciplinary Humanities: The Search for Individual Meaning

Frazier-Jelke C, 2:00-3:00pm

Session Chair: Elizabeth Tomlinson

2:00

Colin Antaya, Virginia Beasley, Ryan Carroll, Will Lang

Faculty Sponsor: Leigh Johnson, Department of Philosophy

This panel is concerned with the perspectives of four Search students on how the program as a whole has affected the development of their values. These accounts are tied together by the common theme of finding individual meaning in one's life.

Colin Antaya

We Are All Essentially and Painfully Individual

I have come to believe that each human being is essentially and necessarily individual. Therefore, I have developed a philosophy based on my inherent individuality. Essentially, I believe that a proper ethics of individuality can serve to relieve each person's need to transcend their individualized loneliness.

Will Lang

My Values (or Lack Thereof) in the Light of Search Class

The Search curriculum has helped me better identify some things I value; namely reason, music, love, and honesty. Even with these values, I have come to view my life as art- amoral yet capable of meaning and worth. In any case, I am certain of myself and delight in the life this allows me.

Ryan Carroll

Through the Depths of Nihilism to Rationalism

Coming into Rhodes and the Search program, my mind was tormented by a raging nihilism that refused to be resolved. Yet through the depths of this depression and bitterness, the thinkers encountered later in Search, in particular Descartes, compounded upon each other and laid the foundation for a new found morality and happiness.

Virginia Beasley

The Search program provided me with a venue by which to confirm and expand on my already in place belief system, and I was most influenced by four texts that shared a strong belief in the importance of personal choice. I found the ideas espoused by these four texts liberating, in that they empower the individual to take control and not slough off responsibility onto others.

Greek and Roman Studies & History

205 Kennedy, 2:15-3:15pm

Session Chair: Katy Johnson

2:15

Significance and Identity of Beggars in the Odyssey, Aristophane's Acharnenses and Plutus, Sophocles' Oedipus Coloneus, Euripides' Suppliants, and Aristotle's Rhetorics

Allison Dove

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

This paper explores the significance and identity of the beggar as they appear in the Odyssey, Aristophane's Acharnenses and Plutus, Sophocles' Oedipus Coloneus, Euripides' Suppliants, and Aristotle's Rhetorics. It will examine how others viewed and treated them, with an emphasis on their lack of identity and their position as negative social models as well as their function in this literature. A beggar in this literature serves as the antithesis of successful members of society, illustrating the opposite of what society highly regarded. They often share similar characteristics such as clothing. In addition, it will explore the difference between beggars and suppliants in these texts. For example, in religious rituals, worshippers assumed the role of suppliants as a means of erasing their

personal identity and shifting the focus to the gods as they begged for their help. Beggars are people that beg out of subsistence from humans. Suppliants beg more out of prayer to the gods. They do not beg humans.

2:30

Judging Fiction as History: The Merits of Latin American Novelists' Depiction of Historical Events

John Pevy

Faculty Sponsor: Willie Hiatt, Department of History

My research this semester examines Latin American fictional texts as historical documents. I argue that novels and short stories are important archival sources because they provide authors the freedom to explore important social, political, and cultural currents beyond historical context. These works help us understand the social classes of the authors, and their relationship to the topics they wrote about provides insightful commentary on how separate socioeconomic classes in Latin America view one another and interact across cultural boundaries. By examining works from the indiginismo period, a period of Latin American literature focusing on the plight of indigenous populations, the boom period, and those works dealing with political violence I have uncovered many nuanced ways to interpret historical content from works which most deem to be purely fictitious. I believe that this project is important because it opens a completely new realm of possible historical exploration through literature that has previously been ignored by many scholars.

2:45

Mourning Dove: A Native American Woman's Struggle for Identity

Mary Beth Ricke

Faculty Sponsor: Alex Novikoff, Department of History

I researched the struggle that mixed-blood Indians have in determining their identity. Specifically, I used the case study of a Salishian woman named Mourning Dove by looking into her autobiography and novel to examine this issue. In her autobiography, it is clear through her religion and education that she is pulled in two different directions because of her culture. Mourning Dove then uses her novel Cogewea to convey her frustrations about her identity. My thesis is that Mourning Dove's novel and autobiography present the struggle of defining an identity for mixed-blooded Indians, as well as present the discrimination these mixed bloods face from whites and fellow Native Americans. Her autobiography explains where this confusion originates from, and her novel highlights it. Her autobiography and novel have important historical significance because they bring to light the struggles mixed-bloods face in defining an identity.

3:00

"Thou Shalt Not Suffer a Witch to Live": Law and the Salem Witch Trials

Monica Gaudio

Faculty Sponsor: Alex Novikoff, Department of History

Though a wide range of scholarship exists concerning the Salem witch trials, the legal aspect of this remains largely unexplored. Indeed, the legal implications of these trials have been overlooked. What has been said about the trials themselves is negative and usually bemoans the use of the word "trial" without any discussion of how the trials were conducted legally and why a trial was used when this was not the predominant venue for such prosecutions at the time. Through a survey of the transcripts of the trials themselves, letters and testimony from secular and ecclesiastical authorities, legal treatises, and scholarship concerning the Puritan faith, a clearer picture of how the law was executed in these infamous trials comes into focus. This investigation reveals that, due to the pervasive idea that the Devil was attacking Puritans in the Massachusetts Bay Colony, the magistrates violated prevailing legal tenets to produce convictions of the Devil's servants, witches. In viewing these documents within the seventeenth century legal framework, this paper reveals an absent dimension of the Salem witch trials and early American legal history as a whole that helps to answer the question of why such a violation of due process occurred.

English & Gender and Sexuality Studies

208 Kennedy, 2:15-3:30pm

Session Chair: Anne Wilson

2:15

"An affair of sense": Godwin's Caleb Williams and the Burkean Sublime

Andrew Miller

Faculty Sponsor: Michael Leslie, Department of English

The English political philosopher and novelist William Godwin's *Things as They Are; or, The Adventures of Caleb Williams* (1794) stands in a vexed relationship with the thought of statesman Edmund Burke both political (*Reflections on the Revolution in France* [1790]) and aesthetic (*A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful* [1757]). My interest is in how Godwin's novel holds and critiques the two as inextricable, thereby bringing to light the moral and political implications of Burke's theory of sublimity.

2:30

History, Paratext, and Myth

John Yackulics

Faculty Sponsor: Michael Leslie, Department of English

The importance of history to myth, and myth to history, is evident most particularly in Sir Walter Scott's novel *The Bride of Lammermoor* in the way that the different "paratexts", or texts within the text of the novel, such as Scott's footnotes and the novel's prologue, flesh out a historical mythology of two families, in particular Lucy Ashton and Edgar Ravenswood. These paratexts, give history a new meaning within the novel. History in *The Bride of Lammermoor* is something that fetters the two main characters to a dismal and tragic fate, and the paratexts that operate within that novel flesh out that history by giving a historical air of authenticity to the novel itself. This presentation would focus on the creation of a Romantic historiography that Scott sets up within the novel, and what that says about history itself. Drawing on Marxist critics such as Georg Lukács to examine the historical context in which Scott was writing the novel, this presentation will provide interdisciplinary analysis on how historiography, or the writing of history, is not just within the realm of history, but within the realm of literature as well.

2:45

The European Reaction to the Election of President Barack Obama

Colleen Hunter Jones

Faculty Sponsor: Michael Leslie, Department of English

During a six-week period in summer 2009 I undertook an independent research study on the European Reaction to the Election of President Barack Obama. I traveled through Spain, Germany, France, Switzerland, Italy, Austria, and Ireland. I conducted interviews, spoke with approximately 200 individuals from around the world, and over eighty written surveys were completed. These interviews, conversations and surveys were in both English and Spanish and took place in trains, buses, airplanes, hostels, hotels, homes, streets, parks, restaurants, and pubs. Although my study focused on the European Reaction to President Obama, I took advantage of meeting people from Australia, Argentina, Columbia, Puerto Rico, Senegal, Mexico, Romania, Canada and Mongolia. There was an overwhelmingly positive opinion of and support for President Obama in Europe. More educated individuals gave fuller and more reasoned answers. Some people's positive reaction to President Obama was based primarily on their hostile views of President George W. Bush. Others saw the election of an African American as a positive change in American leadership. Many people's positive responses were based on the belief that Obama would end the War in Iraq, uniting the world. Meeting individuals from around the world exposed me to new ideas and cultures. I developed strong communication skills, learned foreign political ideas, and became more open minded. The opportunity to speak with individuals from around the world afforded me a global perspective and enhanced my research study. This project was made possible by a Rhodes College Research Grant. I spent spring 2009 in Granada, Spain followed by British Studies At Oxford where I was a Senior Student Assistant; the study was conducted in the six-week interim between these study abroad programs.

3:00

Cultural Imperialism in Peter Carey's "War Crimes"

Noah Black

Faculty Sponsor: Jason Richards, Department of English

In the Australian writer Peter Carey's 1979 short story "War Crimes," postmodern styles and postcolonial themes collide to form an extremely pessimistic depiction of the writer's home country. Despite the linguistic similarity of the prefix "post-," the two modes of thought function in vastly different ways throughout the story and, in doing so, are shown to have different effects on the culture of Australia itself. Australia's existence straddles the two intellectual movements; its past as a British territory qualifies it as postcolonial, but, because the majority of its citizens are the descendants of European settler colonists, its culture falls into the Western traditions that have progressed through stages of thought up to postmodernity. As an inheritor of these Western mindsets, Carey uses his postmodern sensibilities, evident in the chaotic narrative landscape of the story, to reveal that despite its political situation, Australian postcoloniality, the idea of an escape, or even a move towards an escape from colonial influence is ultimately a myth, as the nation has traded the physical imperialism of Britain for the cultural imperialism of the new Western world power, America.

3:15

Let's Talk About Sex

Elizabeth Mansfield, Shelby Kramer

Faculty Sponsor: Judith Haas, Department of English

During an internship with Planned Parenthood Great Memphis Region, we made video podcasts specifically for PPGMR and filmed them largely at Rhodes. Through asking student opinions and filming short interviews with them, we learned that at on Rhodes campus, the topic of sex is still largely taboo. Students were uneager to be filmed or to even answer questions. When asked questions regarding sexually transmitted infections, or how to properly use a condom, many students were ignorant. Our paper is an exploration of why so many students at Rhodes are reluctant to talk about sex and if they are not embarrassed to answer questions, they just do not normally speak up about it. Is sex really still a taboo subject, or is there something else going on? We hypothesize that there are many reasons why, including Memphis' location as part of the Bible Belt and the way in which sex education has been portrayed on this campus and in their personal lives, that the students at Rhodes are reluctant to discuss sex. In this presentation, we also intend to offer ways in which more information on methods of safe sex, and sexually transmitted diseases can become a larger part of Rhodes.

French and Francophone Studies

Frazier-Jelke C, 3:15-4:00pm

Session Chair: Janelle Adams

3:15

Female Hybridity in *So Long a Letter* by Mariama Bâ

Leah Taylor

Faculty Sponsor: Katheryn Wright, Department of Modern Languages and Literature

In my paper for the French senior seminar, I analyze Mariama Bâ's use of the female characters in her novel. The hybridity of these characters and of the novel itself serve as means to situate a female community within the text. The paper uses Homi Bhabha's idea of the "third space," which, according to him, lies at the intersection of two conflicting cultures. *So Long a Letter* takes place in post-colonial Sénégal and as such, typifies this intersection. Because of the French influence on the traditional sénégalèse customs, values, and principles, the women of this period become hybrids as an adaptation to transition. My paper examines the importance of adopting this hybridity in the "third space." I argue that in order to belong to the female community, one must be a hybrid. Moreover, the hybrid aspect of the text, which is both a letter and a journal, a written text and an oral communication, serves to not only show the importance of hybridity but also as a bridge, inviting the reader to share in the solidarity of the female community.

3:30

A Mirror of Man: The Function of Water in Jean Marie Gustave Le Clezio's Desert

Cate Vierling

Faculty Sponsor: Katheryn Wright, Department of Modern Languages and Literature

In his novel, *Desert*, published in 1980, Jean Marie Gustave Le Clézio uses the qualities and the movements of the elements -- earth, wind, water, and fire -- to express the difficulties as well as the virtues of life in the desert. Le Clézio uses the presence of the elements in his novel to form a relationship between human beings and the universe. Through a Taoist reading of *Desert*, one can see how the influence of this ancient philosophy confirms the importance of nature in human life and explains how the two protagonists, Nour and Lalla, react to the events in their lives. In their stories, one can find numerous correlations between these characters and the elements. Of the four elements, the use of water is the most surprising because there exists an apparent contradiction between the title and the setting of the novel, the desert, and water, an element that is rare and precious in the desert. However, this element can also be used to explain many of the connections found in the novel. A Taoist reading of *Desert* affirms that water acts as a mirror for the lives of the characters Nour and Lalla.

3:45

Le Silence: Une Voix de Desert de Jean Marie Gustave Le Clezio

Courtney A. Eskew

Faculty Sponsor: Katheryn Wright, Department of Modern Languages and Literature

According to Jean-Marie Gustave Le Clézio, both silence and the desert are powerful indicators of life rather than mere indicators of empty space. In his novel *Désert*, the author uses silence to transform the Sahara from a barren, dry, and infertile region into a vast community characterized by an unknown language. *Désert* tells the stories of Nour and Lalla: Nour is a young nomad who travels the desert with his tribe, fighting French colonialists who have arrived in North Africa; while Lalla is a young orphaned girl who leaves the slums where she lives to find work in France during a period of immigration. Although they are presented as different stories, with no direct ties to one another, it becomes clear throughout the book that something unites Nour and Lalla. This paper argues that Le Clézio creates an imagined community in *Désert*, where silence is a way to communicate. Therefore, through silence, Nour and Lalla become aware of their membership in the same desert.

Film Presentation

Frazier-Jelke A, 4:00-5:30pm

Session Chair: Jasmin Mayen

On the Line

Alexandra Garris, Frederic Ball, Brian Blake, Joiceann Compton, Meghan Cullen, William Hornaday, Anthony Maples, Otisha Paige, Haley Smoot

Faculty Sponsor: Dee Garceau-Hagen, Department of History

In the words of Carol Branch, “Stepping contains the history, dreams, and rebellions of its practitioners”. Stepping is a popular dance form practiced by African-American fraternities and sororities. But stepping is more than just entertainment; it represents a line of dancers that stretch back to African music traditions. These traditions evolved into distinctive African-American forms of song, dance, and rhythm during the Atlantic slave trade. On plantations in North America, patting juba, call-and-response, circle dances, and line dances emerged away from the watchful eyes of the master, or in public performances that subtly mocked the oppressor. After the Civil War, these performance traditions further evolved to meet the needs of communities who faced race discrimination. As African-Americans founded churches, schools, and mutual aid societies to meet the needs of a segregated population, these institutions, in turn, sponsored parades and drill teams through which African styles of processional dance resurfaced. Also during this period, pioneering college students formed the first Black Greek fraternities and sororities, each one dedicated to providing support to members, and “racial uplift” to the wider community. Over time, these student organizations expanded the meaning of “uplift” to include civil rights activism, particularly during the post-World War II era. In short, stepping has become a performative tradition vital to understanding African, African American, and United States history.

NATURAL SCIENCES ORAL SESSIONS

St. Jude Summer Plus Program

Frazier-Jelke A, 1:00-2:00pm

Session Chair: Stephanie Milazzo

1:00

Protein Phosphatase 2Cbl Regulates Human Pregnane X Receptor-Mediated CYP3A4 Gene Expression in HepG2 Liver Carcinoma Cells

Alexander Tong; Satyanarayana Pondugula, Taosheng Chen, St. Jude Children's Research Hospital

Faculty Sponsor: Darlene Loprete, Department of Chemistry

The human pregnane X receptor (hPXR) regulates the expression of cytochrome P450 3A4 (CYP3A4), which plays vital roles in hepatic drug metabolism and is known to have considerably reduced expression levels in proliferating hepatocytes. Signaling molecules such as kinases and phosphatases contribute to the regulation of hPXR. We have recently shown that cyclin-dependent kinase 2 (Cdk2) negatively regulates hPXR-mediated CYP3A4 gene expression. Cdk2 can be dephosphorylated and inactivated by protein phosphatase type 2C beta isoform long (PP2Cbl), a unique phosphatase that was originally cloned from human liver. In this study, we sought to determine whether PP2Cbl is involved in regulating the activity of hPXR, and whether PP2Cbl affects Cdk2 regulation of the hPXR activity in HepG2 liver carcinoma cells. In transactivation assays, transiently coexpressed PP2Cbl significantly enhanced the hPXR-mediated CYP3A4 promoter activity. In addition, PP2Cbl notably relieved the inhibitory effect of Cdk2 on hPXR transactivation activity. Furthermore, shRNA-mediated downregulation of endogenous PP2Cbl remarkably attenuated the hPXR transcriptional activity. Neither overexpression nor downregulation of PP2Cbl affected the expression levels of hPXR. Our results show for the first time that PP2Cbl is essential for the activity of hPXR, and can positively regulate the activity of hPXR by counteracting the inhibitory effect of Cdk2.

1:15

Attitudes and Use Patterns of Clinical Decision Support in the Electronic Health Record

Logan Eberly; James Hoffman, St. Jude Children's Research Hospital

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Clinical decision support (CDS) consists of functions that provide clinicians and others with knowledge and person specific information, intelligently filtered or presented at appropriate times to enhance health. CDS, particularly computerized alerts, is cited as a compelling benefit of computerized provider order entry (CPOE) and electronic health records (EHRs). When too many alerts are presented to clinicians, alerts are ignored (or overridden) and the patient safety benefits of clinical decision support are no longer realized. (This situation is commonly called "alert fatigue"). Our overall objective is manage alert fatigue by developing methods to minimize nuisance alerts while maintaining clinically important alerts that will improve patient care and medication use. This objective will be accomplished through 1.) a survey of St. Jude Children's Research Hospital clinicians that will be completed via email on a periodic basis and 2.) retrospective analysis of clinician response to CDS alerts at St. Jude.

1:30

Mutating PAX3-FOXO1 to Understand Its Regulation and Its Role in Alveolar Rhabdomyosarcoma Tumorigenesis

Anthony Chiang; Lingling Liu, Taosheng Chen, St. Jude Children's Research Hospital

Faculty Sponsor: Darlene Loprete, Department of Chemistry

Rhabdomyosarcoma (RMS) is a common childhood soft tissue cancer associated with skeletal muscle lineage. Alveolar rhabdomyosarcoma (ARMS), a type of RMS, is characterized by the presence of PAX3-FOXO1, the fusion gene produced by (2;13) (q34;q14) chromosomal translocation. PAX3-FOXO1 is a chimeric transcription factor, containing the DNA binding domain of PAX3, and the activation domain of FOXO1. To identify the PAX3-FOXO1 domains or single amino acids that regulated the localization or activity of the fusion protein, we performed site-directed mutagenesis of PAX3-FOXO1. We targeted amino acids that are known or predicted phosphorylation

sites, as well as domains predicted to affect nuclear import of the protein. Plasmids bearing mutated GFP-PAX3-FOXO1 were then transfected into multiple cell lines, including the U2OS cell lines. We used fluorescence microscopy to determine the localization of each mutant. We measured the activity of the mutated PAX3-FOXO1 using luciferase-based reporter assays, which are used for understanding the regulation of PAX3-FOXO1 and its role in ARMS tumorigenesis.

1:45

Off Target Effect of Nutlin-3a May Enhance Anti-Neuroblastoma Therapy

Jenkin Chan; Stacy Throm, Fan Zhang, Clinton Stewart, St. Jude Children's Research Hospital

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Neuroblastoma (NB) is the second most common extracranial solid cancer in children, and high risk NB poses significant treatment challenges with a long term survival rate below 30%. Therefore, new treatment modalities and approaches are needed. Unlike adult tumors 98% of NB express wild-type p53. While p53 tumor suppressor activity is often inactivated in NB, the potential exists to restore the pathway and arrest uncontrolled cell growth. Nutlin-3a, an MDM2 antagonist, is currently under investigation as a p53 reactivation agent. Interestingly, results from recent studies suggest that off-target effects are also important. For example, nutlin-3a was shown to inhibit P-gp-mediated drug efflux. Moreover, our lab has shown that nutlin-3a inhibits BCRP-mediated efflux. By taking advantage of this off-target effect of nutlin-3a, multi-drug resistance in NB may be overcome. To evaluate whether nutlin-3a is synergistic with anti-neuroblastoma drugs in vitro, we measure response of neuroblastoma cell lines to single and combination therapy. We propose to evaluate anti-NB drugs that are substrates for uptake and efflux transporters. Preliminary results show that nutlin-3a reduces the BCRP substrate topotecan IC50 4-fold, suggesting that we will see synergy when nutlin-3a is combined with efflux transporter substrates.

Conservation and the Environment

Frazier-Jelke B, 1:00-2:30pm

Session Chair: Emily Woods

1:00

Food Security, Poverty, and Bike Lane Correlations in Memphis

Brennan Lowery, Maria Cartagena

Faculty Sponsor: Sarah Boyle, Department of Biology

In the City of Memphis, 26.2% of residents had incomes below the poverty level in 2007, and due to historical trends it is projected this number will increase by 1.45% this year. Many of these residents in Midtown Memphis live in communities that do not have access to local grocery stores. This situation becomes problematic because community leaders note most of these residents also do not own cars. Analysis techniques using Geographic Information Systems (GIS) were utilized to look at the trends between grocery store locations, communities with the lowest incomes levels, bus routes, and current bike lanes. Previous sources suggest existing correlations between access to grocery stores with fresh vegetables, meats, and fruit, also known as food security, and the poorest neighborhoods in Memphis. The area we are surveying, Midtown Memphis, has almost no bicycle lanes. Based on the correlation of the communities with the most poverty, lacking the most convenient public transportation, and have the least access to food security, suggestion for bike lanes in Midtown are proposed.

1:15

Archaeology and Technology: Visualizing Archaeological Data

Rebecca Vandewalle, Milton Moreland

Faculty Sponsor: Sarah Boyle, Department of Biology

This project focuses on the historical archaeological investigations conducted by Rhodes College's Archaeology Field School at the Holcombe 2 plantation site, located at Ames Plantation, Fayette County, Tennessee. The goal of this project was to develop effective techniques, using Geographic Information Systems and Google Earth, to create a data-mapping interface that does not require the user to have expensive GIS software or the technical expertise to operate it. After organizing and cleaning the data, I created a searchable and interactive map containing many different archaeological data layers in order to describe the complex data related to the site, which allows for easy

access, navigation, and display of the spatially organized data. Using Google Earth in the project gives greater control to the user accessing the data, allowing him or her to choose which extent to view and which data to display. The final product displays data in an economical and more diverse way than what is possible with a series of individual maps.

1:30

A Novel, NIRS Based Approach to Chytrid (*Batrachochytrium dendrobatidis*) Detection in the Toad *Anaxyrus fowleri*

Daniel Eastlack, Andy Kouba, Memphis Zoo; Carrie Vance, Mississippi State University

Faculty Sponsor: Jon Davis, Department of Biology

Amphibian populations are declining globally due to, in part, the rapid spread of the pathogenic chytrid fungus, *Batrachochytrium dendrobatidis* (Bd). The goals of our study were to determine if Bd is present in Fowler's toad (*Anaxyrus fowleri*) populations around Memphis, TN and to use the toads as a model species to develop a novel, and rapid method of Bd screening based on Near Infrared Reflectance Spectroscopy (NIRS) both in-situ and ex-situ. We used Taqman quantitative PCR to confirm Bd infection at 7 of 11 study locations in 11 of 159 sampled individuals; however, populations are thriving at these sites without evidence of widespread mortality, perhaps indicating Bd resistance in *A. fowleri*. Our library size of *A. fowleri* Bd-positive NIRS spectra is very small (n=2), yet these spectra are visibly discernable from Bd-negative spectra and may provide an NIRS-based diagnostic method for determination of Bd-status in *A. fowleri*.

1:45

Behavioral Modifications Following Tail Loss in Lizards

Julia Goss

Faculty Sponsor: Jon Davis, Department of Biology

Tail autonomy is an effective predator avoidance strategy used by lizards; however, it results in subsequent costs including loss of energy reserves, reduced locomotor ability, and altered behaviors and social status. Notably, tail loss can negatively affect lizards' foraging behavior and reproductive success. We conducted prey detection trials to test the hypothesis that increased prey detection behavior is a mechanism by which lizards replace energy stores lost due to tail autonomy. We scored the intensity of prey detection behavior of 10 lizards towards three stimuli: (1) control = deionized water, (2) nonsense control = 1:500 dilution of hand soap, and (3) prey = cricket scent before tail loss and at 50% and 95% regrowth. In addition, we also tested the hypothesis that social status of males decreases following tail autonomy. We randomly paired 1 female with 1 male, videorecorded each 20 minute behavioral trial, and later analyzed the video to score the females' spatial proximity and social behaviors towards each male. Results of this study will help clarify the trade-offs between tail autonomy and subsequent predatory and social behaviors in lizards.

2:00

Stop and Smell the Roses: How Olfactory Enrichment Affects the Behavior of Captive Jaguars (*Panthera onca*) at the Memphis Zoo

Stephanie N. Cassel, Allison Graham; Andy Kouba, Morgan Powers, Memphis Zoo

Faculty Sponsor: Sarah Boyle, Department of Biology

Jaguars (*Panthera onca*) require enrichment to promote active behavior in order to maintain fitness while in captivity. The purpose of our study was to evaluate changes in behavioral and spatial activity with the introduction of novel scents for two captive female jaguars displayed at the Memphis Zoo in the fall of 2009, as well as to evaluate the effect of enrichment upon a single female jaguar in the spring of 2010. During 60-minute control and enrichment periods, jaguars were monitored through 5-minute interval group scans, recording behavior and location for 8 weeks. Following exposure to olfactory enrichment, a continuous behavior scan was also conducted on behaviors associated with enrichment (sniffing, rubbing, licking and scratching). The jaguars spent more time sleeping and resting during control periods, using only a few areas within their exhibit. During enrichment periods, sleeping and resting behavior frequency decreased. The jaguars used more areas of their enclosure when enrichment items were present. Scents such as perfumes and deodorants received the greatest frequency and duration of enrichment behavior. Behavior of a single jaguar was affected similarly by olfactory enrichment. In conclusion, olfactory enrichment promotes positive active behavior in captive jaguars and may help support conservation programs.

2:15

Development of Non-Invasive Reproductive Monitoring Techniques for Endangered Amur Leopards

Allison Graham; Michael Drake, Andy Kouba, Erin Willis, Memphis Zoo

Faculty Sponsor: Jon Davis, Department of Biology

An understanding of the reproductive biology of critically endangered snow and Amur leopards can aid in conservation efforts. The first objective of this study was to optimize fecal steroid hormone extraction procedures using snow leopards as a model. We compared combinations of different fecal steroid hormone extraction procedures to determine which method extracted the greatest amount of steroids. For fecal androgens, a 6.8-fold increase in concentration was found when samples were extracted with methanol and vortexed for 20 minutes compared to other extraction methods. This method also yielded a greater amount of estrogens. Our next objective was then to determine appropriate antibodies for enzyme immunoassays, as well as reproductive seasonality in the closely related Amur leopard. Results indicated broad scale testosterone and progestin antibodies and an estrogen metabolite (estrone glucuronide) antibody could be used to measure fecal steroid hormones in Amur leopards. In male Amur leopards, preliminary results indicate that the average level of testosterone for the transitional month of September was lower than the average level for fall months. For females, differences in estrogens indicate that summer is suppressing ovarian function. Results from these studies will characterize the seasonal reproductive profiles and assist with the conservation of these leopards.

Quantitative and Computational Science

Frazier-Jelke A, 2:15-3:45pm

Session Chair: Stephanie Milazzo

2:15

Radiation Safety in Medicine

Chase Sliger; Bill Maguire, Methodist University Hospital

Faculty Sponsor: Ann Viano, Department of Physics

Health physics is an important part of ensuring patient and employee safety during medical procedures involving radiation. Two important areas are in the design of shielding for PET/CT scan rooms and determining the amount of radiation patients receive as part of therapy. Calculations were performed to determine the required thickness of lead needed to properly shield hospital staff and patients and family in the surrounding area for the installation of new equipment at Methodist University Hospital. A second project computed the dosage of I-131 patients received for either hyperthyroidism or thyroid cancer and a determination as to whether or not release from the hospital was safe. Both projects illustrate the use of physics for medical safety in routine hospital procedures.

2:30

Gamma-Euler-Satake Characteristics on Orbifolds

Ryan Carroll

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

The Euler characteristic of a geometric object such as a sphere or torus (doughnut) is a number calculated via a concept known as triangulation and is associated to that specific space. For example, the Euler characteristic of a sphere is 2 while the torus is 0. This action of triangulation refers to building a space “equivalent” to the original from triangular prisms when the object is 3-dimensional or triangles when the object is 2-dimensional. The number of vertices, edges, and faces of this constructed shape can then be used to classify this space and provide much useful information. For spaces known as orbifolds with singularities in the form of cusps or edges on the surface, a rehashing of this Euler characteristic is necessary to obtain equivalently useful information. The Gamma-Euler-Satake characteristic is an example of such a rehashing. Given an orbifold, we can decompose the space into pieces known as sectors, and when the Euler characteristic is applied to each piece and summed, this Gamma-Euler-Satake characteristic is obtained. In this presentation, I will discuss the process of decomposing an orbifold into its sectors, these old and new Euler characteristics, and their application.

2:45

Studying the Effectiveness of Various Input Methods when Interacting with a Large-Screened Computer from a Distance.

Lily Elfrink, Tierney Jackson, Travis Rasor

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

With projectors and other large-screened computing interfaces becoming more ubiquitous, it is more important than ever to identify efficient input methods and devices. Previous work has indicated that an input method using a PDA as a virtual controller is useful, and this project extends that idea and also incorporates the Wii-mote as another input method. The project evaluated these two methods in a variety of categories and compared their usability with that of a traditional mouse and keyboard interface when used for the same tasks. This project seeks to determine whether or not the mouse and keyboard are the best input methods when interacting with a large-screened computer, and also offers insight into how these findings can be applied in an academic setting.

3:00

Ligand Binding and Charge Migration in AChBP's Aromatic Box

Erin Carter

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

The active site of the Acetylcholine Binding Protein, called the aromatic box for its five aromatic amino acid components, is a receptor for nicotine in the brain. To try to better understand how charge interactions are involved in nicotine binding, we calculated Mulliken atomic charges. The structures that we studied include isolated amino acids, isolated nicotine, the aromatic box without nicotine, and nicotine bound to the aromatic box from the protein's crystal structure. The Mulliken atomic charges of the various structures were calculated using both correlated WFT and select DFT methods. In addition, we examined charge convergence over a range of basis sets from 3-21g to 6-311+g*. We found that the charge migration in the aromatic box was relatively minor compared to nicotine's considerable charge migration. We also experimented with adding both implicit and explicit solvents to the aromatic box and observed the resulting charge migration. Finally, we docked additional ligands—morphine, cocaine, and galantamine—and calculated interaction energies (using the 6-311++g** basis set) to further map the electronic structure of the aromatic box.

3:15

Molecular Modeling Of The Metabolism Of Acetaminophen And Acetaminophen-like Molecules

Laura Hofto

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Paracetamol, or acetaminophen, is a common analgesic and fever-reducer. There are three major metabolic pathways for acetaminophen in the liver. The final products of each pathway are nontoxic and are excreted by the kidneys. Cresol and similar molecules are competitors with acetaminophen for metabolism in the gut. We can compare the metabolism of acetaminophen with alternate molecular structures—such as cresol—using a QSAR analysis of each molecule. We compute the dipole moments, hydrogen bonding capabilities, electron density and homo/lumo energies and orbital shapes of these molecules in order to understand how the optimized structures of these molecules interact with enzymes during each possible path of metabolism. We apply correlated quantum mechanical methods, such as MP2, and DFT methods to the interaction of acetaminophen and its analogs with the protein active site responsible for its metabolism. We also perform docking calculations to see how tightly these molecules will bind to the protein structures.

3:30

Quantifying Molecular Properties of Statin Drugs: DFT Results

Allison Price

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Statin drugs are used to inhibit the production of cholesterol by competitively binding to the active site of HMG-Coenzyme A reductase. We have taken seven existing statins, (Rosuvastatin, Compactin, Fluvastatin, Cerivastatin, Atorvastatin, Lovastatin, and Simvastatin), and calculated solvation energies—both in water and a non-polar solvent, HOMO and LUMO energies and dipole moments. HCTH407/6-31g was used for optimization of the

molecular structures and the continuum salvation models (COSMO) was used for studying the molecules in solution. We correlated these properties to the values of the in vivo potencies (the pIC₅₀) of each drug in order to derive quantitative structure/activity trends. A possible correlation was found between the structural orientation of the LUMOs and the potency. We are currently using the trends derived in the work to predict the potency of novel statin drugs being developed in our research group.

Genetics, Biochemistry and Molecular Biology

Frazier-Jelke B, 2:45-3:45pm

Session Chair: Helen Floersh

2:45

Development of New Treatment for Skeletal Metastases

Blake Copeland; David Komatsu, InMotion Orthopaedic Research Center

Faculty Sponsor: Ann Viano, Department of Physics

There are over 1.3 million new cases of carcinoma in the U.S. each year with 50-80% of them resulting in skeletal metastases. These skeletal metastases increase the risk of pathologic fracture, which requires surgery and the implementation of an orthopedic plate and screws. This surgery adds to the trauma already being experienced by the patient during the duration of their cancer treatments, and decreases their quality of life. In order to improve palliative care a new treatment for skeletal metastases is needed. We have developed a novel biomatrix that has demonstrated efficacy for the local delivery of chemotherapeutics and has been approved by the FDA. This biomatrix shows promise to not only effectively treat skeletal metastases, but also to do so with little to no side effects to the patient. The eventual application of this biomatrix will be a single injection by a family practitioner that requires no follow up, yields no side effects, and requires no extensive financial or time burden on the patient.

3:00

Regulated expression of the SccA gene by the inducible AlcA promoter affects both development and cell wall integrity in *Aspergillus nidulans*

John Musgrove, Erinn Ogburn, Loretta Jackson-Hayes, Terry Hill

Faculty Sponsor: Darlene Loprete, Department of Chemistry

The filamentous fungus *Aspergillus nidulans* is the most genetically tractable member of the *Aspergillus* genus, which includes species of industrial and medical significance. Pathogenically, these fungi cause superficial, allergic and invasive aspergillosis. This research describes a novel gene designated SccA, which affects cell wall integrity in *A. nidulans*. Plasmid-borne extra copies of SccA can suppress the calC2 mutation in the *A. nidulans* orthologue of protein kinase C (PkcA), which results in hypersensitivity to the chitin-binding agent Calcofluor White (CFW). In filamentous fungi, as in yeasts, hypersensitivity to CFW correlates with defects in cell wall integrity. The hypothetical translated product of SccA is a 271-aa protein (unprocessed), with a probable transmembrane domain and an extracellular domain rich in serine and threonine. A SccA-GFP hybrid localizes to the plasma membrane of vegetative hyphae. When SccA is placed under the tightly regulatable AlcA promoter, vegetative growth is normal under both inductive and repressive conditions (growth on glycerol and glucose containing medium, respectively), but asexual sporulation is inhibited during growth on glycerol. SccA repression enhances CFW sensitivity, while SccA induction decreases sensitivity. We hypothesize that this phenotype is representative of a signal transduction protein functioning in the cell wall integrity pathway.

3:15

Father Knows Best: Identification of Paternal Genomic Loci that Regulate Flowering Time in *Arabidopsis thaliana*

Maria Cartagena

Faculty Sponsor: Jonathan Fitzgerald, Department of Biology

Plants are typically responsive to a wide variety of environmental cues, such as day length and temperature. Plants from different environments can therefore display different adaptive strategies to fit their own environment. Our current hypothesis is that these adaptive strategies are transmitted to the offspring through epigenetic mechanisms,

whereby differences in maternal or paternal regulation of gene expression can potentially change adaptive strategies even in plants that are otherwise genetically identical. We first examined *Arabidopsis thaliana* from Columbia, USA (Col) and Landsberg, Germany. (Ler). It was found that seed size and flowering time were regulated by these parental influences. In some cases, genetically identical individuals express different phenotypes based on the plant, Ler or Col, chosen as the father. With these studies we found a locus on chromosome V that, when inherited paternally, can greatly prolong the time for flowering. To establish if these epigenetic adaptive strategies are abundant in nature, genome wide association lines, which comprise 96 individual lines isolated from all over the world, are being used to find the genes responsible for these phenomena.

3:30

Analysis of the C-terminal Domain of a Putative Cell Wall Stress Receptor in *Aspergillus nidulans*

Jacqueline Ward, Terry Hill, Loretta Jackson-Hayes

Faculty Sponsor: Darlene Loprete, Department of Chemistry

We have found a gene, designated SccA, that affects cell wall integrity in the filamentous fungus *Aspergillus nidulans*. Plasmid-based, overexpression of SccA can suppress the calC2 mutation in the *A. nidulans* orthologue of protein kinase C (PkcA), which results in hypersensitivity to the chitin-binding agent Calcofluor White (CFW). In addition, we have shown that SccA complements 6 wall-sensitive strains. In filamentous fungi, as in yeasts, hypersensitivity to CFW correlates with defects in cell wall integrity. SccA is predicted to have a single transmembrane domain, an extracellular domain rich in serine and threonine amino acids residues, and C-terminal domain of 59 amino acids. Homologues exist in the genomes of other filamentous fungi, but not in yeasts or other organisms. A SccA-GFP hybrid localizes to the plasma membrane of vegetative hyphae. In the cell wall integrity pathway in yeast, the C-terminal domain of the stress receptors, Wsc1 and Mid2, have been shown to play an important role in the signal transduction pathway. Because SccA most likely works upstream from PkcA and may be acting in a similar manner, we have created truncation mutants to determine the amino acids important for a functional SccA.

SOCIAL SCIENCES ORAL SESSIONS

Research in the Social Sciences

110 Buckman, 11:00am-12:15pm

Session Chair: Sarah Rogers

11:00

Organizational Design: An Interconnected Perspective

Aaron A. Fitzgerald

Faculty Sponsor: Dee Birnbaum, Department of Economics and Business

Two competing perspectives of organizational design, coactivational and configurational, are discussed and studied as interrelated. The coactivational perspective views structure as emergent from a pattern of behaviors among organization members, or actors, that is constrained socially and communicatively; whereas, the configurational perspective views structure in a more technical manner, in that, there is a clear distinction in managerial authority. To prove that these perspectives are not disparate, but connected, this paper uses the socialization variables: technology, size, and dependence, to demonstrate how these variables can change organizational design and structure.

11:15

Migration for Development: A Case of the Philippines

Courtney A. Eskew

Faculty Sponsor: John Copper, Department of International Studies

Foreign aid has received increased scrutiny over recent years for its failed role in international development. This paper therefore considers migration, and more specifically the remittances associated with migration, as an alternative to traditional aid. Migrant remittances, or the monetary transfers made by a foreign worker to his home

country, are recognized to be a significant channel through which Diasporas can contribute to poverty alleviation in some of the world's least developed countries. In order to capitalize this increasingly more durable and stable source of capital flow, both recipient and donor governments must treat remittances as a form of development assistance. The Philippine government is rare in that it has already realized the potential for migrant remittances and thus shaped its migration policy accordingly. The government provides training to Filipinos in service-specific industries for the purpose of migrating to developed countries where skilled Filipino labor is needed. Consequently, the Philippine government is producing migrants for the world market. In return, their remittances are used for development initiatives. This paper will argue this case of the Philippines as a model of migration for development policy in other countries.

11:30

Zulu Nationalism In South Africa

John Yackulics

Faculty Sponsor: Andrew Michta, Department of International Studies

The effects of ethno-nationalism, where ethnicity drives the political identity of a state, are aptly demonstrated when examining Zulu Nationalism and the Inkatha Freedom Party (IFP) in South Africa during the era of apartheid. Led by Mangosuthu Gatsha Buthelezi, the IFP was a significant political force in South Africa right up to the first free multiparty elections in 1994. Essentially, ethno-nationalism served as the primary vehicle to advance Buthelezi's political agenda of making the IFP the dominant party in South Africa. In light of this fact, this paper focuses on three areas of interest. 1. The Zulu as the largest ethnic group in South Africa during Apartheid. 2. The political program of the IFP and Buthelezi's goals. 3. Whether or not Buthelezi was successful in achieving his political agenda. Buthelezi was ultimately unsuccessful in achieving his agenda because tensions created with the African National Congress, which had a more inclusive platform, as well as the polarizing effect that ethno-nationalism had on the electorate, ultimately led to the defeat of the IFP by the ANC. Ethno-nationalism was thus the greatest strength and weakness of the IFP's platform.

11:45

The Electoral College and the Two-Party System: Four Case Studies in Electoral College Reform

Peter Zanca

Faculty Sponsor: Michael Nelson, Department of Political Science

Since the ratification of the U.S. Constitution, the electoral college has become one of its most controversial provisions. Beginning in 1800, members of Congress have submitted hundreds of amendments to replace the electoral college – far and away more than any other topic. Nevertheless, the Twelfth Amendment represents the only successful attempt at reform. If electoral college reform has been such a popular idea over such a long period, why have reform movements so often ended in failure? This paper examines four major efforts at altering the electoral college: the Twelfth Amendment of 1804, the Lodge-Gossett Amendment of 1950, the Celler-Bayh Amendments of 1969 and 1970, and the National Popular Vote plan that began in 2006. While each of these reforms advocates a different substitute for the electoral college, the politics surrounding each movement demonstrate major similarities. Each movement gained momentum from potential crises in preceding presidential elections, and support for each proposal tended to develop along partisan lines. Even with the support of the majority party, however, factionalism within that party – either along regional or ideological lines – has been one of the major causes of failure for these amendments.

12:00

The Role of Vasopressin and Oxytocin in Romantic Attachment

Danielle Fincher

Faculty Sponsor: Kimberly Gerecke, Department of Psychology

Human males and females tend to form long-term, selective, mostly monogamous, social attachments that are often described as romantic love. What accounts for this monogamous tendency is the subject of on-going discussion. Because of their role in bonding between parents and offspring, researchers have begun investigating the role of the neurohormones vasopressin and oxytocin in non-familial, romantic bonding. Most research has been done using a monogamous prairie vole (*Microtus ochrogaster*) model and these studies suggest that the pattern of oxytocin and vasopressin receptors differ between monogamous and nonmonogamous voles. Moreover, in monogamous species,

activity of oxytocin and vasopressin influence areas of the brain associated with the dopamine reward pathway, making social behavior and affiliation with one's partner rewarding. Additionally, these hormones, especially oxytocin, help solidify social memories of one's partner. The combined effect of oxytocin and vasopressin facilitate the formation of strong social attachment between two individuals and often leads to, if not sexual monogamy, then at least monogamous social affiliation.

Anthropology & Sociology Research I

212 Buckman, 11:00am-12:15pm

Session Chair: Elizabeth Hook

11:00

If it Flies it Dies: An Ethnography of Ducks Unlimited

Andrew Hammond

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

The purpose of this project is to help explain how a successful environmental conservation organization can thrive despite the fact that most of its members hunt the very animals they pledge to protect. I have conducted an ethnographic study on the Ducks Unlimited Organization in order to better understand how Ducks Unlimited functions by examining its methods and motives for conservation, its stance on recreational hunting, and its view on animal rights. My research has taken me deep within the Ducks Unlimited organization and has allowed me to gain an insider's perspective to the culture of America's waterfowl hunters. By use of participant-observation through Ducks Unlimited membership, I have been able to study a number of issues regarding the coexistence of conservation and sport hunting. This research has also given me the opportunity to directly witness a revolutionary approach to environmental conservation that many ecologists assumed would fail.

11:15

Youth Homelessness in Memphis

Wesley Campbell

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

Youth constitute a large segment of the homeless Memphis community; however, very few organizations offer aide, shelter, and supportive services to this population. For a variety of reasons, existing shelters, social services, medical clinics that serve homeless persons are typically restricted to adult use. The lack of resources for homeless youth is partially due to the nonexistence of a cohesive research strategy for documenting the presence and needs of homeless youth. The purpose of this research study is to develop a valid needs assessment survey that may be administered in institutional and public settings to document the housing and supportive service needs of Memphis homeless youth. The development of this needs assessment survey is based on 1) an analysis of needs assessment instruments used in other cities, 2) interviews with local stakeholders involved in programs addressing youth homelessness and 3) a review of competing definitions of "youth homelessness." The needs assessment survey developed through this research will be provided to local stakeholders for consideration in future efforts to document and address the problem of youth homelessness in Memphis.

11:30

Japan: Marxism, Identity, and American Women

Joy-Katherine H. Martin

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

Why and how do people participate in other cultures and what impact does this involvement have on their identity? I ask these questions with the assumption that our interactions with mass produced goods have the potential to give us an appreciation of, and a desire to learn about, other cultures. This assumption is contrary to Karl Marx's limited view of capitalism and expressed the need for a paradigm which appreciates the significance of culture and its relationship to capitalism. In this study the inter-relationship among cultural context, historical background, intergroup relations, the consumption of products, and diversity among interests is examined to understand the consumption of Japanese culture among American female youth. This culture includes, but is not limited to, the Japanese language, kendo, Japanese fashion, and other Japanese cultural products. In depth interviews were

conducted with 16 college-aged American females who participate in America's Japanese subculture. Half of these women have been to Japan, half have not. The interviews show the complexity of culture and the need to go beyond traditional Marxist theory to study cross cultural, capitalist consumption.

11:45

Mapping the Beat: Gender and Race in the Memphis Police Department

Armanda Venezia

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

This research focuses on the impact of race and gender on policing style and views of authority in the Memphis Police Department. The research consists of an ethnographic study of the daily activities of MPD patrol officers. The ethnography involved ride-alongs with officers on duty, which provided an environment for participant-observation and a chance to become fully engaged in the field. Through a review of relevant literature, the theoretical framework of constructionism emerged as the most fitting conceptualization for this study. Additional areas of inquiry include racial profiling, police brutality, the negative reputation of police, and the presence of corrupt cops in the media. This study shows that most officers view both crime and policing style as complex constructs influenced by a variety of social-structural, institutional and environmental factors.

12:00

A Depilation Nation: The Politics of Body Hair

Molly Bombardi-Mount

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

The general purpose of this research is to study the way individual behavior can empower the self and simultaneously undermine or destabilize oppressive social norms. Specifically, this study explores the narratives of females who have disavowed the feminine identity-marker of hairlessness and how their actions are experienced as a form of embodied empowerment that challenges the feminine beauty ideal fixed by the dominant discourse. Personal stories gathered through dialogic interviews show how females, oppressed by a domineering system that expresses disgust for female body hair, have redefined feminine beauty and are destabilizing the current concept of the feminine mystique. My interpretive analysis of the narratives explores how these females have come to perceive the limitations, exclusions and anxieties engendered by the feminine beautification system in America. My research illuminates certain patterns of the socialization of females that are generated by specific social, political, and economic institutions. With this research I hope to educate and empower other females by documenting how individuals can undermine oppressive aspects of the dominant discourse.

Anthropology & Sociology Research II

212 Buckman, 1:00-2:45pm

Session Chair: Carolyn Lamere

1:00

Pentecostalism: Perpetuated by Poverty?

Lindsay Chaisson

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

This project is situated at the crossroads of sociology and religious studies. Its purpose is to study the connections between charismatic religion and the socioeconomic status of the people who adhere to it. Using a semi-ethnographic approach, Herbert J. Gans' claim that Pentecostalism could not exist without the poor is critically examined. Field-work included attendance at 1) lay member meetings and 2) worship services held by the Church of God in Christ in Memphis. This field-work provided opportunities to study the inter-relationship between socioeconomic status and religious practice through participant observation and conversations with church members. Research findings are used to question the extent to which Pentecostalism may be sufficiently explained as a rational strategy to deal with material poverty, as Gans suggests. Findings from this study indicate that Pentecostalism provides much more than a material coping strategy by providing members with social capital and a sense of identity and self-worth. In light of this, Emile Durkheim's functionalist view of religion is offered as a more valid,

theoretical alternative to Gan's economically restricted view of Pentecostalism. Following Durkheim, Pentecostalism is viewed as a positively functional social institution that provides order and meaning to its members.

1:15

An Exploration of the Memphis Holistic Health Community: Holistic Health Inspiring Holistic Lifestyles

Kimberly Brodziak

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

The purpose of this research is to understand the phenomenological meaning of holistic health among holistic health practitioners in Memphis. In-depth interviews were conducted with ten holistic health practitioners to gather first-person narrative descriptions of their experiences with holistic health. Interview subjects were selected using a snowball sampling method. An inductive, qualitative interpretive approach was used to identify how the meaning of health is represented in the personal and professional experiences, and lifestyles, of the interview subjects. A phenomenological theoretical framework is used to frame the interpretation of narratives and identify common themes across the subjects' descriptions of embodied experiences that disclose the meaning of holistic health. This includes narrative descriptions of embodied experiences leading to the decision to study holistic health, become a professional holistic healer, and choose a holistic lifestyle. This research shows how individual experiences can inform the emergence of a holistic self and professional identity that deviates from several dominant cultural assumptions.

1:30

An Ethnographic Study of Nurse-Patient Relations in a Clinical Setting

Kathryn Sella

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

This ethnographic study explores the clinical setting and provider-patient interaction at Methodist University Hospital's Outpatient Cardiovascular Center. Ethnographic description of the clinical setting and participant-observation are used to study the clinic's culture and the types of interaction engaged in between staff and patients. Special attention is placed on the interaction between nurses and patients and the importance of cross-cultural understanding and its role in structuring nurse-patient relationships. The concept of cultural competence is used to frame interpretations of field observations regarding nurse-patient interaction. A key finding of this study is the way language and concrete examples are used by staff to communicate important information regarding self-care to patients from different cultural backgrounds. This research suggests that the use of concrete, understandable examples is an important component of cultural competence in chronic-care clinical settings.

1:45

An Ethnographic Study of Culturally Generative Space in Contemporary Midtown Memphis

Bridget McCall

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

"Man is an animal suspended in webs of significance he himself has spun," anthropologist Clifford Geertz once observed. He goes on to state, "I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning." Anthropology is concerned with the study of culture, and this study seeks to explore what unique webs we have spun in our own local community here in midtown Memphis. With a theoretical basis in symbolic anthropology, this research employs the interpretive science of the ethnographic method to study "culturally generative spaces" in contemporary midtown Memphis. Roy Wagner's notion that "culture is invention" is used to define "generative cultural spaces" as social settings that foster interaction among individuals that are especially supportive of creative and productive experience. Field-work conducted in a variety of such spaces in Memphis suggest that these spaces foster a creative, dialectical process between the individual and the social world that is productive for both the individual and culture.

2:00

Women: An Ethnographic Study of Women’s Organizations on the Rhodes College Campus

Meredith Fifer

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

This research is an ethnographical study of three women’s organizations on Rhodes College campus: The Women’s Center, VOX (Voices of Planned Parenthood) and V-day. This study explores how women are perceived on Rhodes campus and how these three organizations contribute to improving the college environment for women and the issues they may face. The research was conducted over the period of four months and included attendance at organizational meetings and events, and interviews with organization members and speakers. Participant observation and completed interviews show that these organizations contribute to the improvement of the condition of women on campus through advocacy and the raising of campus awareness regarding women’s issues, including issues of safety and gender-based discrimination. This study offers an ethnological perspective of campus life understood from the embodied situation of women, the issues they face at Rhodes, and the prospect of ongoing improvement of women’s conditions on campus.

2:15

Cultural Change in the Deaf Community Due to Recent Technological Advances

Emily Wheelwright

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

The d/Deaf community is one that is traditionally close-knit, with a strong and unifying culture that provides critical support for the traditionally oppressed social minority of the d/Deaf and hard of hearing. Within the last twenty years, vast changes have been made in policy and technological development to make it easier for d/Deaf and hard of hearing people to operate in a hearing world. What is the impact of these developments on deaf culture, once so central and critical in the lives of the d/Deaf and hard of hearing? In this project in-depth interviews were conducted with members of the deaf community, including d/Deaf individuals and interpreters, regarding the impact of recent technological change on their lives and deaf culture as a whole. A neo-Marxist theoretical framework is used to analyze the interview data to argue that increased use of technology (such as cochlear implants and video phones) creates alienation among members of the deaf community and decreases the cohesion of deaf culture. This development creates new, unresolved problems and challenges for d/Deaf individuals and their family members.

2:30

An Ethnographic Look into My Internal Evaluation of Grizzlies Academy

Kendral Ellison

Faculty Sponsor: Thomas McGowan, Department of Anthropology & Sociology

The purpose of this study is to conduct an internal evaluation of the Grizzlies Academy and the progress it has made toward realizing the goals specified in its strategic plan. This study is timely because of a recent change in the school’s leadership, which included the hiring of a new principal. The previous principal of the school was of a different race, gender, culture, and generation. For this reason the evaluation focuses on changes in the organizational culture resulting from changes instituted by the new principal and his strategic plan. Participant observation is used to observe the transition experienced and reported by faculty, students, and staff as a result of the administrative change. The evaluation criteria used to assess organizational change include but are not limited to the following indicators: leadership, morale, the financial health of school and changes in student performance, behavior and attitudes. Focusing on these aspects of the school’s organizational culture provides insight into the recent changes and the implications of these changes for the future of the Grizzlies Academy.

Research in Economics

110 Buckman, 1:00-2:45pm

Session Chair: Meredith Hicks

1:00

The Effectiveness of the Ballot Box

Allyson Pellissier

Faculty Sponsor: Teresa Gramm, Department of Economics & Business

The main purpose of this investigation lies in examining the creation and sustenance of these legal parameters through congressional voting behavior. In political science, there exist two “roles” that legislators fulfill: trustee and representative. In the first role, the jurisdiction entrusts its legislators with using their expertise to determine the best policy. In the second, it expects its legislators to represent accurately its expressed policy preferences (as revealed through elections and polls). In economics, this distinction exists but takes on a different mold. The literature in economics uses market terminology, with political candidates being the demanders of votes and constituents being the suppliers; on the other hand, when considering policy, legislators are the suppliers and constituents are the demanders. This study analyzes the three proposed motivations behind legislative voting: personal ideology, logrolling, and representation of the prevailing jurisdictional ideology. The existing literature reaches disparate conclusions about which factor serves as the prevailing influence in voting on proposed legislation. In reality, legislators likely draw from all three sources of motivation for different votes. This investigation will test these three prompting influences using data drawn from roll call votes in the past decade. To test these different possible influences, it uses economic regression models, as well as mathematical clustering techniques. This project also analyzes the effectiveness of the political market. That is, it seeks to answer definitively the question of whether the current election system effectively punishes legislators when they shirk. Moreover, it distinguishes between shirking in the form of absenteeism and shirking in the form of voting against jurisdictions’ ideologies.

1:15

Public or Private? The Effects of a Private, Public, and Catholic Education on Financial Aid and College Performance

Becca Clarin

Faculty Sponsor: Marshall Gramm, Department of Economics & Business

Public vs. Private secondary education is an ongoing issue in educational research. Whether private schools provide a student with a higher quality education or whether they better prepare students for college are some of the main questions asked when comparing high schools. This study looks at the impact which private, public, and Catholic high schools have on academic performance by looking at data of past Rhodes students. After controlling for a number of factors, this model regresses different variables, including high school category, on a student’s first semester GPA, first year cumulative GPA, and senior year cumulative GPA to measure the significance and effects of a high school education on college academic performance, and whether those effects diminish over time. The model will also regress the type of high school on the amount of financial aid which a student is offered to note whether the type of high school a student attended has a significant effect on the amount of financial aid they are offered.

1:30

Peak Performance of Professional Athletes

Allen Orgeron

Faculty Sponsor: Marshall Gramm, Department of Economics & Business

Despite the enormous amount of research that has been conducted on professional sports, there have been very few studies done to analyze the peak performance age of these athletes. Analyzing data collected from numerous professional sports websites and other statistic websites, this study was able to harvest data from most major professional sports including: NFL, tennis, PGA, LPGA, and MLB. Using the data collected, the study found results of prime age for each profession based on an output measure selected. The peak performance age was found by utilizing a quadratic function to interpret the results. The findings of this study were very interesting because many of the peak performance ages found had never been done previously. The most interesting finding was the prime age of an NFL quarterback; which was found to be 33 years old. This finding has never been published or documented

before and is interesting to note. The results allowed the study to compare the differences in prime age across sports and gender. Although the results only analyze one performance measure to find peak performance, the study would provide future research a starting point in most professional sports.

1:45

Google Insights and Movie Box Office Revenue

Drew Morehead

Faculty Sponsor: Marshall Gramm, Department of Economics & Business

The internet (and particularly the Google search engine in the U.S. market) has, since its inception just a few decades ago, rapidly become a primary educational source. Due to Google's dominance in the United States search market, its search database (an aggregated and normalized repository of queries) represents a large and significant sample of the American public's requests for information. Economic analyses using this database have been shown to generate or improve predictive models on the macro level. Furthermore, applied economics literature has shown movie box office revenue is often predictable based on characteristics such as star power, director reputation, and Oscar nominations. This paper combines some of the effective regression analysis techniques from literature related to both forecasting using Google data as well as predicting movie box office revenue in an attempt to improve existing models for the U.S. movie market.

2:00

Voter Influence in the United Nations General Assembly

Ryne Marksteiner

Faculty Sponsor: Marshall Gramm, Department of Economics & Business

Power and influence are central to the study of international politics. Because voting in the United Nations General Assembly is unweighted, a state's power outside the assembly is not directly institutionalized as voting power within the assembly. This paper analyzes the relationship between state power attributes and voting influence within the General Assembly while considering General Assembly voting blocs which greatly affect voting outcomes. The results indicate that in the small powers-dominated assembly external power is both an asset and a liability.

2:15

The Value of Contracts: The Change in Expected Salary Before and After Free Agent Signings

Chris Eberle

Faculty Sponsor: Marshall Gramm, Department of Economics & Business

This study uses statistics from the year leading into, and the year following a player signing a free agent contract to determine the expected salary of players based on performance. Using slugging percentage, years of experience, a league dummy variable, and the size of the city a player plays in, salary estimation equations are developed and contrasted in the two time periods in question. While the statistical difference in value between many of the variables is hard to determine, the model does become more efficient in explaining the salaries of players after they sign contracts and players receive salaries that are more in line with their actual value. Along with this, it hints at players signing new contracts at the end of their careers and their overall value decreasing.

2:30

Do Marital Transitions Confound the Obesity Wage Gap?

Hannah Spurrison

Faculty Sponsor: Sarah M. Estelle, Department of Economics and Business

Since 1980, the adult obesity rate has doubled in the United States; according to the Center for Disease Control, over 72 million adults and over one-third of the adult population are obese. Obesity not only comes with health consequences but possible labor market consequences as well. As of 1998, obese workers were paid approximately \$1.20 an hour less than nonobese workers. Recognizing the variety of possible explanations for the wage differential, a new and growing literature has recently developed, focusing on factors such as productivity, self-esteem, genetics, and marriage market outcomes. This research seeks to enhance the obesity wage-gap literature related to marital status by specifically exploring transitions into and out of marriage for women. Obesity affects both marriage and divorce probabilities. If obese women are less likely to marry or more likely to divorce than

nonobese women, obese women may devote more time and effort to labor market activity, increasing their expected wage due to work effort. If we ignore marriage transitions in estimating an obesity wage gap, our results may actually understate the true obesity wage gap.

Ethnography at Home

214 Buckman, 1:15-4:00pm

Session Chair: Neha Mehta

1:15

Flexibility and Functionalism: A Westernized Study of the Yogi Lifestyle

Brittany Gray

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Ethnography is the method of research using participant-observation as a main avenue of studying separate cultures than one's own. The ethnographic method is a two-part approach, the first part utilizes participation within the cultural scene being studied; secondly, observation is used to gain an objective perspective. I have employed the ethnographic method as a foundation for my studies of yoga in order to gain a more in depth knowledge, appreciation, and understanding of the Yogian culture. My studies were conducted at the Midtown Yoga studio, located in Midtown Memphis, Tennessee. Yoga entails many levels of practice, and as a student anthropologist it is vital to not only to study various levels but to focus oneself according to the allotment of time. Throughout the duration of my practices at Midtown Yoga I attended a separate session for each differing day until I settled into a personal rhythm with fellow yogis and the facility itself. This specific focus has allowed more time to observe a set group of yogis, although there were constant variability. I have learned that yoga is more than an hour long sanctuary for Midtowners, but rather a ripple in their daily endeavors that results in positive lifestyle changes.

1:30

The Body as a Canvas: An Ethnographic Study of a Tattoo Parlor

Kirby Pool

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

An important part of anthropology is the ethnography as a way of understanding another culture. Participant-observation as a research method used in the ethnographic experience allows for the researcher to become intimately familiar with a cultural scene through outside observations and descriptions as well as through becoming a part and insider of a cultural scene. This semester, I used the participant-observation method as a way to study the culture of Underground Art, a store in the Cooper-Young district providing tattoo and piercing services. My study focused on the store itself, the people and relations within it, and the purpose of tattoos and piercing within the culture. I observed and asked questions of both staff and clients in the scene. During my study, I found that the structure of the store, in terms of sensual and material culture as well as relations among staff and clients, fosters an atmosphere of artistic collaboration among clients and staff. This study compelled me to question what constitutes "art" and to whom art belongs.

1:45

Mismatched Happiness: An Ethnographic Study of Java Cabana

Grey Robinson

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Ethnography is a method of anthropological study that allows the observer to become part of a culture in order to fully understand and appreciate it. The ethnographer is often considered a participant observer because he or she both observes and participates in the culture in which they are studying. I took the role as participant observer at Java Cabana, a local independent coffee shop in the Cooper Young area of Memphis, TN. Throughout my study I have found that Java Cabana is the farthest thing from a traditional coffee shop. The regulars, the owner, and the employees are a family, not a group of coffee drinkers. They openly share their opinions on any topic and even if they disagree, they still love each other. This warm feeling given off by those that are participants in this culture is clearly reflected in the décor of the shop as well. Just like the people that come into it, the shop is eclectic, diverse,

and fun. Stepping into Java Cabana is stepping out of the harsh real world and catching a glimpse of the quirky, fantastical world of family and individuality that Java Cabana exudes.

2:00

Coffee Culture: An Ethnographic Study of Starbucks

Anna Beth Sanford

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

The ethnographic method, which is most commonly used in fieldwork, allows anthropologists to record and relay information about alternative cultures. Whether these cultures exist in exotic places or right around the corner, the ethnographic method of participant observation provides detailed insight into the anthropologist's area of study. This semester, I employed this method in learning about the unique culture of Starbucks. Through my time spent observing a singular location, I came to conclusions as to why so many are willing to pay generally higher prices for Starbucks coffee and why the café is such a popular place for study and social interaction. I became a participant in the Starbucks experience and through thorough observation became an informed member of its culture. During my time in this space, I focused on sensory perceptions such as sight, smell, taste, and sound, along with social interactions between customers and employees. Through my own experiences along with the stories of employees of Starbucks, I was able to understand more fully what makes this place so appealing to such a diverse group of customers. After many hours spent in the Starbucks environment, I was able to conclude that this space offers the unique experience of interacting with people of many different backgrounds, all being drawn to Starbucks for its variable utility and high quality products.

2:15

Behind the Smoky Curtain: A Deeper Look into the Cultural Scene of the Hookah Bar

Heather Bishop

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

One may think that the most common reason for going to a hookah bar is just to smoke hookah, but for many of the patrons at Oasis, it is much deeper than that. Through research using the ethnographic method of participant observation, I have spent the last three months being both a participant and an observer in this scene. I asked questions, listened, observed, and got people's opinions on what makes this hookah bar such a popular spot. My specific place of study is called Oasis; it is a hookah bar on South Highland, where you can only come in through the back door. During my time at Oasis, I focused on the many reasons that bring the customers here (whether it be just for the free wifi, to meet up with a "brotherhood" that was formed here, or to do homework) and why they keep coming back.

2:30

Cultural Bondage and the Desire to Break Free: A Peek into the Culture of A& A Bail Bond Company

Phylcia Douglas

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Culture is a multi-layered word that is filled with complex meanings. Culture can be defined as the collective actions, patterns and actions of a class or community. The proper and most effective way to go about studying other cultures is to actually become a part of that culture which is considered the ethnographic method. I decided to conduct my ethnography at A& A Bail Bonds Company. I chose this setting because people tend to overlook the skill and finesse it takes to conduct business within that setting. By investing in sustained observation of this setting and the people who come and go, I wanted to see how the business is conducted in a bail bonds company. Communication style, attitudes towards customers and work environments were major themes that I chose to focus on while conducting my ethnography at A&A Bail Bonds Company.

3:00

Between Bites: An Anthropological Look into the Social Community of Dino's Grill

Daniel Wolfe

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Research is a crucial part in understanding the various educational studies in the world today. Within the field of cultural Anthropology, research is typically performed with the ethnographic method, which searches for patterns within a social context through participant observation. This practice of participant observation tries to give the researcher an understanding of the culture through observation as an outsider and subsequent participation as an insider in the cultural scene. My study was conducted at Dino's Grill, a local Memphis restaurant that has been around since the 1970s, and has attracted many in the Memphis community, some of who have continually returned over the years. Restaurants are usually thought of as just a place to grab a bite to eat that is different from a typical meal. However, during my time spent at Dino's Grill, I began to focus on the social patterns presented within the cultural scene. By focusing on the social aspects, I found that there is far more meaning involved at Dino's Grill than simply "going out to eat." The individuals that become part of the community are an integral part to how the restaurant gains its cultural meaning through social behavior.

3:15

Books as Babysitters: The Pagemaster Day Care Provider of a Memphis Public Library

Leigh Swiger

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

The discipline of ethnography serves to transform the unknown into the known with the purpose of creating interconnectedness in an increasingly globalized world. During the 2010 spring semester, I engaged in ethnographic research at the Central Branch Library on Poplar. By sitting at benches in the main foyer and without any interaction with the public, I observed the comings and goings of Library patrons. During the course of my investigations, certain themes emerged regarding the various functions of the Public Library. Among these uses, an unforeseen role dominated this cultural scene. The Central Branch Library serves the community of Memphis as an unsanctioned after school care center for both unsupervised children and young adults. Either waiting for rides or socializing, these young kids flood the Library as soon as school is let out until the Library closes. They enter the Library alone and leave likewise; and the only form of adult interaction and supervision comes from the Library staff, particularly the security guards. As a future children's librarian, studying the Library's foyer as an ethnographer has undoubtedly added to my education in the field of Library Science with regards to the role of Libraries as after school day care centers.

3:30

Friends of Felines: Becoming a Cultured "Cat"

Olivia Ryan

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

When someone says they are a "cat person," what do they mean? The House of Mews, located in the Cooper-Young district of Memphis, is a non-profit rescue and adoption center for cats. There are 60 cats roaming free around the small front room where the customers can browse, as well as cats in cages on each side of the room. My role as a volunteer has allowed me not only to practice the method of participant-observation, which is the foundation of ethnographic method, but has also allowed me to become familiar with a different cultural scene to better understand the significance and meaning of this cultural location for the participants. Some themes that I have come to recognize in my fieldwork at The House of Mews is the importance of the role of community and the time commitment and dedication displayed by the participants. People from all walks of life enter and exit the store every day, allowing me to observe impressions and interactions that I may not see during my working hours as a volunteer. The importance of this ethnographic method lies in the knowledge to be gained about the human condition, and appreciating another way of being in the world.

3:45

Exotic Aerobics: Stripping Away the Misconceptions

Brianna Levy

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Among women, there is a culture, only understood by women, that bonds us in unexpected ways. Gender roles peg women as sexual beings, while calling on women to be quiet and shy. It is fair to say that across the world, women of extreme sexual confidence are looked down upon. Eccentric Studios is an aerobics studio that seeks to break women from social constraints and allow them to come into their own. The studio promotes self-confidence, comfort in one's own skin, and personal "sexiness". This is done through classes like Strip-to-Fit, Pole Dancing: Levels 1-3, Hot Body Boot Camp, and a few others. This semester, using the ethnographic method of participant observation, which calls for research to be done within the field by learning a culture in order to understand it, I immersed myself in the culture that surrounds Eccentric Studios. While taking classes and interacting with the instructors and patrons of Eccentric Studios, I attempted to gain an understanding of how these women combat the ideas that others may have about them for being a part of such an institution. Beyond that I discovered that it is more than just a facility that provides a fun way to get in shape and gain confidence. It is also a facility that provides a space for women to come together and support each other, building a community with an unexpected—and not necessarily politically correct—common link.

Buckman Scholars Presentations

110 Buckman, 3:00-3:30pm

Session Chair: Elizabeth Hook

3:00

Life Through a Provencal Lens: A Novel Perspective

Olivia DeLozier

Faculty Sponsor: Steve Ceccoli, Department of International Studies

Studying in Aix-en-Provence while deeply submerged in French culture and language is a dramatically life-changing experience. The experience demonstrated the importance of building relationships and communication skills, while presenting many novel ideas along the way. Challenges arising from integrating those positive changes upon return to Memphis - from consumption habits to post-baccalaureate endeavors - can reaffirm one's core values and interests, and profoundly shape one's future as a healthcare professional.

3:15

Land of the Rising Sun, Pinnacle of My Dreams

Joy-Katherine H. Martin

Faculty Sponsor: Steve Ceccoli, Department of International Studies

Common assumptions and stereotypes about Japanese people and society pervade American perceptions and impressions of Japan. Such themes will be explored through the use of recent experiences and observations within and outside of Japan's Nanzan University. Daily cultural influences, such as those emanating from host family relationships to interacting with foreign classmates, provide valuable anecdotes and lessons in cultural assimilation.

POSTER SESSION I (poster numbers precede titles)

Multisports forum, Bryan Campus Life Center, 11:00am–1:00pm

Fine Arts

#7 Harp Ensemble Outreach

Amber Owens, Julz Anderson, Leerin Campbell, Kelly Dodson, Mae Gillespie, Annabelle Young, Ye Zheng

Faculty Sponsor: Gina Neupert, Department of Music

The Harp Ensemble developed an outreach program that has enabled the group to play for various members in the community that would not normally be exposed to harp music. The focus of the harp ensemble was to touch the lives and provide a release from daily stress and worries for patients of St. Jude, nursing home patients, and young students alike. Through this the harp ensemble has encouraged music education in the community as well as fostered a link to Rhodes College. The production of a CD of the harp ensemble allowed for the music to be distributed in the community so that the music could touch the lives of many for a much longer time in the future. The work of the harp ensemble is being continued through all participants on a regular basis as the members strive to help others in the community in all ways as well as encourage students to take an interest in music.

Social Sciences

#8 The Effects of Campus Engagement on Career Attitude

Dat Nguyen

Faculty Sponsor: Dee Birnbaum, Department of Economics and Business

Many researchers have examined the effects of student engagement (campus engagement) on academic achievement, career development, and job placement upon graduation. Unfortunately, limited research has been done on the relationship between student engagement and attitude toward one's career. The purpose of this paper is to take the literature a step forward by exploring the different measures (cognitive and emotional) of campus engagement and how they are related to student attitude toward his or her internship/externship. The sample consisted of 49 nursing students from a large, southern university. The researcher followed the cohorts through four semesters (from their basic nursing classes to externships in the third and fourth semester). The researcher surveyed the sample in the first and second semester to see how engaged they were, and then surveyed the same students again after they had completed internships. Although the results indicate a strong, significant relationship between campus engagement and student attitudes toward work, they also show both positive and negative correlations. The paper will discuss why these phenomena are occurring.

#9 Congruence in Personality Type and Undergraduate Major: Using Holland's Theory to Study Achievement in Pre-Med Students

Sammy Knefati

Faculty Sponsor: Bette Ackerman, Department of Psychology

This study was designed to examine the assumption of Holland's Theory that person-environment congruence relates positively to academic achievement. Using self-rated "Interest and Ability Scales" from CIRP surveys to assign personality types, a sample of 2,149 college students, including 230 pre-meds, were classified according to congruence in personality type and major field. Students' congruence, as well as "traditional science" and "nonscience" pre-med backgrounds, were analyzed using achievement measures such as cumulative grade point average, science grade point average, and MCAT scores and sub-scores. Results supported Holland's congruence-achievement hypothesis in that congruent students achieved higher cumulative GPA and science GPA, as well as significantly higher MCAT scores than incongruent students. Furthermore, in accordance with previous research, pre-med students majoring in the nonsciences performed as well as or better than their traditional science counterparts in every achievement measure. Implications for academic advisement and counseling are discussed.

#10 An Examination of Student Satisfaction, Color Blind Racial Attitudes and White Privilege Attitudes: The Impact of Race/Ethnicity

Derek King, Noah Schill, Whitney Warren, Jesse Straus, Lakeya McGill, Shadana Bracy

Faculty Sponsor: Mistie Germek, Department of Psychology

Previous research has shown that undergraduate students of color attending predominately white colleges are not as satisfied with their collegiate experiences as their white counterparts (Ancis, Sedlacek, Mohr, 2000; Schwitzer, Griffin, Ancis & Thomas, 1999). The purpose of this study was to explore potential differences in the degree of satisfaction with social experiences and academic experiences that students of color and white students have on campus. Furthermore, differences between students of color and white students' reports of color-blind racial attitudes, white privilege attitudes, and psychological stress and well-being were also examined. Overall, 273 juniors and seniors attending Rhodes College participated in this study. Results revealed that white students reported higher levels of social and academic satisfaction than students of color and were also more likely to recommend Rhodes College as a good college to attend. White students also reported feeling more like they were part of the community at Rhodes College than students of color. In addition, students of color reported higher levels of knowledge of white privilege, lower levels of color blind racial attitudes, and more mental health issues than white students. Practical implications of the results will be addressed.

#11 The Influence of Socioeconomic Status and Race/Ethnicity on Student Performance on the EXPLORE Test

Cristina Iskander, Brittany Signorelli, Samantha Sipple

Faculty Sponsor: Janet Panter, Department of Psychology

Both socioeconomic status (SES) and race have been found to directly and indirectly influence students' academic performance and future educational and career goals. The EXPLORE(ACT, 2006) standardized test given annually to eighth grade students in Memphis City Schools assesses aptitude in Math, Reading, Science and English; collects data regarding students' plans for high school courses, higher education and career choices; and measures students' vocational interests. Using test results from 2007-08 and 2008-09, we examined the achievement gaps evident amongst Memphis City Schools' students based on their race/ethnicity and SES. Additional analyses were conducted to analyze the extent to which students' academic and occupational aspirations were in line with their achievement scores on the EXPLORE test. We found a disconnect between students' career aspirations and expectations and the level at which they were performing academically, as evidenced by their low scores. In addition, we investigated whether students whose scores fell below college benchmarks were aware of their need for academic assistance. We will discuss the extent of the achievement gap, variations in students' career aspirations and educational plans, and students' self-perceptions regarding their need for academic assistance.

#12 The Downfall of Early Intervention Programs: the Relationship Between the Ease of Early Intervention Programs and a Child's Outcome

Kelly McClenathan, Shadana Bracy, Melanie Carter, Kelly McClenathan, Lauren Oldenburg

Faculty Sponsor: Janet Panter, Department of Psychology

Early Intervention (EI) programs provide services to children with a diagnosed disability, developmental delays or who are at risk of becoming developmentally delayed. Considerable research (e.g., Bailey et al., 2004) has evaluated the outcomes of EI programs, though much of that work does not differentiate among the three eligibility categories of (diagnosed condition, developmental delay, or at risk of a delay). The National Early Intervention Longitudinal Study (NEILS) assessed the services and outcomes provided to over 3,000 children. Using that dataset, we examined the factors influencing the negative feelings and experiences reported by families with children receiving EI. In addition, we analyzed the relationship between the ease of access to EI services and the outcome of these services. First, we hypothesized that the access to EI services would be easier for children with a diagnosed condition and those that are at risk of a delay than a child with a developmental delay. Our second hypothesis was that the easier it was to enroll in an EI program, the better the child's life quality would be at their entrance to Kindergarten. Based on our research, we hope to identify the factors that significantly influence children and family outcomes.

#13 Every Child, Every Day College Bound: Aspirations and Achievement of Eighth Grade Students

Jessica Rathel, Flecher Ferguson, Alexandra Nobel

Faculty Sponsor: Janet Panter, Department of Psychology

Though Memphis City Schools adopted the motto “Every child, Every day, College bound,” this has not been an attainable goal for a number of reasons. Social stratification plays an integral role in the perception of realistic career goals for children. Memphis city children growing up in lower socioeconomic communities face many obstacles that cause them to set low educational and career goals, believing they are unable to achieve a higher professional status in the future. The EXPLORE(ACT, 2006) standardized test given annually to eighth grade students in Memphis City Schools assesses aptitude in Math, Reading, Science and English; collects data regarding students’ plans for high school courses, higher education and career choices; and measures students’ vocational interests. Our study analyzed results from the 2007-08 and 2008-09 school years for trends based on socioeconomic status and its effects on students’ self-reported high school course plans and career goals. We will discuss the influence of socioeconomic status on students’ aspirations and suggest some ways the Memphis City Schools may better prepare students to reach their potential.

#14 The Effect of Tutor Emotion on Student Learning

John Nichols, Hal Flowers

Faculty Sponsor: Natalie Person, Department of Psychology

The primary goal of this study is to code for the expression of tutor emotions in forty, one hour expert tutoring sessions. A Rhodes alumnus reliably coded the expression of student emotion in the same corpus of expert tutoring videos we will be using in this study. We plan to analyze the relationship between the expression of tutor emotions to the previously coded student emotions. This analysis will inform the existing body of literature which emotional expression drives the other. Does student emotional expression drive tutor emotional expression, or vice versa? The answer to this question could pose interesting possibilities in understanding how affect can influence learning outcomes in tutoring scenarios. Inter-rater reliability for the emotion coding has been achieved by the two investigators in this study. The emotions we plan to code for include: anger, anxiety, boredom, confusion, curiosity, disgust, empathy, fear, frustration, happiness, neutral, sadness, skepticism, and surprise. We anticipate that the most frequently occurring emotion seen in expert tutors will be “neutral”. This expected outcome is based on the findings of a previous study that found that educational contexts afford the expression of “neutral” at a rate statistically greater than all other coded emotions.

#15 "And the moral of the story is...": An Examination of Moral Discourse in Children's Conflict Narratives

Darcy Emerson, Danielle Parrott

Faculty Sponsor: Marsha Walton, Department of Psychology

Previous honors research at Rhodes has shown that children’s stories about interpersonal conflict encourage children to carry out moral evaluation (Brewer, 2001; Harris, 2004). In this study we have extended this work by examining 239 autobiographical conflict stories written by children in grades 3 through 6 from two schools. The children filled out several assessments of self-concept and of their place in the network of classroom peer relationships. Approximately three weeks later, they were asked to write about an occasion in which they had a conflict with a classmate. Their stories were reliably coded for the explicitness of the author’s moral evaluation of self and other. Multivariate analyses of variance will be used to investigate the effects of age, gender, and peer group status (rejected, neglected, accepted) on the tendency to include moral assessments in the narratives, on popularity, and on measures of self-concept. We expect to see explicitness of moral assessments increase as a function of age. We also expect that children who are rated higher across multiple variables of popularity will exhibit more moral aptitude than their less popular peers. This will be discussed with regard to existing evidence showing narrative discourse facilitates moral and social cognitive development.

#16 “I wonder why did she think that”: Exploring the Relationship Between Psychological Mindedness and Peer Relations in Middle Childhood Conflict Narratives

Darcy Gist, Kelly Schrickler, Kryseana Harper

Faculty Sponsor: Marsha Walton, Department of Psychology

Previous research suggests that children’s understanding of mental and emotional states in themselves and in others, a skill we refer to as psychological mindedness, plays an important role in peer relationships (de Rosnay and Hughes 2006). Our approach is grounded in Bruner’s 1990 theory that narrative is critical for developing this skill. The major purpose of this study is to investigate the role of psychological mindedness in children’s narratives about their own interpersonal conflict and its connection to peer relations. Stories were collected from 239 3rd to 6th graders from two urban schools located in the southern United States. Children also completed surveys that allowed us to assess their self-concept and integration in a peer network. Inter-rater reliability was established, and stories were coded for different types of psychological mindedness: reports of own and other’s mental and emotional states, motives, or traits. Grade, gender, and school effects will be examined using analyses of variance. We predict that socially accepted children will exhibit more psychological mindedness than their neglected and/or rejected peers, and psychological mindedness will increase with age. Results will be discussed in light of ongoing efforts to reduce peer rejection and isolation.

#17 Tip-of-the-Tongue States for Proper Names

Sarah K. Holloway, Marian S. Howorth, Lakeya McGill, Kathryn C. South

Faculty Sponsor: Katherine White, Department of Psychology

The purpose of this experiment was to investigate tip-of-the-tongue (TOT) states for proper names. TOTs occur when known words or names are temporarily unable to be recalled. Previous research has found that proper names are the most common cause of TOTs, and this experiment tested whether alternate names decreased resolution of TOTs for proper names. College students saw a series of descriptive questions that were designed to induce TOTs for famous people’s names (“target names”). When participants indicated having a TOT, they were presented with a name of a different famous person that either shared the first or last name with the target name, or did not share either of the names. Based on previous research showing that phonologically-similar words with the same part-of-speech compete for retrieval, we predicted that fewer TOTs would be resolved following names that shared phonology with the target compared to names that did not. Further, we expected fewer TOTs to be resolved following presentation of first- than last- name primes because first names are used more frequently and thus are stronger competitors during retrieval. Findings will be explained within speech production models and implications for resolution of “everyday” TOTs will be discussed.

#18 Does Bruce Stinson Prevent Tip-of-the-Tongue Resolution for Bruce Wayne?

Derek King, Greg J. Bolwell, Jasdev K. Singh, Mandi R. Waits

Faculty Sponsor: Katherine White, Department of Psychology

This experiment investigated whether exposure to non-famous names influenced resolution of tip-of-the-tongue (TOT) states for famous names. A TOT occurs when a known name cannot be recalled, and results when specific sounds (i.e., phonology) of the name are temporarily unavailable for retrieval. Rhodes College undergraduates were asked questions designed to elicit the names of famous people (e.g., actors, politicians, historical figures). Participants responded that they knew, did not know, or were having a TOT for each target’s name. Following TOT responses, participants answered a question that had a non-famous name prime that shared either the first name or last name with the target, or did not share any phonology with the target. Based on previous research, similar sounding words that share part-of-speech compete for retrieval. We predicted that names that share phonology with the target would inhibit TOT resolution compared to names that do not share phonology. Further, first name primes should lead to the greatest inhibition of TOT resolution because of their high frequency usage, making them stronger competitors. However, inhibition was not expected to be extremely strong because non-famous fictional names do not have pre-existing representations in memory. Results will be discussed in terms of speech production models.

Environmental Science & Geographic Information System (GIS)

#19 Spatial Patterns and Behavioral Activity Budgets of Grey Wolves (*Canis lupus*) at the Memphis Zoo

Stephanie N. Cassel, Andy Kouba, Memphis Zoo

Faculty Sponsor: Sarah Boyle, Department of Biology

Grey Wolves (*Canis lupus*) are experiencing widespread habitat destruction and have been negatively impacted by human interactions in the wild. Limited research has been done on wolf habitat use in captivity. With the opening of Teton Trek at the Memphis Zoo, four grey wolves were introduced into a new public exhibit. The objectives of this study were to create activity budgets of the four wolves and to analyze the spatial use of the exhibit through Geographic Information Systems (GIS) mapping. Data were collected from October 2009 through February 2010. Using 5-minute interval group sampling, we recorded the behavior and geographic location of each individual in sight. These data were then analyzed to determine overall activity budgets for the wolves, and to identify areas of concentration within the exhibit using GIS. Through geospatial analysis, we concluded that the wolves maximized full use of their enclosure. We also found that the wolves spent the majority of time sleeping, resting, traveling, and interacting with visitors through staring or head movement. We compared these results with previously published literature on wolves in captive environments. Through this study, we hope to promote conservation through a better understanding of captive wolf behavior.

#20 I Speak for the Bamboo: An Evaluation of Red Panda (*Ailurus fulgens*) Habitat and Human Impact

Stephanie N. Cassel, Allison W. Graham

Faculty Sponsor: Sarah Boyle, Department of Biology

Red Pandas (*Ailurus fulgens*) inhabit a small geographic range within parts of Nepal, India, Bhutan, Myanmar and Southern China. They require temperate forests containing bamboo in order to survive. The species is classified as vulnerable by the IUCN as their habitat is currently threatened by deforestation and fragmentation. Main issues include increasing urbanization and agricultural activities including a high demand for firewood. The objective of this study was to evaluate the status of red panda habitat and the effects of human impact through Geographic Information System (GIS) mapping. We created layers for the range of existing populations of red pandas, as well as layers for potential suitable habitat across Asia as evaluated by current terrestrial biomes inhabited by the red panda. A final layer mapped human population density and cities. By evaluating these maps, we can better understand how to approach conservation efforts for this vulnerable species. We also compared our data with recent literature pertaining to panda habitat in order to understand other factors affecting red panda distribution. Using this information, we identified areas of high concern for human impact on red panda population.

#21 The Effects of Soil Content and Vegetation on Infiltration Rates of Rhodes Campus

Ruth Allard, Jared Swenson

Faculty Sponsor: Jennifer Houghton, Department of Biology

The rate at which water is absorbed by the soil, infiltration rate, is affected by soil composition, soil moisture levels, and vegetation. Rhodes campus has a variety of combinations of soil content and local plant life besides a large area of impervious surfaces, such as roads and buildings, which allow water to run off in concentrated areas and create many flooded regions on campus for a large portion of the year. As rainwater collects on saturated soil, fertilizer contaminants and sediment nutrients can run off into storm drains and into major waterways. By measuring infiltration rate, soil moisture, discovering fertilizer techniques used on campus, and analyzing vegetation in areas that frequently flood we will demonstrate the varying speeds of infiltration and their effect on runoff and flooding across campus.

#28 The Dangers of Water Shortages: Atlanta vs. Memphis

Julia Clapper, Emily Barber, Turner Willis

Faculty Sponsor: Jennifer Houghton, Department of Biology

In 2007, an unprecedented drought spanning across the southeastern United States forced the city of Atlanta, and many other regional cities, to declare water emergencies. Droughts are typical of this southeastern climate and are not uncommon. However, the severity of droughts in this region has increased in the past decades. This is not a

result of climate change but rather poor planning in water conservation. While Memphis is not in immediate danger, droughts are known to have severely damaged unsuspecting cities as well as extremely prepared one. We will analyze through historical records what happened in the Atlanta drought, why they had to declare a water emergency, and how they plan to prevent it in the future. The results from these studies will then be applied and compared to the current water storage methods in Memphis. The effectiveness and appropriateness of Memphis' primary source of drinking water, the aquifer, will be discussed. We are examining whether Memphis would have stored an adequate amount of drinking water to avoid declaring a water emergency if it was faced with severe drought conditions. We believe that if Memphis were faced with a drought, similar to the one in Atlanta, the city will have stored a sufficient amount of drinking water to avoid declaring a water emergency.

#29 Using GIS to Model the Consequences of Global Climate Change

Andrew Foss-Grant

Faculty Sponsor: Sarah Boyle, Department of Biology

Global climate change has already modified a large number of Earth's ecosystems, and its effect is projected to increase over the next century. Geographic Information Systems (GIS) provides an ideal way to track climatic variations and predict future consequences of this change. In this poster I focus on climate change over the next century in three key regions of the globe: undeveloped, developing, and developed. Specifically, I examine predicted climate models from the Intergovernmental Panel on Climate Change (IPCC) in Africa, China and India, and the United States. I compare these data with agricultural, demographic, and economic data from the different regions. The results indicate that Africa will likely encounter problems as low agricultural output and small economies conflict with increased drought and decreased precipitation. In developing nations, rapidly increasing populations are likely to conflict with decreasing water availability and shifts in the growing climate for crops. Finally, the United States, though economically suited to cope with changing climate, is predicted to face severe decreases in runoff as well as increased extreme weather, greatly affecting agricultural activity. Global climate change is predicted to affect all areas of the globe, but the determining factor as to how much it will affect human activity seems to be more closely tied to the economic status of the region.

#30 Behavioral Observations of Wild Orphaned Grizzly Bears in a New Captive Environment

Lauren Lieb, Kelly Patton; Andy Kouba, Memphis Zoo

Faculty Sponsor: Sarah Boyle, Department of Biology

We aimed to provide a better understanding of how wild grizzly bear cubs (*Ursus arctos*) adjust to a captive environment. Three bear cubs were orphaned in the wild in July 2009, and subsequently were brought into captivity. The cubs first entered their outdoor exhibit at the Memphis Zoo on September 28, 2009. We documented their initial response to the exhibit, and collected behavioral data for six months. The bears exhibited a range of behaviors, but the greatest proportion of time was spent resting, swimming, and digging. They used all areas of the exhibit, including a sand pit, den, stream, and pool. The cubs also interacted with the public through a glass viewing area, and used enrichment items. No agonistic behaviors were noted. We conclude that the bears exhibited a range of behaviors and used multiple areas of their exhibit, but we suggest that behavioral monitoring continues as the cubs mature.

#31 Assessing Potential Conservation Threats to the Leatherback Sea Turtle (*Dermochelys coriacea*) in the Designated Critical Habitat of St. Croix

Cybil Covic, Julia Goss

Faculty Sponsor: Sarah Boyle, Department of Biology

The majority of sea turtle species around the world are categorized as endangered by the International Union for Conservation of Nature (IUCN), and all five species of sea turtles inhabiting the Atlantic Ocean and Gulf of Mexico are listed as endangered. Their critical habitats have the potential to be threatened by multiple factors including: vessel traffic, increased human population density, anthropogenic effects such as global climate change and pollution, and state and federal regulations. We assessed the level of risks in the Leatherback sea turtle's (*Dermochelys coriacea*) critical habitat around St. Croix, U.S. Virgin Islands. We used a Geographic Information System (GIS) to overlay the critical habitat designated by the National Oceanic and Atmospheric Administration (NOAA) for the turtles, the industrial and recreational build-up on the island, human presence via proximity of roads to the shoreline and beach access. By examining the overlap of these potential threats to the Leatherback species

within its immediate critical habitat, we determined areas within and outside the designated critical habitat where more attention should be focused by turtle conservation groups and government agencies.

#32 Human-Elephant Conflict in Namibia

Blaire O'Neal, Adam Alsamadisi

Faculty Sponsor: Sarah Boyle, Department of Biology

In Namibia, human population growth, land use changes, elephant mobility, and political and media manipulation have caused human-elephant conflict. Two factors that dictate where human and elephant populations live are proximity to water sources and avoidance of habitat disturbances, such as wildfires. For this GIS project, we combined field data on the distribution of elephant and human populations to determine the locations of conflicts. In addition, we researched the availability and distribution of water and the related carrying capacity of the land in Namibia. We hypothesize that (1) human-elephant conflicts are more frequent around water sources and less frequent around areas of wildfire disturbances, and (2) human populations are located on lands that have a higher carrying capacity, displacing the elephant population to areas with fewer resources.

#33 Ecosystem Analysis of Rhodes College Campus

Carsen Bahn

Faculty Sponsor: Rosanna Cappellato, Department of Biology

During the spring 2010 a GIS-based Urban Ecosystem Analysis was conducted on Rhodes College campus. Using CITYgreen software, the Campus was assessed as an urban ecosystem and the benefits of its green infrastructures were quantified. The distribution of different land cover types, such as impervious and pervious surfaces, open space, and tree canopy were determined to calculate current storm water runoff, air pollution removal, and carbon storage and sequestration. The CITYgreen analysis reported the economic benefits of Rhodes Campus in dollar value per year from air pollution removal. The analysis then projected different scenarios with changes in tree canopy. Preliminary results indicated that impervious surfaces account for 28.8%, open spaces 58% and trees only 9.% of the of the total area of the Campus. Results on carbon storage and sequestration will be presented at the meeting.

#34 Wetland Ecosystem Changes and Development Along the Wolf River

Lee Bryant, Jared Swenson

Faculty Sponsor: Rosanna Cappellato, Department of Biology

In the 1920s and 1930s, the Army Core of Engineers began widening sections of the Wolf River. This process called channelization was done to decrease flooding and make the land more suitable for development. Channelization causes headcutting, a natural process by which the river widens itself due to erosion and rapidly flowing water. Both processes have resulted in ecosystem changes, such as increasing bank height and change in vegetation, that are threatening the biodiversity and wetlands of the surrounding areas. We will collect data on soil moisture and vegetation on a total of four 20 meter-long transects from the bank at two locations, one impacted by channelization and the other unaltered. We will also use maps and satellite images from the last 50 years to assess the changes in land use along the Wolf River. We predict that the wetlands have decreased in size and vegetation type has been altered due to channelization and that as these wetlands have decreased land use for development has increased.

#35 Soil Makeup Affects the Abundance of the Pawpaw Tree in Overton Park

Hana Bucholz, Sarah Kennedy

Faculty Sponsor: Rosanna Cappellato, Department of Biology

This experiment tests how nutrients in the soil affect the growth of the pawpaw tree. We hypothesize that soil differences in pH and nutrients between two different locations in Overton Park, one dominated by pawpaw and one not, determine the abundance of pawpaw trees. We predict that the soil in the location dominated by pawpaws will be slightly more acidic (pH = 5-7) and has higher amounts of the nutrients that allow pawpaws to compete successfully. In two selected locations, we will use 50 meter transects and take 2 samples for every 5 meters for a total 40 overall samples. Using a soil test kit we will measure the pH, soil moisture, nitrogen, phosphorous and potassium levels in the soil. A t-test and ANOVA test will determine if there is a statistical difference ($p < 0.05$), between the soil and the two habitats.

#36 The Edge-Effect's Influence on Soil Quality in Overton Park, Memphis, TN

Charlie Ferebee, Tiara Brice

Faculty Sponsor: Rosanna Cappellato, Department of Biology

The objectives of this project were to determine whether the edge-effect influences soil quality in a forest ecosystem, and if so, to what degree. We will collect a total of 54 samples from three locations in Overton Park. We hypothesize that the edge-effect will influence soil quality because they are subjected to a different microclimate than the interior. We predict that soil nutrients and pH will be lower closer to the edge than closer to the interior of the forest. The results from this project will help us better understand the true effects that edge-effects has on soil quality, as well as vegetation distribution and composition of the forest in Overton Park, Memphis, TN.

#37 Comparing the Effects of Acid Rain on pH, Dissolved Oxygen and Carbon Dioxide Levels in Urban and Suburban Bodies of Water

Tia Hannum, Elizabeth Brown

Faculty Sponsor: Rosanna Cappellato, Department of Biology

The purpose of this experiment was to understand the varying effects of acid rain (pH <5) on bodies of water within the city of Memphis and its suburbs. In this experiment, Rainbow Lake in Overton Park was used as the urban location, while Patriot and Beaver Lakes in Shelby Farms were used as the suburban location. Patriot Lake is located near Walnut Grove Road, and Beaver Lake is located in a wooded area at one end of the park. Following a baseline test, water samples of both rain and lake water were tested before and after rainfall to assess the effect of acid rain in the ponds. Measures of pH, dissolved oxygen, and carbon dioxide levels, as well as air and water temperature were taken to make comparisons between sites. These measurements were taken on two occasions. We predicted that: 1) after rainfall there would be a decrease in pH and an increase in dissolved oxygen and carbon dioxide levels and 2) there would be lower pH and oxygen levels but higher carbon dioxide levels at Rainbow Lake, followed by Patriot Lake, and finally Beaver Lake. Additionally, the microorganisms inhabiting the lakes were compared and used as indicators of water quality.

#38 Effect of Disturbance and Soil Nutrient Availability on Seed Banks

Phillip Lyons, Thomas Jones, Melissa Porter

Faculty Sponsor: Rosanna Cappellato, Department of Biology

Soil seed banks contain the future generations of the vegetation in an ecosystem. Therefore, the seed bank of an ecosystem is an important factor determining the composition and diversity of the ecosystem. Seed banks also provide reserves that can be used when disturbance creates gaps or suitable conditions for seedling recruitment. Seed output is determined by the resource acquisition of vegetation present within the community and the allocation of resources to seeds. Nutrient enrichment has been shown to increase total seed density in previous studies. We hypothesize that disturbance and soil nutrient availability determines the seed density of soil seed banks in an urban deciduous forest. To test for seed density, soil cores from three transects within Overton Park, an urban deciduous forest in Memphis, TN, were taken with a metal cylinder with a height of 5cm and a diameter of 5cm. Seeds were separated from the soil by a sieve. 5 soil cores were taken from each transect. Separate soil samples were taken within .5m of each soil core site and their nutrient content was measured using a soil nutrient evaluation kit. We predicted that there would be a direct relationship between soil nutrient availability and soil seed bank seed density and that areas with less disturbance would have higher seed density than all other levels of disturbance.

#39 College Students' Valuation of an Urban Park

John Nichols, Anna Moak

Faculty Sponsor: Rosanna Cappellato, Department of Biology

The purpose of this study is to analyze the ways in which Rhodes College and Memphis College of Art students value Overton Park (i.e. recreational value, psychospiritual value, etc.) and how these values correlate to the monetary amount they would be willing to donate to maintain the integrity of the park. Included in the survey are questions that are designed to take into account interesting variables such as major and family income that could potentially influence both how students value the park and the amount of money they would be willing to donate. The data will be collected by administering a cross-collegiate multiple-item survey to students at both Rhodes and Memphis College of Art. The survey is completely voluntary and will be offered to students in public places across the campuses. After collecting data from approximately 100 students from each campus, we plan to analyze the responses to account for informative differences and correlations between notable survey items and between the two

colleges. We anticipate that students at Memphis College of Art will be willing to donate more to maintain the integrity of Overton Park than Rhodes students based on previous research findings involving proximity to environmental areas.

#40 The Effect of Human Development on the Water Quality of the Wolf River in West Tennessee

Sarah Tchang, Lauren Lieb

Faculty Sponsor: Rosanna Cappellato, Department of Biology

The purpose of this study is to observe how human population contributes to water pollution in the Wolf River in West Tennessee. Water samples are collected from urban and rural areas located on the river and tested for chemical indicators such as: pH level, nitrate, nitrite, lead, and dissolved oxygen as well as biological indicators such as: protozoa, algae, and Escherichia coli (E. Coli.) that will indicate the level of contamination from human activities. The presence or absence of these indicators is compared between the two sites to illustrate the impact of human development on water quality. A T-test is used to determine if there are any statistically significant differences between the urban and rural locations. Even though the river's continual flow distributes the pollutants downstream, it is predicted that there will be a higher concentration of pollutants in the urbanized area.

#41 The New Green Economy: Perspectives from the National Conference on Science and the Environment

Leigh Varley

Faculty Sponsor: Rosanna Cappellato, Department of Biology

In January 2010 I had the opportunity to attend the National Conference on Science and the Environment. This year's topic, the New Green Economy, allowed me to strengthen the connection between my major, economics, and my minor, environmental studies. Many people tell me that my two chosen fields of study conflict, and while I do not totally disagree, I believe that this must change in the very near future if we do not wish to see both our economy and environment crumble beneath our feet. This conference gave me the opportunity to learn about and discuss this important and timely topic with more than a thousand like-minded college students, professors, and government and private sector employees and attend lectures by speakers such as Gary Hirshberg, the President and CEO of Stonyfield Farms, Cecilia Rouse, an economic advisor to President Obama, and Lisa Jackson, the Administrator of the Environmental Protection Agency. The path to a new green economy requires a shift in priorities from unsustainable mass consumption to long-term sustainability. Negative externalities must be reflected in prices, government policies and production and consumption patterns must become more sustainable, and all parties must be held accountable for their actions.

#42 Development of Reproductive Monitoring Techniques in Endangered Snow Leopards

Kimber Jones, Chelsea Peters, Allison Graham; Andy Kouba, Erin Willis, Memphis Zoo

Faculty Sponsor: Jon Davis, Department of Biology

Due to the fact that knowledge of the reproductive biology of snow leopards is limited, we utilized non-invasive methods to study their reproductive physiology. By monitoring reproductive steroid levels over time, we were able to better understand seasonal trends in reproductive hormones, which will aid in captive breeding efforts. Fecal hormones were extracted using a methanol protocol optimized by our laboratory for snow leopards. Concentrations of progestins, estrogens, and testosterone hormones were analyzed using an enzyme immuno-assay. We found that broad scale antibodies for progestins, testosterone, and an antibody for the estrogen metabolite Estrone glucuronide were appropriate for measuring reproductive hormones in snow leopards. Preliminary results indicate that the average testosterone level for males in summer months was not different than that of the transitional month of September. Preliminary results also indicate that the follicular phase for females was an average of 13 days in length, and no spontaneous ovulation was observed in the months examined thus far. We are currently analyzing additional samples from multiple animals in order to distinguish seasonal trends. Results from this study, as well as results from a similar study with Amur leopards will be used to improve conservation efforts for these two endangered species.

#44 Environmental and Societal Effects of Logging in California

Tory Adcock, Carrie Saracini

Faculty Sponsor: Jennifer Houghton, Department of Biology

The logging industry in California is primarily responsible for deforestation in that state. This deforestation has numerous consequences for the residents of California and others. In researching this project, runoff data from deforested areas were compared to data in areas of similar elevation and rainfall that have not been logged. This project also determined that deforestation has other negative impacts besides a possible increase in storm flow. Logging has been linked to soil erosion, which combined with flooding, can cause pollution to be spread. Deforestation has also been linked to global climate change, due to a decrease in repositories for CO₂. Furthermore, the degradation of forests and the encroachment of humans into animal habitats can lead to the spread of infectious diseases and the introduction of new diseases to humans. Perhaps the most immediate danger of deforestation, though, is the increase in landslides in California, which leads to loss of property and life. Soil erosion also leads to increased pollution in soil and water. Our goal is to determine the impact of logging on the land and people of California.

#45 Determining Ammonia Levels in Memphis

Megan Cleary, Lib Davis

Faculty Sponsor: Jennifer Houghton, Department of Biology

The air pollutant ammonia is of great concern because of its presence in agriculture and commerce in most communities. Some of the NH₃ emissions are released into the air, while some combine with water in the air and fall as rain or snow, contaminating rivers, lakes, and oceans. Thus, these emissions affect both air and water quality. According to the Sierra Club, Shelby County (Tennessee) is in the top 10% worst counties in air quality in the United States. Based on this fact, we will look at the air quality in Memphis, focusing specifically on ammonia levels, and determine which areas have higher NH₃ emissions. We hypothesize that NH₃ in the atmosphere is higher near farmland in the Memphis area than in Germantown, Tennessee. Using colorimetric test based on a modified Berthelot reduction method, we will test for ammonia in the air by equilibrating air from both areas into NH₃ free water. We will standardize our test on solutions of known NH₃ concentrations. From this experiment, we expect to find that ammonia emissions are more significant closer to farmlands. To help control ammonia levels, we think that farm managers should be more pressured to implement ammonia reduction methods than other ammonia producers.

#46 What Huck Finn Didn't Know: A Historical Look at The Flooding of the Mississippi River and its Effect on Hypoxia Levels in the Gulf of Mexico

Cami Fenton, Clark Smith

Faculty Sponsor: Jennifer Houghton, Department of Biology

The Mississippi River is the largest river system in the United States and it stretches all the way from Lake Itasca, Minnesota meandering its way down to New Orleans, LA where it empties out into the Gulf of Mexico. With heavy rainfall the Mississippi River has been known for extensive destructive flooding. In 1927, the Mississippi River broke through the existing levees, and flooded an area of 27,000 square miles. Steps taken to prevent future flooding have not always been successful. The Mississippi River contributes to the growing hypoxic zone in the Northern Gulf of Mexico. Hypoxia occurs when the concentration of oxygen is < 2mg/L in coastal waters, and results from eutrophication and increased sediment deposits in the Gulf of Mexico. We hypothesize that the man-made modifications to the Mississippi River after the 1927 flood lessened the impact and damage of the 1993 flood. We also hypothesize despite effective efforts to help control the Mississippi River, they haven't controlled hypoxia, and after each significant flood of the Mississippi River there will be more widespread and elevated levels of hypoxic conditions. We investigated the historical, social and political implications of the great floods of 1927 and 1993 and resulting modifications made to the Mississippi River, and how these changes affect years with high rainfall. We also looked at oxygen levels in the Gulf of Mexico following flood years to see if hypoxic levels were more widespread.

#47 The Social Impacts of Draining Wetlands

Matthew Isom

Faculty Sponsor: Jennifer Houghton, Department of Biology

Wetland losses have many impacts on the environment and the human societies around them. The aim of this project is to focus on the social aspects of draining wetlands, and to weigh the costs and benefits thereof. The data will be drawn from studies of the Everglades, an area extensively researched. It is expected that the costs will outweigh the benefits, especially when the increased vulnerability to flooding is taken into account.

#48 Mapping the Relationship between Income Level and Flooding Risk in Memphis, TN

Lauren Lee, Otisha Paige

Faculty Sponsor: Jennifer Houghton, Department of Biology

Hurricane Katrina struck the New Orleans area early morning August 29, 2005. Due to the city's social and economic composition, the storm greatly impacted the poor and minority populations. Therefore, if the rivers within the city of Memphis were to flood today, would only a particular income group be affected? We hypothesize that if the rivers within city limits were to flood Memphis, then the low-income zip codes will suffer the worst affects due to historical geographic patterns in property value. We will map the topography and income levels along the rivers within city limits to predict which zip codes would be affected first by a flood and compare the data to see if the results establish a pattern between flooding zones, income levels, and current property value.

#49 Tap Water vs. Bottled Water

Lucy Luken, Leigh Varley

Faculty Sponsor: Jennifer Houghton, Department of Biology

When you go to the grocery store, do you buy bottled water because you are worried about the quality of tap water coming through your kitchen sink? "Ground and surface sources of drinking water can be contaminated by bacteria from human or animal sources, overflowing storm sewers, defective storage tanks, leaking hazardous landfills, pesticides and fertilizers from agricultural run-off, underground injection of hazardous wastes, decay products of radon and uranium, and industrial solvents" (94, Innes and Cory, 2001). As expected, tap water has more contaminants such as calcium, magnesium, and iron deposits than bottled water. This study was done by measuring the alkalinity, hardness, and iron levels in several tap water samples in the Memphis area and comparing it to bottled water. Alkalinity is the ability of the water to act as a buffer to neutralize acidic solutions; whereas, hardness measures the presence of calcium, magnesium, and iron minerals in the water. Tap water samples were taken from various locations in Memphis, TN including Rhodes College campus drinking fountain and bathroom sink and two resident locations off campus. The bottled water was purchased from Kroger. An opinion survey was also used to determine the public perspective that most people think tap water quality is inferior to bottled water, which must be approved first using an IRB form. We performed the tests together, and the results of this study show that bottled water has fewer contaminants than tap water.

#50 The Effects of Pollution on the Microbial Biodiversity in the Wolf River and Cypress Creek

Mya Santos, Jennifer Whatley

Faculty Sponsor: Jennifer Houghton, Department of Biology

Bacteria are highly abundant and ubiquitous in almost any habitat, especially aquatic habitats. Therefore, it is crucial to study their presence and the importance of their biodiversity, which may affect other organisms down the food web. Previous studies have shown that water pollution can have a negative effect on the diversity of aquatic bacteria. The Wolf River provides an ideal location to monitor disturbances such as pollution from anthropogenic factors. Cypress Creek, in specific, is a tributary of the Wolf that has a past of pollution and degradation. A common example of pollution in streams and rivers is nutrient pollution. This nutrient pollution commonly originates as agricultural fertilizer. In addition, Cypress Creek has a past use as a sanitary sewage and wastewater dump before 1963 and has suffered long term effects from the contaminants. We will use Winogradsky columns to ensure microbial presence and also test the pH, dissolved oxygen, nitrogen, phosphorus, and temperature of the environment to see what types of bacteria can survive. Through our research and experimentation, we want to examine how the microbial biodiversity is affected in these polluted streams and to show how this may influence its ecosystem. We believe that increased levels of pollution in the aquatic ecosystems will subsequently show less microbial biodiversity.

#51 Water use Amongst Rhodes Students

Ethan Stegich, Jake Minaldi

Faculty Sponsor: Jennifer Houghton, Department of Biology

In past years with changing climates it has become evident that in order to maintain the amount of water we have Rhodes College may need to make changes with water use. In order to do this we surveyed the Rhodes student population and used them as a model in order to see whether the student's water consumption. By evaluating the survey results we will be able to create a pattern on the consumption of Rhodes students to see how water consumption can be reduced and to see where students can be more efficient at Rhodes College. We surveyed a group of Rhodes students asking them the following questions: How often they go to the restroom a day, How many time they shower per day and how long, If they take baths or not , If they leave the water running while they brush their teeth, and how many times they do their laundry per week. With this information we were able to break down where most of the Rhodes water consumption comes from and we were able to form a pattern telling us whether water consumption by Rhodes students was greater on campus or off campus.

#52 Accuracy of Chlordane Extraction in Organic-rich Versus Organic-depleted Soils

Jennifer Whatley

Faculty Sponsor: Jennifer Houghton, Department of Biology

The chlorinated compound, chlordane, was used in the past as a pesticide. Its use was banned in the 1980's after its toxic effects became known. Chlordane is found to cause various cancers in humans, including testicular and prostate. The compound bioaccumulates in fish and is hazardous at extremely small doses. Chlordane has been found near water bodies Memphis, owing to properties of the compound that increase adhesion to organic matter in soils. This paper focuses on testing the accuracy of chlordane extraction in organic-rich soils against those soils that are organic-depleted. We hypothesize that soils richer in organic matter will have higher concentrations of chlordane residues.

Community Connections

#43 GlobeMed at Rhodes College

Shannon Fuller

Faculty Sponsor: Jonathan Fitzgerald, Department of Biology

GlobeMed is a growing, non-profit network with chapters at 19 universities across the country. Each chapter partners with a grassroots organization in a developing country to collaborate on specific projects and organize educational events on-campus. GlobeMed at Rhodes partners with A Ministry of Sharing Health and Hope (AMOS), an organization based in Managua, Nicaragua. Established in 2006, AMOS works with the Nicaraguan Ministry of Health to develop a primary health care system that combines traditional clinical services with community-based health promotion and disease prevention. Since our chapter was founded in October 2008, we have helped sponsor a health promoter training conference and purchase 80 water filters. A team of 4 students traveled to Nicaragua to work alongside AMOS and another group will return this summer to develop a water filtration project and assist with a community health worker training conference. We have also organized several events on-campus, such as film screenings, panel discussions, and lectures. Our members have attended the GlobeMed network's annual Global Health Summit at Northwestern University, and our chapter recently selected to attend the Clinton Global Initiative University this to present our work and learn from leaders in the field of global change.

#54 Memphis Urban Politics: A Look at City Council Representation

Carson Duffy

Faculty Sponsor: Arielle Goldberg, Department of Political Science

Theories of representation hold that how city elections are organized clearly affects the outcome. In exploring the relationship between an elected official and their constituents, I studied the manifestation of these theories in Memphis politics, focusing my research on Councilmen Jim Strickland and Conrad Kemp, representing District 5 and Super District 9. I looked to local news reports in The Commercial Appeal, information and data provided on the Memphis City Council website, as well as other social media established by the above mentioned local officials to research the applicability of these theories in Memphis.

#55 HOPE VI: Hope or Homelessness?

Sydney Shearer, Heather Bishop, Phylicia Douglas, C. J. Lewis, Travis Lux, Hunter Moore Grey Robinson, Lacy Ward, Whitney Warren

Faculty Sponsor: Heather Jamerson, Department of Anthropology & Sociology

HOPE VI is a \$5 billion public housing program enacted by the federal government in 1992. The aim of this urban redevelopment effort is to replace severely distressed public housing projects with mixed-income housing. While some residents are allowed to move back in, nearly two-thirds are given housing vouchers to rent apartments in the private market. The program's stated objectives include revitalizing public housing projects, improving the surrounding neighborhood, decreasing the concentration of very low-income families, and building sustainable communities. In this study, we examine the Vance Avenue neighborhood, where two public housing units: Clearborne and Foote Homes are slated to begin HOPE VI redevelopment projects within the next year. This study uses a sociological perspective to explore the potential conduciveness of such development. In order to make an assessment, this project involved working in collaboration with the University of Memphis to gain nearly 175 resident interviews, 20 focus groups and 40 organizational interviews. Beyond this, crime data, GIS mapping, and surveys from other groups were utilized.

#56 Structure and Representation in the Memphis City Council

Sydney Shearer

Faculty Sponsor: Arielle Goldberg, Department of Political Science

As the primary legislative institution in cities throughout the U.S., city councils are charged with creating and enforcing policy that will benefit and improve the lives of citizens. Scholarship over the last several decades has made key claims about the nature of city councils and the representation of constituents. Timothy B. Krebs and John P. Pelissero outline many of these arguments and observations in their writing on city councils. In their work, they discuss the structure of city councils, council elections, representation systems within councils, and the council members themselves. This study analyzes these claims by talking a comprehensive look at the Memphis City Council. By performing a comparative analysis of two individual council members on the Memphis City Council, it becomes clear that not only does Memphis seem to fit this theoretical model, but also that city council structure is intrinsically tied to the nature of representation. This study further reveals certain unique aspects about representation in Memphis with regard to racial politics.

#57 City Council: Race Matters

Hunter Moore

Faculty Sponsor: Arielle Goldberg, Department of Political Science

City council members are elected and voted for by constituents that want their voices heard. Two ways in which a city council member can be elected is through an at-large election or a district election. In an at-large election, constituents will have a large list of candidates. The candidates with the most votes win a seat on the council. In a district election, each candidate represents a particular area and the candidates only run against other candidates that represent the same area. In my project, I researched how the race of a candidate can affect constituent's feelings about candidates, researched how the candidates were elected, and how the candidates represent their constituents. Often times, minority groups feel they are represented better if the elected candidate resembles the constituents; this is called descriptive representation. In my research, I focused on council members Edmund Ford Jr. and Myron Lowery. Edmond Ford Jr. represents district six, and Myron Lowery represents super district 8. Edmund Ford Jr. was the youngest African American ever to be to the council and the second youngest overall to be elected at the age of twenty-eight. Both council members are very hands on as they both work with several projects in the community. Both council members represent their constituents through descriptive representation. These findings are from researching several websites and by attending a city council meeting to see the styles of the two council members. I was also able to see the council members' thoughts about certain items.

#58 Theories of Memphis City Council Representation

Hannah Peck

Faculty Sponsor: Arielle Goldberg, Department of Political Science

The Memphis city council has been set up to deal with the issues facing the city. Many however; question whether or not the council is able to deal with or even recognize the city's true issues. While the city may be faced with economic issues, it is as well faced with a major social issue. Several urban scholars argue the following: Race and

immigration lead to social divides and tensions. Through these tensions and racial polarization, there has been a clear split in representation. In the 1960s after the “white flight” to the suburbs had and continued to occur, class fears and tensions, as well as a fear of intermingling between races kept the races polarized (Sugrue 1996, p. #139-153). These fears have created a divided council with the majority of white council members elected from suburban areas and African American council members being elected from the areas surrounding the suburbs. This study will mainly focus on the question of how race dynamics affect the council and its decisions. There will be special focus given to District 7 and Super District 8. Through Census stats, interviews, and the Memphis City Council website (including minutes and agendas), the issue of racial division can be examined and compared to that of other cities. My findings have indicated a clear divide on the Memphis city council, as well as what the council members support.

#59 At-large vs District Elections

Petar Radujkovic

Faculty Sponsor: Arielle Goldberg, Department of Political Science

Krebs and Pelissero claim that at-large and district elections are very different. Because these types of elections are so different so are the types of people who gets elected and which constituents get represented. The study tested this by comparing two different politicians, Councilman Edmund Ford Jr. and Councilman Myron Lowery. The study compared how they acted in office as well as how they got there and how much of the vote each of them was able to get. It compared what kind of issues each councilman brought up in city council and how each of them got along with each other and when they disagreed. The study compared their political styles. The findings were mostly based on of information found on the city of Memphis website, media coverage by the Commercial Appeal website, and the Shelby County Election Commission website.

#60 All Improvement Leads to Crime Prevention: An Assessment of Council Member Strickland’s Plan to Improve Memphis

Hannah Sackett

Faculty Sponsor: Arielle Goldberg, Department of Political Science

A presentation on the goal of Jim Strickland to improve all aspects of Memphis life, including but not limited to the school system, infrastructure, housing, population migration out of the city, etc., through a detailed Crime Reduction plan. Strickland heavily focuses upon the fact that improvement of the police force in both technological efficiency and staffing will reflect back on to the community in a positive manner. The question that this study discusses is whether or not Strickland’s crime plan is a feasible and realistic solution to implement in Memphis’s and will successfully address it’s problems. On the road to establishing a Crime Prevention plan for Memphis, Strickland establishes the main components for success as data mining technology, adjusting staffing schedules through linear programming and a repeal of the Residency Requirement Ordinance. This final plan came about based upon research and finding from cities such as Baltimore, Seattle, and Vancouver. Although his goal is an idealistic one, the measures within it present and organization and consistency that Memphis is lacking. They allow the police force to not merely affect public safety, but the present a method for maintenance of overall citizen well being.

#61 Political Representation in Memphis

Elliot Williams

Faculty Sponsor: Arielle Goldberg, Department of Political Science

Political representation in city governments covers a wide spectrum of influences. According to Judd and Swantsrom Council members and politicians will interact with their colleagues and the constituents of their districts in ways which will best serve their political career. In understanding the ways council member Boyd and super district council member Conrad represent their general districts in Memphis I found these points to be accurate. The council members interact regularly with newly elected Mayor AC Wharton. Recent legislature pertaining to public school funding has described the way in which certain council members try to protect their interests by appeasing their constituents. Most of all though the issue of demographics, in Memphis especially, comes into play a great deal when these council members are deciding how to vote and act.

#62 Memphis City Council

Suzanne Zelenka

Faculty Sponsor: Arielle Goldberg, Department of Political Science

The racial tension in Memphis, and the separation of the two Super Districts, 8 and 9, have greatly shaped the way that the Memphis City Council functions. This research project attempts to show the way that Memphis differs from the usual types of city council governments, which generally use at-large, district, or mixed voting representation. The city of Memphis is divided into 7 districts that make up two larger super districts. The decision to use this type of electoral system plays a huge impact on who is represented, and who is elected. The super districts are separated in such a way that race, socioeconomic status, and urban/suburban interests are separated rather than mixed. This project also deals with the ways in which descriptive and substantive representation, as well as the nonpartisan ballot, function in Memphis. All of these aspects of the Memphis City Council are analyzed using two of its members, Kemp Conrad of Super District 9, and Bill Morrison of District 1. These two councilmen are examples of the ways in which council members represent their constituents in general, and specifically in Memphis.

#63 A Feasibility Study of a Rails to Trails Program in Midtown Memphis

Erin Foster

Faculty Sponsor: Michael Kirby, Department of Urban Studies

Midtown Memphis is lacking trails that would connect it to the downtown area and East Memphis. I am studying the feasibility of the proposed Chelsea Greenline rails to trails. In creating a PowerPoint that tracks the entire span of the current rail line with photographs, I was able to determine potential problems and great opportunities for the trail. This information will be used to conduct a forum with community leaders, area businesses, and residents, about how this trail could impact this portion of Memphis. I am working with area organizations, businesses, and government agencies to help create the idea of large, usable trail in midtown Memphis into a reality.

#64 Rural Arkansas's Perceptions of the Regional Medical Center

Maura Mohler

Faculty Sponsor: Mike Kirby, Department of Urban Studies

The Regional Medical Center serves a 150 mile radius surrounding Memphis in which a substantial portion of the patients do not have insurance, the means to pay and/or live inside Shelby County. Consequently, the MED is struggling financially. On Wednesday October 21st the board of directors publicly announced the plan to close emergency services if the Med cannot get 32 million in additional funds by February 1st. A substantial number of patients are residents of Arkansas and therefore, this closure would undoubtedly affect rural Arkansas. In order to identify Arkansas resident's perceptions and feelings towards the MED and amount of use, surveys were administered in Marion, Turrell and Marked Tree, small towns that range from 11 to 30 miles from Memphis. The survey included questions asking the number of people in their community that use the MED, which group of citizens based on economic status are more reliant on the MED, why people from their community use the MED, do they feel the state of Arkansas should help pay for costs and are they personally concerned the closure will affect their community? Ultimately, understanding Arkansas's awareness, use and feelings towards the MED will indicate the importance of the MED services and whether rural cities deem it necessary to assist financially.

#65 Main Street: Off the Beaten Path

Lacy Ward

Faculty Sponsor: Mike Kirby, Department of Urban Studies

The purpose of this project is to examine the relationship between the residents of an inner-city neighborhood and the local, inner-city strip center located in the neighborhood. I am doing my research on an inner-city commercial strip center on Vollintine Ave between Maury and N. Avalon Streets in Memphis. I surveyed residents who live around the shopping center to find out their opinion about the center. To do this I went door-to-door and survey every third house on the streets I choose to survey. I will be doing around 100 interviews all together. I talked to the business owners at the strip center about the results and improvements that could potentially be made. I began establishing a plan for making improvements to the strip center. From here business owners and residents will be able to discuss the strip center with one another.

#66 Latino Parental Involvement at Jackson Elementary School

Whitney Warren

Faculty Sponsor: Mike Kirby, Department of Urban Studies

Predictions are that over one-fourth of K-12 students in 2030 will be Hispanic (Smith, Stern & Shatrova 2008). However, in 2003 only 62% of Hispanic students graduated from high school, compared with 88% of their black peers and 94% of their white peers (Wong & Hughes 2009). One factor schools are beginning to examine as an explanation for these poor statistics is the lack of traditional parental involvement from the Hispanic community. I examined how involved Hispanic parents were in their child's school. In order to do this, I examined the efforts of the school to reach out to Hispanic parents, the availability of materials in Spanish, how comfortable parents felt at the school and communicating with the school, the parents' perception of the school's interest in cultural diversity, their involvement in their child's education at home and their educational aspirations for their child. I had brief interviews with Hispanic parents. I partnered with Casa Vecino, a social service organization near Jackson Elementary, to administer the surveys. I conducted many of the surveys myself, but also partnered with several Hispanic students in the community who offered to conduct surveys in their neighborhoods or churches.

St. Jude Summer Plus

#22 Effective Drug Therapy for Ph+ BCR-ABL Acute Lymphoblastic Leukemia

Alex Kovalic; Harpreet Singh, Richard Williams, St. Jude Children's Research Hospital

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Omacetaxine mepesuccinate is an anticancer drug with known activity against chronic myeloid leukemia (CML), hematological cancers, and even some solid tumors. Until the explosion of tyrosine kinase inhibitors, such as Imatinib and Dasatinib, as new anticancer drugs, omacetaxine was the drug of choice for treating various forms of leukemia. This experiment sets out to test omacetaxine as a single agent as well as in combination with other antileukemic drugs against Ph+ BCR-ABL acute lymphoblastic leukemia (ALL) cell lines. The ultimate goal of this experiment is to find an efficacious drug therapy combination to treat ALL through a drug screening of omacetaxine in combination with other known antileukemic drugs.

#23 Investigating the Role of Usp10 in Translation

Matt McCulloch; Brett Winborn, St. Jude Children's Research Hospital

Faculty Sponsor: Kim Gerecke, Department of Psychology

The ubiquitin-proteasome system regulates several cellular functions. Usp10 is a known deubiquitylating enzyme, but its role in cellular processes is largely unknown. It has been proposed that Usp10 could regulate translation through its deubiquitylating of proteins such as eukaryotic initiation factors (eIF's), which help form the translation machinery. More generally, the function and expression of Usp10 was examined using cellular and molecular approaches to further understand its role in protein ubiquitylation.

#24 Role of Numb in Granule Cell Migration during Cerebellar Development

Evan Tyler; Jakub Famulski, David Solecki, St. Jude Children's Research Hospital

Faculty Sponsor: Kim Gerecke, Department of Psychology

The cerebellum has long served as a model for the study of neuronal migration, and defects in cerebellar migration have been linked to numerous medical conditions, including medulloblastomas. In the cerebellum, granule neurons migrate inward from the external granule layer (EGL) to form deeper cellular layers by attaching to and moving along glial processes. The PAR complex, consisting of Par6, Par3, aPKC, and other proteins, serves several functions in glial-guided migration. In fact, when the PAR complex is disrupted, migration is inhibited. Siah is an ubiquitin ligase that targets Par3 for degradation and, therefore, inhibits migration. Another target of Siah is Numb, a protein with some known roles in neurogenesis. Interestingly, Numb is thought to interact with Par3. We hypothesized that Numb and Siah would provide dynamic regulation of PAR complex stability. To explore this possibility, cerebella of P8 mice were transfected to over-express Siah or Siah and Numb. After 48 hours, slices of each cerebellum were examined to measure migration distances for individual granule neurons. Preliminary results indicate that the simultaneous over-expression of Numb with Siah at least partially rescues migration. This suggests that Numb is necessary for proper migration, but the mechanisms through which it functions remain unclear.

#25 Catalytic Inactive Caspase-8 Role in Tumor Cell Migration and Metastasis

Maggie Meehan; Tal Tietz, J.M. Lahti, St. Jude Children's Research Hospital

Faculty Sponsor: Mary Miller, Department of Biology

Neuroblastoma is the most common extra cranial solid tumor in children, and Caspase-8 is frequently inactivated through DNA methylation or gene deletion in neuroblastoma tumor cells. Though Caspase-8 is a key protease in Fas induced apoptosis, its presence has been shown to aid in cell motility and metastasis in nonapoptotic cells by promoting cell motility through its recruitment to the focal adhesion complex, enhancing cleavage of focal adhesion substrates, and thus cell migration. This project aims to investigate the role of caspase-8 in the motility, adhesions, and metastasis of neuroblastoma tumor cells. Specifically it asks if Caspase-8 catalytic activity is necessary for its role in enhancing cell migration. Site directed mutagenesis was performed on regulatory site Y380 to produce Y380E and Y380F mutants. The mutant DNA was then cloned into retrovirus vectors, and the viruses expressing these mutants were produced and used to infect cell lines derived from neuroblastoma patients. The effects of the caspase-8 mutants on tumor cell proliferation, apoptosis, and attachment will then be assessed in vitro through migration and apoptosis assays. In vivo studies will be performed by introducing the mutant neuroblastoma cell lines into the tail vein of SCID mouse models and evaluating the resultant tumors.

#26 Synthesis and Biological Evaluation of Benzil Based Carboxylesterase Inhibitors

Elizabeth Parkinson; JL Hyatt, L Tsurkan, LD Hicks, MJ Hatfield, CC Edwards, B Yang, H

Zhou, PM Potter, St. Jude Children's Research Hospital

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Carboxylesterase enzymes (CE) are ubiquitous proteins found in human and animal tissues which hydrolyze carboxylic esters. Some carboxylic esters include clinically used drugs such as the anticancer agent CPT-11 (irinotecan). CEs hydrolyze CPT-11 to its active metabolite (SN-38), which is responsible for killing tumor cells. Because high levels of CEs are expressed in the intestine, high concentrations of SN-38 are produced, resulting in diarrhea, the dose limiting toxicity of CPT-11. Identifying specific CE inhibitors which could ameliorate this delayed diarrhea may have clinical utility. Benzil was previously found to be a potent inhibitor of CEs. In this study, we have synthesized and determined the ability of benzil derivatives to inhibit CEs in vitro. These derivatives include alkyl-1,2-diones and phenylalkyl-1,2-diones. Increased potency of enzyme inhibition was observed with increasing alkyl chain length and hydrophobicity. Another derivative consisted of benzil with differing atoms between the benzene ring and the 1,2-dione moiety. The inhibitory power of these compounds depended upon the polarity and hydrophobicity of the inserted atom. Intracellular inhibition of CEs by these compounds was determined along with inhibition of CPT-11 hydrolysis. Potentially, these CE inhibitors represent a new class of compounds that could be used to reduce the toxicity of CPT-11.

#27 Defining the Role of Human Zinc-finger Antiviral Protein in Influenza Virus Infection

Van Phan; Ruiqiong Wu, Hans Häcker, St. Jude Children's Research Hospital

Faculty Sponsor: Darlene Loprete, Department of Chemistry

Influenza virus is an important human pathogen responsible for annual epidemics and occasional, devastating pandemics. The genomes of influenza viruses encode 11 known proteins. One of these proteins, the non-structural protein 1 (NS1) is known to be essential for virus pathogenicity, yet its molecular mechanism of action is only partially defined. Our lab has identified a novel NS1-interacting host protein, the 'zinc-finger antiviral protein' (ZAP). This protein has previously been shown to interfere with virus replication of a distinct set of other viruses. This project focuses on the investigation of the so-far uncharacterized function of human ZAP in Influenza biology. We first established experimental systems for overexpression and knock-down of hZAP. We have successfully cloned hZAP into mammalian expression vectors (for overexpression) and also established a lentiviral shRNA knock-down construct, which reduces hZAP-mRNA and -protein levels significantly when stably introduced into HEK293T cells. We will use these systems to analyze critical infection-associated parameters, such as virus replication, cytokine production and apoptosis. We expect that these experiments will reveal the biological significance of hZAP as NS1-interacting protein. As such, these results may contribute to our understanding how Influenza A viruses control pathogenicity, and possibly identify a novel antiviral drug target.

POSTER SESSION II (poster numbers precede titles)

Multisports forum, Bryan Campus Life Center, 4:00-5:30pm

Chemistry & Biochemistry and Molecular Biology

#7 A Comparison of Complete Basis Set Extrapolated CCSD(T) and DFT Methods for the Interaction Energies of Various Benzene and Borazine Dimers: The Role of Boronated Molecules in Cancer Treatment

Liz Jeans

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Recent work in our group has focused on ring-ring interactions in biological systems. We have shown that these interactions, which can include dispersion, induction, and other electrostatic forces, can be crucial to protein-ligand binding and nucleic acid-ligand binding. In the current work, we are studying boronated molecules, such as borazine and diborazine, to analyze their possible pharmacological applications. We have set up all possible t-shaped and sandwich complexes of combinations of benzene, borazine, diborazine (the boronated analogue of naphthalene), and naphthalene. The structures of the complexes were optimized using second order Moller Plessett Perturbation Theory (MP2) and the HCTH DFT Functional. Counterpoise-corrected interaction energies were calculated using, MP2, MP3, MP4, QCISD, CCSD(T), B3LYP, SVWN, and TPSS. The calculations were run using the 6-31+g* and 6-311+g* basis sets; we also used the correlation consistent basis sets to extrapolate a large-set-limit CCSD(T) interaction energy. Results showed, in general, that mixed pairs of boronated and non-boronated molecules, in both sandwich and t-shaped interactions, had the strongest binding energies. Of all the DFT methods, only the SVWN method showed the correct interactions both quantitatively and qualitatively. Pure non-boronated sandwich and t-shaped complexes are shown to have the weakest interactions. As boronated molecules see increased use in the medical field (such as in cancer therapy), we also show some preliminary work on boronated molecules in bio-molecular applications, such as Boron Neutron Capture Therapy. In BNCT, boron shows preferential uptake into the cell. We have set up t-shaped and sandwich complexes of octonal (representing the phospholipids in the cell membrane) with borazine and benzene dimers. As well, we have set up t-shaped and sandwich complexes of water (representing the plasma surrounding the cell) with borazine and benzene dimers. By calculating the interaction energies in these complexes, we can analyze BNCT and boron's preferential uptake into the cell during this process.

#8 Ab Initio and DFT Calculations of Ligand-Nucleic Acid Binding Models

Michelle Shroyer

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Flat planar molecules called intercalants can bind to DNA. This binding can cause the DNA to deform or unwind, disrupting normal cellular function. This phenomenon called intercalation is responsible for carcinogenesis and also explains the action of some chemotherapeutic drugs. We have calculated structures and interaction energies for a model intercalant bound to nucleic acid base dimers (Ten total dimers including all possible pairings of Adenine, Guanine, Thymine, and Cytosine) in order to gain insight into the mode of action of intercalants. We optimized structures into sandwich structures and more deformed structures using B3lyp/6-31G. The counterpoise corrected interaction energies or calculated using mp2/6-31+g* as well as mp2, b3lyp, and svwn using the 6-311+g* basis set. Our preliminary results show that most DNA want to deform into a more T-shaped structure rather than a stacked sandwich structure implying how much DNA would want to unwind rather than just spread apart.

#9 Fragment Based Design of Novel Cholesterol Moderating Drugs Using Ab Initio and DFT Methods

Hunter Utkov, Allison Price

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Statin Drugs mediate cholesterol levels by inhibiting the second step of the cholesterol biosynthesis pathway. In this rate-limiting step of the pathway, 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) is reduced to mevalonic acid by the enzyme HMG-CoA reductase. The statin drug molecules displace the substrate HMG-CoA in the enzyme active site via competitive inhibition. We are investigating the weak binding forces involved in the binding of ligands to the enzyme HMG-CoA reductase in order to develop possible modifications to current statin drugs which may improve their ability to bind to the active site and inhibit the enzyme. We use correlated post-HF Ab

Initio as well as hybrid and local DFT methods to study important ring-ring type dispersion and induction interactions that are not currently exploited by statin drugs. We have shown that these interactions are important and contribute to binding with similar weight as hydrogen bonds and ion-dipole interactions. We have identified several functional groups and trends that seem to result in greatly increased binding of ligands to the enzyme. Using these trends we made four drug lead-candidates, optimized their structures in solution phase, docked them in the active site of the enzyme, and calculated interaction energies between the candidates and the active site using ONIOM. We believe that these novel drug molecules that take explicit advantage of these weak forces can be important in the next generation of statin drugs.

#10 Electrostatic and Docking Studies on the Active Site of Aromatic Amino Acid Decarboxylase: Implications for Serotonin Synthesis

Caroline Lee

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Serotonin levels have been implicated in conditions such as psychological disorders and paralysis in mice. An understanding of the serotonin synthesis pathway is necessary in future pharmacological studies. We examine the full binding site of aromatic amino acid decarboxylase (AAAD, from the crystal structure) which is responsible for the synthesis of serotonin. We use 20 amino acid residues in close proximity to a bound ligand, pyridoxal-5-phosphate (PLP), to model the active site. We calculate the potential energy surface of the active site using DFT methods to aid in understanding of ligand docking, and we calculate pair wise interactions between PLP and the residues in the active site using MP2 and DFT methods to identify which are crucial to ligand binding. We also perform docking studies with PLP in this active site. We use this information to create a model for the optimal binding of new ligands that target this active site, including drugs for disorders such as Alzheimer's disease and depression.

#11 Construction and Thermal Rearrangement of 4-Hydroxy-2,4-Diaryl-2-Cyclobuten-1-Ones

Daniel Schrader, Joshua A. Anderson

Faculty Sponsor: Kimberly Fisher, Department of Chemistry

Cyclobutenediones have proven useful as starting materials for synthesis of highly functionalized biologically relevant molecules. The rearrangement of cyclobutenediones has a wide synthetic scope and can be utilized as a key step in the construction of quinones, benzo[*o*]isoxazoles, and 3-methylenoxindoles having a variety of substitution patterns. Construction of 4-hydroxy-2,4-diaryl-2-cyclobuten-1-ones can be accomplished from squaric acid ester derivatives. Thermal rearrangement of 4-hydroxy-2,4-diaryl-2-cyclobuten-1-ones provides naphthoquinones. This short sequence can be applied towards the synthesis of biologically active molecules.

#14 The Role of Septation-related Proteins and Protein Kinase C in Cell Wall Structure and Septation of *Aspergillus nidulans*

Chassidy Groover, Brittany Chavez, Michael Pluta, Erinn Ogburn, Miranda White, Terry Hill, Darlene Loprete

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

We have shown that the *Aspergillus nidulans* orthologue of protein kinase C (PkcA) participates in regulating cell wall integrity (CWI) and localizes at sites of cell wall synthesis, including growing hyphal tips and septa. To better understand the mechanisms by which PkcA localizes to tips and septa, we have observed the formation of cortical rings at sites of septation by fluorescently tagged PkcA in hyphae defective in expression of other proteins necessary for septum formation. In addition, we have co-imaged PkcA and other septation proteins bearing complementary fluorescent tags. Here we report that localization of PkcA to septa lies “downstream” of the functions performed by MobA (Mob1p orthologue), TpmA (tropomyosin), SepA (formin), SepD, SepG, and proteins encoded by one other not-yet-cloned Sep locus. In the absence of function of these proteins, PkcA cortical rings were not observed. PkcA localization lies “upstream” of MyoB (myosin II orthologue), the *A. nidulans* orthologue of Bud4p (in yeast, a bud site selection marker), and a protein encoded by a second not-yet-cloned Sep locus. PkcA cortical rings still form in the absence of function of these proteins, though septa do not develop. SepA, TpmA, MyoB, and MobA all appear to colocalize with PkcA during normal septum formation. Studies with other septation-related proteins are ongoing.

#15 GDP-mannose Transporter Oligomer Formation in the Filamentous Fungus

Aspergillus nidulans

Laura Johnson

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

GDP-mannose transporters (Gmt) carry nucleotide sugars from the cytosol across the Golgi apparatus membrane in various eukaryotic organisms. Some fungal species like *Saccharomyces cerevisiae* express a single Gmt, while others including *A. nidulans* express two (GmtA and GmtB). GmtA and GmtB display a punctate pattern of distribution indicative of localization within the Golgi apparatus. Gmt in *S. cerevisiae* localizes to the Golgi as well, and proper localization is dependent on oligomerization. Here we report progress on determining if GmtA and GmtB form oligomers and the preferred combinations of GmtA and GmtB for Golgi localization. In addition, C- and N-terminal truncated versions of GmtA and GmtB were created in order to designate regions responsible for Golgi localization and possible oligomer formation.

#16 COG Localization in Aspergillus nidulans

Kelsie Persaud, Sara Gremillion, Terry Hill, Darlene Loprete

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Fungi are a diverse group of organisms that play many roles in nature including decomposers, mutualists, and pathogens. Fungal growth is characterized by long filamentous cells, called hyphae that contain a cell wall essential for the growth and maintenance of the organism. Various genes and proteins govern cell wall metabolism in the fungus *Aspergillus nidulans*, including non-clathrin-coated vesicular coat proteins (COPs) and conserved oligomeric Golgi proteins (COGs). COPs mediate protein transport between the endoplasmic reticulum and the Golgi apparatus, while the COG complex participates in retrograde vesicular trafficking within the Golgi apparatus. The goal of the current experiments was to determine where COGs localize within the cell by labeling them with complementary tags both COG2 and CopA, which are known to localize to the Golgi.

#17 Synthesis of Diblock Copolymers for Micelle Stabilization

Ashley Juenger

Faculty Sponsor: Michael Julian, Department of Chemistry

In order to find a more direct relationship between the length of polymer blocks on the inside of the micelle and the micelles' overall volume, the synthesis of rigid diblock copolymers of various chain lengths and block lengths will be explored. Liquid-liquid micelles have proven useful in the formation of polymer nanoparticles and other applications that are dependent upon their volumes. These types of micelles are droplets of a liquid in another liquid. Recently diblock copolymers have found use as emulsifying agents and will be used as such in this study to collect data about how liquid-liquid micelles are affected by the presence and amount of them. Other aspects to be looked at include mixing speed and the amounts of each liquid in the micelles. Diblock copolymers attach two types of polymers by a covalent bond. Our approach uses a polymer that is hydrophilic (water soluble) and covalently bonded to a hydrophobic (not water soluble) polymer. By using ring opening metathesis polymerization, the length of each block will be directly controlled and the polymer chains will stay similar in size. Forming the polymers by this technique will result in rigid polymer backbones that will stay structured inside the micelles.

#18 Temperature and Humidity Effects on Explosive Detection

William Peeler, Punam Patel, Marshall Friskics-Warren

Faculty Sponsor: Jon Russ, Department of Chemistry

The detection of explosives in open air environments is important for protecting people in areas subject to terrorists attack and for finding extant landmines. One of the primary strategies used to collect and concentrate explosive vapors for detection is solid phase micro-extraction (SPME). We tested the effects of high and low temperatures and humidity conditions on the efficiency of various SPMEs to absorb explosive residues using 2,4-DNT as the target analyte. The conditions were controlled within a 200 L tube which was externally wrapped with fiberglass insulation. DNT vapors were generated inside the pipe by heating a 1.0 g sample of a sand/DNT mixture (1.0 % DNT W/W) to 30 °C. The air inside the pipe was sampled through a virtual impactor inside the tube that was connected to a flow controller and a SPME injection port using ¼" stainless tubing. Four types of SPMEs were tested. The SPMEs were exposed to the airflow for ten seconds, then injected into a Varian CP-3800 GC with an ECD detector. The mass of DNT absorbed was determined based on peak height and calculations based on a regression curve.

Physics

#12 Finding Paths with the Principle of Stationary Action

Stan Badger

Faculty Sponsor: Shubho Banerjee, Department of Physics

The Principle of Stationary Action is a mechanical law that describes the possible paths that any projectile will take. In other words, when I apply this principle to a system—a 3-dimensional surface for example—I can obtain the equations of motion for that system. In plain English, if I am given a 3-dimensional surface and the starting and ending points for the projectile's motion, and I can use the principle of stationary action to determine equations that describe the possible paths that the object can take. For example, imagine a putting surface that is sloped or bumpy in some way. The surface has a specific starting point and ending point for the golf ball, but the actual path that the ball can take may be difficult to determine without the Principle of Stationary Action; with it, however, it is possible to figure out the path the ball will take, as well as the initial angle and initial velocity that should be applied. I have created a systematic way of determining the equations that describe a possible path on a surface, and I have explored several examples.

#13 Nuclear Structure of Palladium-101

Nick Badger; A. Heinz, H. Ai, R. J. Casperson, B. Huber, J. D. LeBlanc, R. Luttke, E. A. McCutchan, J. Qian, B. Shoraka, J. K. Smith, J. R. Terry, J. L. Hugon, E. Williams

Faculty Sponsor: Deseree Meyer, Department of Physics

Palladium-101 lies in a region of atomic nuclei where the nucleus's structure can evolve from vibrational to rotational motion. In order to examine the nuclear structure of Palladium-101, an experiment was performed at the Wright Nuclear Structure Laboratory at Yale University using the ESTU-1 Tandem Van de Graaff Accelerator. A beam of 70 MeV Carbon-12 collided with Zirconium-92 nuclei to produce Palladium-101 and an additional three neutrons. Emitted gamma rays were detected by the SPEEDY array. By analyzing which gamma rays were detected at the same time as one another, we were able to confirm many nuclear energy levels and observe several new ones. Also, new connections between bands of energy levels have been discovered. The structure of Palladium-101 was then interpreted using the E-GOS (E-Gamma Over Spin) method, which is based only on experimental data. The E-GOS plot, created by graphing energies of gamma rays over spin versus spin, revealed a clear transition from vibrational structure to rotational structure.

Neuroscience

#19 Localization of Neural Activation During Aggressive Behavior in the Brown Anole (*Anolis sagrei*)

Emily Burford, Veronica Alix, Jason Ballard, Aaron Kala, David Siu

Faculty Sponsor: David Kabelik, Department of Biology

The neurotransmitters and neural pathways involved in the mechanisms of aggression are not yet understood. Dopamine and vasotocin (the nonmammalian homologue of vasopressin) are neurotransmitters associated with aggressive behaviors, however the method of their influence is not fully known. Anole lizards (E.g., the brown anole, *Anolis sagrei*) serve as excellent models for such behavioral neuroendocrinology studies as they often exhibit easily recognizable aggressive displays, and experience seasonal changes in hormones and behavioral activity levels that can be related to changes in the brain. Subjects of this species were allowed to interact in either a control encounter or an aggressive encounter, and their brains were harvested for analysis. By fluorescently tagging these neurotransmitters using immunocytochemistry techniques, we can examine neural activation during aggression, as indicated by colocalization with the immediate early gene product Fos. Further understanding the neurotransmitters employed in territorial and other forms of aggression and social interaction will provide insight into the complex mechanisms regulating behavioral expression. Considering that the neurotransmitter systems involved in such regulations and responses are conserved across terrestrial vertebrates, these studies will allow for a more complete understanding of aggression and related social interactions not specific to *Anolis* alone.

#20 The Protective Effects of Exercise Against Chronic Restraint Stress-Induced Apoptosis in the Mouse Cortex and Hippocampus

Sarah Allen, Anna Kolobova, Jessie Pearson

Faculty Sponsor: Kim Gerecke, Department of Psychology

Chronic restraint stress has been shown to cause deleterious effects on the hippocampus through chronic elevation of glucocorticoids. Excess levels of glucocorticoids leave neurons vulnerable to other toxic insults such as oxidative stress, which may lead to apoptosis (programmed cell death). This process has been implicated in all neurodegenerative events, including Parkinson's and Alzheimer's diseases. Exercise has been shown to protect against the harmful effects of oxidative stress and therefore decrease markers for apoptosis. In this experiment, we examined the protective effects of exercise against chronic restraint stress in the mouse hippocampus and cortex. Mice were divided into two housing groups: standard housing and exercise. Half of the animals in each housing group were chronically stressed for 2 hours per day for 14 consecutive days. Animals were sacrificed 1 hour and 24 hours after the final stress and tissue was harvested for Western Blot analysis. We examined Bax, a marker for apoptosis, in the hippocampus and cortex at two different time points to determine if there is a differential temporal upregulation in these brain regions. We expect that markers for apoptosis will increase in the stress condition, but exercise will protect against these effects and decrease Bax expression.

#21 The Effects of Chronic Restraint Stress and Voluntary Exercise on Neuroinflammation in Cortex and Hippocampus of Mice

Darcy Gist, Brett Simek, Perry Person

Faculty Sponsor: Kim Gerecke, Department of Psychology

Exercise has been shown to be neuroprotective against the harmful effects of stress, which contributes to neurodegeneration seen in disorders such as Alzheimer's disease. One of the underlying mechanisms involved in this neurodegenerative effect is changes in expression of inflammatory factors. We investigate the effects of exercise on pro-inflammatory cytokines involved in the stress response, including TNF-alpha. Mice were randomly assigned to live in standard housing or in housing with exercise wheels, and all exercise animals were allowed voluntary access to a running wheel to control for additional stress induced by forced exercise. Half of each group were exposed chronic restraint stress, which was induced by 2-hour, variably scheduled tube restraint once a day for 14 days. All samples were taken one hour after the final stressor and were analyzed using immunohistochemistry and western blot analysis with special focus on the hippocampus and cortex. We expect to see an up-regulation of toxic inflammatory cytokines in standard housing stressed mice, and that exercise will protect against this up-regulation.

#28 Caffeine, Physiological Arousal, and Mood: The Effects of Caffeine and Induced Mood on Brain Activity, Heart Rate, and Attitude Change

Kelly Coney, Perry Person, Erika Reckert, Sarah Eldridge, Dani Fincher, Kate Stewart, Madeline Scott

Faculty Sponsor: Jeffrey Sable, Department of Psychology

There is evidence that caffeine makes people more likely to change their attitudes, but what drives this effect is unclear. We studied the effects of caffeine and mood on attitude change, heart rate (HR), and brain activity (measured with electroencephalography—EEG). Participants received caffeine or a placebo and viewed positive, neutral, or negative pictures. Participants were then presented with persuasive arguments for implementing senior comprehensive exams at a nearby institution. Attitudes about such exams were taken prior to the study and after the persuasive argument to assess attitude change. EEG and HR were recorded at the beginning of the study (as a baseline), and before and after the pictures. We predicted that participants in the caffeine/positive mood condition would exhibit more attitude change than those in any other condition, while participants in the caffeine/negative mood condition would exhibit less. We also predicted that caffeine would increase HR and induce changes in EEG patterns. Preliminary analyses indicate that neither caffeine nor mood had significant effects on attitude. However, physiological measures (EEG and HR) were significantly affected by caffeine such that HR was found to decrease in participants given a placebo and EEG patterns were significantly different in participants given caffeine.

#29 Does Caffeine Improve Attention by Improving Filtering in the Brain?

Perry Person, Sarah Eldridge, Kelly Coney

Faculty Sponsor: Jeffrey Sable, Department of Psychology

The belief that caffeine enhances attention seems to be a common one among college students. In order to test the validity of this belief, we used a repeated measures design to evaluate changes in the auditory N1 in college students both with and without caffeine. The auditory N1 is a brain response that normally gets smaller as sounds are repeated (e.g., over the course of a 5-tone train). This decrease in the magnitude of the N1 is related to the level of attention drawn by each tone. This process is thought to be regulated by an inhibitory circuit in the brain that serves to filter out irrelevant information. If caffeine enhances the function of this inhibitory circuit, drinking caffeine should increase the degree to which the N1 decreases across the tone trains. We will show how the N1 is affected by caffeine and how this may be related to performance on an auditory attention task.

#30 Does Caffeine Affect the P300 Brain Response During a Challenging Auditory Discrimination Task?

Erika Reckert, Sarah Eldridge, Perry Person, Kelly Coney, Jeffrey Sable

Faculty Sponsor: Jeffrey Sable, Department of Psychology

Past research into caffeine's effects on the brain have specified an effect of general arousal and up-regulation. However, worldwide use of caffeine makes it imperative to look for more specific processes than simple arousal theory order to gain a better understanding of caffeine's effects on cognitive processes. While most research in the field has focused on the global effects of caffeine, new detailed analysis has shown that caffeine's effects on the brain are more complex. Caffeine seems to have specific effects on the heightened processing of expected and unexpected stimuli due to effects on incoming information processing and the amount of attentional resources engaged during a task. We focused on the P300 event-related brain potential (ERP) to more specifically determine the effects of caffeine on cognitive processes. An auditory discrimination task was utilized in which participants responded to one of two tones, with the probability of the target being 20%. The research seeks to determine if the experimental caffeine dose of 200 mg affects the P300 brain response. This would further suggest the importance of this component in identifying specific effects of caffeine on attention and information processing.

St. Jude Summer Plus

#22 Effective Drug Therapy for Ph+ BCR-ABL Acute Lymphoblastic Leukemia

Alex Kovalic; Harpreet Singh, Richard Williams, St. Jude Children's Research Hospital

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Omacetaxine mepesuccinate is an anticancer drug with known activity against chronic myeloid leukemia (CML), hematological cancers, and even some solid tumors. Until the explosion of tyrosine kinase inhibitors, such as Imatinib and Dasatinib, as new anticancer drugs, omacetaxine was the drug of choice for treating various forms of leukemia. This experiment sets out to test omacetaxine as a single agent as well as in combination with other antileukemic drugs against Ph+ BCR-ABL acute lymphoblastic leukemia (ALL) cell lines. The ultimate goal of this experiment is to find an efficacious drug therapy combination to treat ALL through a drug screening of omacetaxine in combination with other known antileukemic drugs.

#23 Investigating the Role of Usp10 in Translation

Matt McCulloch; Brett Winborn, St. Jude Children's Research Hospital

Faculty Sponsor: Kim Gerecke, Department of Psychology

The ubiquitin-proteasome system regulates several cellular functions. Usp10 is a known deubiquitylating enzyme, but its role in cellular processes is largely unknown. It has been proposed that Usp10 could regulate translation through its deubiquitylating of proteins such as eukaryotic initiation factors (eIF's), which help form the translation machinery. More generally, the function and expression of Usp10 was examined using cellular and molecular approaches to further understand its role in protein ubiquitylation.

#24 Role of Numb in Granule Cell Migration during Cerebellar Development

Evan Tyler; Jakub Famulski, David Solecki, St. Jude Children's Research Hospital
Faculty Sponsor: Kim Gerecke, Department of Psychology

The cerebellum has long served as a model for the study of neuronal migration, and defects in cerebellar migration have been linked to numerous medical conditions, including medulloblastomas. In the cerebellum, granule neurons migrate inward from the external granule layer (EGL) to form deeper cellular layers by attaching to and moving along glial processes. The PAR complex, consisting of Par6, Par3, aPKC, and other proteins, serves several functions in glial-guided migration. In fact, when the PAR complex is disrupted, migration is inhibited. Siah is an ubiquitin ligase that targets Par3 for degradation and, therefore, inhibits migration. Another target of Siah is Numb, a protein with some known roles in neurogenesis. Interestingly, Numb is thought to interact with Par3. We hypothesized that Numb and Siah would provide dynamic regulation of PAR complex stability. To explore this possibility, cerebella of P8 mice were transfected to over-express Siah or Siah and Numb. After 48 hours, slices of each cerebellum were examined to measure migration distances for individual granule neurons. Preliminary results indicate that the simultaneous over-expression of Numb with Siah at least partially rescues migration. This suggests that Numb is necessary for proper migration, but the mechanisms through which it functions remain unclear.

#25 Catalytically Inactive Caspase-8 Role in Tumor Cell Migration and Metastasis

Maggie Meehan; Tal Tietz, J.M. Lahti, St. Jude Children's Research Hospital
Faculty Sponsor: Mary Miller, Department of Biology

Neuroblastoma is the most common extra cranial solid tumor in children, and Caspase-8 is frequently inactivated through DNA methylation or gene deletion in neuroblastoma tumor cells. Though Caspase-8 is a key protease in Fas induced apoptosis, its presence has been shown to aid in cell motility and metastasis in nonapoptotic cells by promoting cell motility through its recruitment to the focal adhesion complex, enhancing cleavage of focal adhesion substrates, and thus cell migration. This project aims to investigate the role of caspase-8 in the motility, adhesions, and metastasis of neuroblastoma tumor cells. Specifically it asks if Caspase-8 catalytic activity is necessary for its role in enhancing cell migration. Site directed mutagenesis was performed on regulatory site Y380 to produce Y380E and Y380F mutants. The mutant DNA was then cloned into retrovirus vectors, and the viruses expressing these mutants were produced and used to infect cell lines derived from neuroblastoma patients. The effects of the caspase-8 mutants on tumor cell proliferation, apoptosis, and attachment will then be assessed in vitro through migration and apoptosis assays. In vivo studies will be performed by introducing the mutant neuroblastoma cell lines into the tail vein of SCID mouse models and evaluating the resultant tumors.

#26 Synthesis and Biological Evaluation of Benzil Based Carboxylesterase Inhibitors

Elizabeth Parkinson; JL Hyatt, L Tsurkan, LD Hicks, MJ Hatfield, CC Edwards, B Yang, H Zhou, PM Potter, St. Jude Children's Research Hospital
Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Carboxylesterase enzymes (CE) are ubiquitous proteins found in human and animal tissues which hydrolyze carboxylic esters. Some carboxylic esters include clinically used drugs such as the anticancer agent CPT-11 (irinotecan). CEs hydrolyze CPT-11 to its active metabolite (SN-38), which is responsible for killing tumor cells. Because high levels of CEs are expressed in the intestine, high concentrations of SN-38 are produced, resulting in diarrhea, the dose limiting toxicity of CPT-11. Identifying specific CE inhibitors which could ameliorate this delayed diarrhea may have clinical utility. Benzil was previously found to be a potent inhibitor of CEs. In this study, we have synthesized and determined the ability of benzil derivatives to inhibit CEs in vitro. These derivatives include alkyl-1,2-diones and phenylalkyl-1,2-diones. Increased potency of enzyme inhibition was observed with increasing alkyl chain length and hydrophobicity. Another derivative consisted of benzil with differing atoms between the benzene ring and the 1,2-dione moiety. The inhibitory power of these compounds depended upon the polarity and hydrophobicity of the inserted atom. Intracellular inhibition of CEs by these compounds was determined along with inhibition of CPT-11 hydrolysis. Potentially, these CE inhibitors represent a new class of compounds that could be used to reduce the toxicity of CPT-11.

#27 Defining the Role of Human Zinc-finger Antiviral Protein in Influenza Virus Infection

Van Phan; Ruiqiong Wu, Hans Häcker, St. Jude Children's Research Hospital

Faculty Sponsor: Darlene Loprete, Department of Chemistry

Influenza virus is an important human pathogen responsible for annual epidemics and occasional, devastating pandemics. The genomes of influenza viruses encode 11 known proteins. One of these proteins, the non-structural protein 1 (NS1) is known to be essential for virus pathogenicity, yet its molecular mechanism of action is only partially defined. Our lab has identified a novel NS1-interacting host protein, the 'zinc-finger antiviral protein' (ZAP). This protein has previously been shown to interfere with virus replication of a distinct set of other viruses. This project focuses on the investigation of the so-far uncharacterized function of human ZAP in Influenza biology. We first established experimental systems for overexpression and knock-down of hZAP. We have successfully cloned hZAP into mammalian expression vectors (for overexpression) and also established a lentiviral shRNA knock-down construct, which reduces hZAP-mRNA and -protein levels significantly when stably introduced into HEK293T cells. We will use these systems to analyze critical infection-associated parameters, such as virus replication, cytokine production and apoptosis. We expect that these experiments will reveal the biological significance of hZAP as NS1-interacting protein. As such, these results may contribute to our understanding how Influenza A viruses control pathogenicity, and possibly identify a novel antiviral drug target.

Biology II Laboratory

#31 Salinity Affects Metabolism in Aquatic Plants

Laura Brown, Catherine Carlile, Bethany Larkin, Stephanie Sessarego

Faculty Sponsor: Carolyn Jaslow, Department of Biology

#32 Gender Effects on Crayfish Interaction

Lan Tran, Joey Hollenbeck, Anna Fitzgerald, Christian Kurth

Faculty Sponsor: Carolyn Jaslow, Department of Biology

#33 The Effect of Female Presence on Male Crayfish Aggression

JP Garry, Leo Kokorev, Sarika Mirchandani, Anahita Rahimi-Saber

Faculty Sponsor: Carolyn Jaslow, Department of Biology

#34 Increased Reflection on *Orconectes rusticus/virilis* Enhances Reactive Behaviors When Isolated

Sarah Ferguson, BethAnn McCloskey, Colin Perry

Faculty Sponsor: Carolyn Jaslow, Department of Biology

#35 Variation in Stomatal Density with Leaf Position

Maha Bano, Piper Carroll, Rigelle Tran, Emily Upchurch

Faculty Sponsor: Carolyn Jaslow, Department of Biology

#36 Substrate Preference Among Crayfish

Kavi Patel, Will Wurster, Jack Lartique, Adam Drake

Faculty Sponsor: David Kesler, Department of Biology

#37 Crayfish Substrate Preferences

Kenisha Clark, Cynthia Pham, Anne Rhynes, Farkas Patay

Faculty Sponsor: David Kesler, Department of Biology

#38 The Effect of Salinity on Osmoregulation Demonstrated by Crayfish Activity

Natalie Darar, Shruti Patil, Allie Dillon

Faculty Sponsor: David Kesler, Department of Biology

#39 Effect of Pesticides on Stomal Apertures

Mae Gillespie, Kathy Marr, Chris Perkins, Harrison Daniel

Faculty Sponsor: David Kesler, Department of Biology

#40 Stomata Density's Dependence on Leaf Height in *Arabidopsis thaliana*

Erik Rappa, Clayton Moore, Jenelle Francis, Charlie Yarn

Faculty Sponsor: David Kesler, Department of Biology

#41 The Influence of Size on Crayfish Dominance

Taylor Simmons, John Alexander, Sophie Altamirano, Ben Walsh

Faculty Sponsor: David Kesler, Department of Biology

#42 Turbulent Water Environment Allows for Easy Location of Food Sources

Alec Thompson, Alix Knight, Colleen Parrish, Kelly Patton, Alice Kachowski

Faculty Sponsor: David Kesler, Department of Biology

#43 Size of Crayfish Reflects on the Activity of the Dominant Crayfish

Jonathan Berube, Caroline Rollins, Melissa Welch, Brian Wolpert

Faculty Sponsor: David Kesler, Department of Biology

#44 Circadian Rhythms of Stomata Opening are Dominant over Light Sensitivity

Nora Puetz, Emily Shaw, Robert DeBusk, Tony Pikos

Faculty Sponsor: David Kesler, Department of Biology

#45 The Effect of Boric Acid on the Growth Rate of Pollen Tubes

Komal Mehra, Lisa Chaney, Chris Yang, Matt McCravy

Faculty Sponsor: David Kesler, Department of Biology

#46 Effects of Varying Temperature Change on the Behavior of Crayfish

Grey Ellerson, Matt Grisham, Chris Hardy, Courtney Strachan

Faculty Sponsor: David Kabelik, Department of Biology

#47 Phototaxis and Crayfish

Jared Swenson, Hamza Qadir, Chris Yates

Faculty Sponsor: David Kabelik, Department of Biology

#48 Will Crayfish Avoid Water Turbulence?

Kevin McGinn, Alison Lang, Chris Grigsby, Alex Yu

Faculty Sponsor: David Kabelik, Department of Biology

#49 Territoriality in Crayfish

Nicole McAlvany, Megan Zann, Andrew MacIntyre

Faculty Sponsor: David Kabelik, Department of Biology

#50 Effect of Metabolic Stressors on Crayfish Aggression

Shyretha Johnson, Talor Paige, Kate Stewart, Xiao Wang
Faculty Sponsor: David Kabelik, Department of Biology

#51 Antagonistic Behavior of Two Crayfish in the Presence of Shelter

Vy Nguyen, Huy Vi Spencer Friedrich
Faculty Sponsor: David Kabelik, Department of Biology

#52 Trends of Male Crayfish Aggression

Ryan Conley, Rikeen Patel
Faculty Sponsor: Terry Hill, Department of Biology

#53 The Behavioral Stimulation of a Crayfish in a Mirrored Environment

Leigh Allison, Aynsley Wright, Lindsay Svehla, Laura Wagner
Faculty Sponsor: Terry Hill, Department of Biology

#55 Effect of Temperature on Aggressive Behavior Within Crayfish

Madeline Scott, Kelsey Jones, William Cooner, Tyler Catterton
Faculty Sponsor: Terry Hill, Department of Biology

#56 The Effects of Environment Alteration on Crayfish Substrate Preference

Sully Mehio, Ahmed Minhas, Jordan Perchik, Reid Chadwick
Faculty Sponsor: Terry Hill, Department of Biology

#66 The Presence of Female Pheromones Causes an Increase in Male Agonistic Behavior

Kimber Jones, Mustafa Motiwala, Yasmin Mzayek, Thomas Horn
Faculty Sponsor: Terry Hill, Department of Biology

#67 The Effect of pH on Crayfish Respiration

Hannah Naeger, Mary Marks Nelson, Olivia Wells
Faculty Sponsor: Terry Hill, Department of Biology

Mathematics and Computer Sciences

#57 Gestures In Intelligent Tutoring Systems

Nick Volgas, Brian Yuan

Faculty Sponsor: Betsy Williams, Department of Mathematics and Computer Science

Past research has proven the effectiveness of Intelligent Tutoring Systems (ITSs) which are computer-based tutoring systems that interact with the user in a way that furthers learning. Currently, ITSs are being improved upon by increasing the realism of user's interaction. Our research involves watching videos of real expert human tutors from multiple domains and recording the gestures that coincide with the tutoring dialogue. These expert tutoring gestures can be analyzed with respect to the tutor's pedagogical dialogue strategy or tutoring move. This characterization can provide a good database of the probable gestures that get performed with certain tutoring moves. We plan to use this data to animate a pedagogical agent with gestures based on what information the tutor is attempting to convey in order to make it more life-like.

Biology

#58 Analysis of Seipin Expression in the Mouse and Construction of a Targeting Vector for the Generation of a Mouse Model of Spastic Paraplegia 17

Khang Dang; Ioannis Dragatsis, University of Tennessee Health Science Center

Faculty Sponsor: Rosanna Cappellato, Department of Biology

The purpose of my research is to analyze the expression of seipin in the mouse and to work towards developing a mouse model for Spastic Paraplegia 17 (SPG17). Mutations in the BSCL-2 (Berardinelli-Seip congenital lipodystrophy type 2) gene in humans are associated with two devastating disorders: Congenital Generalized Lipodystrophy type 2 and Spastic Paraplegia 17. BSCL-2 is located in human chromosome 11, contains 11 exons, and encodes a 398 aminoacid protein, called seipin. Aminoacid substitutions that disrupt glycosylation of the seipin cause autosomal dominant Spastic Paraplegia. SPG17 (also called Silver Syndrome, Silver Spastic Paraplegia Syndrome, or Spastic Paraplegia with Amyotrophy of Hands and Feet) is characterized by muscle weakness and atrophy of the upper and lower limbs. In the mouse, the BSCL2 gene homolog is located in chromosome 19 and has 87% identity to the human gene. There is currently no animal model for SPG17 and no information of the pattern of expression of seipin in the mouse. I analyzed the amount of expression of seipin and its localization in different organs in mice. I accomplished this by performing RT-PCR in total RNA from several adult organs and tissues, and from embryos at different stages. I had begun to generate a targeting vector that carries one of the aminoacid substitutions associated with SPG-17. For this, I have PCR-amplified genomic sequences that encompass this region to generate the mutation with site-directed mutagenesis.

#59 G1 Cyclin Cln3 is Dependent Upon NPL3, a Gene Required for Nuclear Export of mRNA in *Saccharomyces cerevisiae*

Lindsey Bierle

Faculty Sponsor: Mary Miller, Department of Biology

The process by which all eukaryotic organisms produce new cells is known as cell division, which is comprised of a series of highly regulated events described as the cell cycle. Cln3, a cyclin in the Growth 1 (G1) stage, is required in order for the cell cycle to progress through “Start,” the point where the cell becomes committed to the cell cycle. Cln3 functions by attaching to and activating Cdc28, a cyclin-dependent kinase (Cdk). This newly formed complex promotes the transcription of genes vital to the cell cycle process. A specific nuclear localization signal (NLS) is needed to transport Cln3 into the nucleus in order for the cyclin to activate transcription. A green fluorescence protein (GFP) reporter system was utilized to study the movement of Cln3 into the nucleus. In this system, the Cln3 NLS is fused to GFP and supports movement of GFP into the nucleus. Seventy-nine yeast deletion strains, each lacking a gene with known connections to transport mechanisms, were assayed for their ability to support CLN3 NLS dependent movement of GFP into the nucleus. In this screen, NPL3 was identified as important for Cln3 NLS activity. NPL3 encodes for a protein that binds RNA and is involved in the nuclear export of messenger RNA (mRNA), which are molecules that relay information from the nucleus to the ribosomes of the cell, where proteins are synthesized. To establish that the Cln3 NLS defect in the absence of NPL3 is relevant to full length CLN3 activity, Cln3-dependent viability assays were carried out. In these assays, Cln3 function was hindered in the npl3 deletion mutant approximately ten fold. Cln3 viability was restored when NPL3 was reintroduced, confirming that NPL3 is important for Cln3 function. Because NPL3 is involved in mRNA export, and NPL3 triggered CLN3 NLS deficiencies in our initial screen, we hypothesize that Cln3 transport is indirectly affected by NPL3 possibly via the function of a mRNA transcript whose transport requires NPL3.

#60 Proteomic Comparison of Spleen Leukocyte Nuclei from Non-Obese Diabetic and Control Strains of Mice

Yuriy Brodskiy; Ivan Gerling, University of Tennessee Health Science Center

A better understanding of cell receptor signaling and its involvement in target and effector tissues can shed light on the pathogenic processes associated with type 1 diabetes mellitus at the molecular level. The goal of this research was to discover spleen leukocyte nuclear proteins that are differentially expressed between Non-Obese Diabetic (NOD) mouse model and the non-diabetogenic C57B1/6 and Non-Obese Resistant (NOR) control strains and probe the cellular signaling mechanism that characterizes the development of type 1 diabetes. 5 Mice from each strain were sacrificed at 3 weeks of age (this period precedes diabetic pathogenesis). The spleen leukocyte nuclear fraction was isolated, and 2-dimensional gel electrophoresis was performed on the samples. The gels were then

stained with a ProQ Diamond phosphoprotein specific stain and a Krypton total protein stain. The data was subjected to a one way Analysis of Variance (ANOVA) followed by hierarchical clustering to identify proteins and phosphorylated proteins that were differentially expressed between the three strains. Results from the protein staining indicated that 212 proteins were differentially expressed between NOD and C57 (control) mice, and 118 phosphorylated proteins were differentially expressed between the NOD and C57 (control) mice.

#61 True Blood: Hematological Comparison Between Wild and Captive Reptiles

Anna Johnson, Cybil Covic

Faculty Sponsor: Jon Davis, Department of Biology

Blood composition is crucial to proper immune function, energetics, and osmoregulation, among other processes. Microscopic examination of hematological parameters can provide information on an animal's current immune function (immature:mature RBCs and heterophil:lymphocyte ratios) and immune challenges (parasite loads); however, such studies are rarely undertaken. We collected blood samples from captive-bred (n=48; 4 species) and wild-caught (n=20; 4 species) reptile species, used Giesma stain to differentiate cell types, and used light microscopy to determine immature to mature erythrocyte ratio, heterophil to lymphocyte ratio, and parasite load for all samples. We compared these data using t-tests to test the hypothesis that hematological parameters would differ between wild-caught and captive-bred reptiles. Specifically, we predicted that wild-caught reptiles will have greater parasite loads and active immune systems compared with captive-bred reptiles. Results of this study will be used to develop sample collection and analysis protocols for hematological assessments of reptiles across an urban-to-rural gradient in the Memphis area.

#62 Costs of Loss: A Comparison of Biochemistry and Morphology of Original and Regenerated Lizard Tails

Ted Boozalis, Landon Lasalle

Faculty Sponsor: Jon Davis, Department of Biology

Tail autonomy is a common and effective method of predator evasion in many lizard species. However, because the tail contributes to a multitude of functions such as mobility, energy storage, and social interactions, there are often costs associated with autonomy. Furthermore, key morphological differences may exist between the original and regenerated tail that could alter the biochemistry and energetics. We tested the hypotheses that lizard tail biochemistry, morphology, or both differ after regeneration. We compared the protein and lipid content of proximal, medial, and distal tail regions for original and regenerated tails across four lizard species. Morphological comparisons will be made on tricolor stained sections to estimate proportion of muscle, lipid, and bone / cartilage in original and regenerated tails. Results of this study will provide insight into potential energetic costs of tail autonomy in lizards.

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