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Publisher	Memphis, Tenn. : Rhodes College
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April 29th Events

- Awards Convocation: 9:00 AM, Hardie Auditorium
- Poster Session I & Lunch Reception, 11:30 AM-1:30 PM, Multi-sports forum of the Bryan Campus Life Center
- Oral Presentation Sessions: 1:30-5:30 PM, various locations
- Poster Session II & Closing Reception: 4:30 PM-6:00 PM, Multi-sports forum of the Bryan Campus Life Center
- Keynote Speaker: 6:00 PM, BCLC Ballroom

Acknowledgements and Special Thanks

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

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Schedule By Division

Time	Room	Session Title	Departments/Programs
Fine Arts			
12:30-1:45	Clough-Hanson Gallery	Artist Talks: Senior Thesis	Art & Art History
1:00-2:00	Tuthill Hall	The Cauthen Competition	Music & Theatre
2:00-3:15	FJ-B	Analysis & Technique	Art & Art History
2:30-3:30	Hassell 100	Production & Analysis	Music & Theatre
3:30-4:30	Evergreen 1 st Floor	Experimental Drawing	Art & Art History
Humanities			
12:00-1:30	Buckman 200	Celebrating the Publication of Rhodes Historical Review, vol 18.	History
1:30-2:15	Palmer 207	Explorations in Greek and Roman Studies	Greek & Roman Studies
1:30-2:15	Palmer 210	Writing, Ethics, and Society	English & Philosophy
1:30-2:30	Language Center	Spanish Senior Seminar I	Modern Languages and Literatures
1:45-3:15	Buckman 200	Digital Shelby Foote: Past, Present and Future	History
2:30-3:15	Palmer 207	Memphis History	History
2:45-3:45	Language Center	Spanish Senior Seminar II	Modern Languages and Literatures
4:00-5:00	Language Center	Spanish Senior Seminar III	Modern Languages and Literatures
Natural Sciences			
1:30-2:15	FJ-A	Quantitative and Computational Science FJ-A I	Mathematics and Computer Science I
1:30-2:15	FJ-C	The Natural World FJ-C I	Chemistry - I
2:30-3:15	FJ-A	Quantitative and Computational Science FJ-A II	Mathematics and Computer Science II
2:30-3:15	FJ-C	The Natural World FJ-C II	Chemistry - II
3:30-4:15	FJ-A	Quantitative and Computational Science FJ-A III	Mathematics and Computer Science III
3:30-4:15	FJ-C	The Natural World FJ-C III	Biology - III
3:30-4:15	FJ-D	The Natural World FJ-D IV	Physics - IV
Social Sciences			
1:30-2:30	Clough 204	Ethnography at Home I	Anthropology & Sociology
1:30-3:00	Kennedy 205	Population and National Security	International Studies
2:45-3:45	Clough 204	Ethnography at Home II	Anthropology & Sociology
2:45-3:45	Kennedy 208	Research in the Social Sciences	Economics
3:30 – 5:00	Kennedy 205	Population and National Security	International Studies
4:00-5:00	Kennedy 208	Research in the Social Sciences	Economics, Environmental Studies

Schedule By Room

Building	Time	Room	Session Title
Buckman Hall	12:00-1:30	Buckman 200	Celebrating the Publication of the Rhodes Historical Review, vol. 18.
	1:45-3:15	Buckman 200	Digital Shelby Foote: Past, Present, and Future
Clough Hall	1:30-2:30	Clough 204	Ethnography at Home I
	2:45-3:30	Clough 204	Ethnography at Home II
	12:30-1:50	Clough-Hanson Gallery	Artist Talks: Senior Thesis
Evergreen	3:30- 4:30	1 st Floor	Experimental Drawing
Frazier-Jelke	1:30 -2:15	FJ-A	Quantitative and Computational Science I - Mathematics
	2:30-3:15	FJ-A	Quantitative and Computational Science II - Computer Science
	3:30-4:15	FJ-A	Quantitative and Computational Science III - Computer Science
	2:00-3:15	FJ-B	Analysis & Technique
	1:30-2:15	FJ-C	The Natural World – Chemistry I
	2:30-3:15	FJ-C	The Natural World – Chemistry II
	3:30-4:15	FJ-C	The Natural World – Biology III
	4:30-5:15	FJ-D	The Natural World – Physics IV
Hassell Hall	1:00-2:00	Tuthill Performance Hall	The Cauthen Competition
	2:30-3:30	Hassell 100	Production & Analysis
Kennedy Hall	1:30-2:45	Kennedy 205	International Studies
	3:00-4:30	Kennedy 205	International Studies
	1:30-3:00	Kennedy 208	Research in the Social Sciences
	3:15-4:45	Kennedy 208	Research in the Social Sciences
Palmer Hall	1:30-2:15	Palmer 207	Explorations in Greek and Roman Studies
	1:30-2:15	Palmer 210	Writing, Ethics, and Society
	2:30-3:15	Palmer 207	Memphis History
	1:30-2:30	Language Learning Center	Spanish Senior Seminar I
	2:45-3:45	Language Learning Center	Spanish Senior Seminar II
	4:00-5:00	Language Learning Center	Spanish Senior Seminar III

Wednesday, April 27, 5 pm

Time	Room	Presentation Title	Presenter
Urban Studies			
5 pm	Buckman 103	New Hope Christian Academy: A Case Study on the Impact of Urban School Gardens	Noelle Schmitter-Schrier
		Race, Class and Local Food: An Examination of Alternative Food Practices in Urban Poor Communities in Memphis	Julia Lovett
		Analyzing the Effectiveness of the Church Health Center's Child Life and Movement Program Through Qualitative Research	Gizman Abdijabar
		Are Kids Having Fun? The Development of Children Through Outdoor Play	Pearlissa Harris
		Use of the Urban Farm and Forest at New Hope Christian Academy	Will Montgomery
		(Art) Education as a Practice of Freedom: A Case Study Offering Best Practices for Urban Afterschool Programming	Lexi Perkins
		Adolescent Pregnancy and Prevention: Where Does Family Fit In?	Chasity Scott
		Sex Education Policy Translation in Shelby County Schools	Leah Wisniewski
		Reproductive Injustice: Reproductive Health Care Services within the Criminal Justice System	Rheanna Henson
		Examining the Process of Collaboration Across Sectors Through the Shelby County Healthy Homes Partnership	Allison Bowen
		Investigation of How the Church Health Center Navigates Conflicting Narratives Put Forth by Health Justice Advocates and Consumer Driven Healthcare Advocates	Madeline Plaster

Thursday, April 28, 5 pm

Time	Room	Presentation Title	Presenter
Urban Studies			
5 pm	Buckman 105	Mental Health Organizations' Impressions of the Memphis Police Department	Casey Renka
		The Effects of the Fiscal Crisis on the Memphis Fire Department and Its Firefighters	Pauline Dinh
		Infectious Disease Prevention and Outbreak Control in Pediatric Populations in Memphis, TN	Michelle Chiles
		Maintaining the Backbone of the Foster Care System: Foster Family Recruitment and Support in Memphis, Tennessee	Kate Morris
		Assessing Refugee Health Through a Trajectory-Based Narrative Framework	Annika Gage
		The Formation of a Lost Generation: Exploring the Movement of Syrian Refugee Women and Children from a Rural to an Urban Context	Adriana Quiroga
		Crosstown Community Mapping Project: Exploring Place Attachment and Sense of Place Through Participatory GIS	Sydney Sepúlveda
		Walking in Memphis: A Study on Walkability in the Crosstown Neighborhood	Jackson McNeil
		Utilizing Collaboration for Urban Health Improvements and Economic Development	Mariko Krause
		Privatized Place: How the Public Spaces of Downtown Memphis are Responding to Trends of Privatization	Ellery Ammons
		She's the Boss : Urban, Female Entrepreneurs in Memphis, Tennessee	Sarah Baumann

BUCKMAN SESSIONS

(History)

Celebrating the Publication of the Rhodes Historical Review, vol. 18

Buckman 200

Moderator: Seok-Won Lee, Department of History

12:00-12:20 *Grit and Grind: Vietnamese Refugees and the Process of Community Formation in Memphis*
Adrian Scaife

Faculty Sponsor: Jeffrey Jackson Department of History

This article explores the origins of the Vietnamese community in Memphis and the process by which the first refugees entered and adapted into the cultural, economic, and political landscape of the city. The refugees arrived during the Civil Rights movement when racial strife had reshaped the social fabric of Memphis and exacerbated a physical and psychological divide between the white and black communities. This research adds color to a history otherwise largely told in black and white and supplements the contemporary understanding of the diverse makeup of the population of Memphis.

12:25-12:45 *Before the Pictures Fade: Understanding the Lives of Korean Picture Brides*
Esther Kang, Class of 2016

12:50-1:10 *François's Journey to Hell*
Smith Stickney, Class of 2017

1:10-1:30 *Sino-Soviet Relations During the Cold War: Nationalism, Disconnect, and Schism*
Mitchell de Kozan, Class of 2016

Digital Shelby Foote: Past, Present, and Future

Buckman 200

Moderator: Tim Huebner, Department of History

1:45-2:15
Jordan Redmon, Class of 2013

2:15-2:45
Maddie McGrady, Class of 2017

2:45-3:15
Selected students from “Shelby Foote, the South, and the Civil War” class

CLOUGH SESSIONS

(Anthropology & Sociology and Art and Art History)

Ethnography at Home I

Clough 204

1:30-1:45 *Living on a Prayer: An Ethnographic Study of Historically Black Churches in Memphis*
Katharine Goebel

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Ethnography is a cornerstone of anthropological research, a method in which researchers immerse themselves in a culture utilizing participant-observation, the act of being both an outside observer of cultural practices, but also being a participant in them. After positioning myself within local historically black denominations as a church goer, participant, and observer, I have begun to understand more about the charismatic worship that is somewhat

synonymous with historically black churches. These churches are more than a lively service with rousing music and stimulating messages. Rather, they are a physical expression of a belief system. This begs the question as to how ethnographers study belief systems when that system is very different from their own and whether the ethnographer can truly understand such systems if not possessing those beliefs themselves. By examining and analyzing the churches' material culture, messages given during the worship service, and interactions between church goers, it is evident that seemingly unimportant details (e.g., shaking one another's hands, dancing, clapping, and verbal expressions of praise) about these churches further enforce the strong Christian belief systems held by each congregation. I also came to better understand the challenges and limitations facing an ethnographer in the study of belief systems.

1:45-2:00 *Growing Grounded Theory: An Ethnographic Study of Memphis Botanic Garden*

Sara LaMonica

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Memphis Botanic Garden is an unlikely find, juxtaposed one road over from Oak Court Mall and just south across the train tracks from Poplar Avenue. It is one of the many non-profits in Memphis and combines natural and human made elements to create a whimsical departure from the city around it. I used the ethnographic method, primarily doing participant observation from my position as an intern and a volunteer, to learn about the unique cultural scene at Memphis Botanic Garden. I found that the garden creates diverse programs to invite a variety of groups to foster its community connections and involve as many people as possible with its mission. The garden cultivates an immersive sensory experience through the use of architecture, planting, incorporation of art from local artists, and the food it provides whether from their restaurant or something served at an event or the occasional garden edible. Four months positioned as an ethnographer studying the Memphis Botanic Garden have given me many insights concerning this important "cultural scene", but it is also the case that the garden is ever changing and thus offers each "participant" a potentially unique vantage point.

2:00-2:15 *Baking and Breaking Bread: Ethnographic reflections on pastry making and community building in a Mexican-American panadería*

Anna Rodell

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

The Kay Bakery Panadería Monterrey is a shining example of the thriving but much-overlooked Latino community in Memphis. Situated in a strip just off of Summer Avenue, the bakery could easily evade the eye of a passerby, but one look inside makes clear the significant role this business plays in the local community. Having visited panaderías in Mérida, Mexico, I was curious about how the elements I witnessed there would translate into a Mexican-American bakery. I situated myself within the panadería by closely observing interactions among staff and customers, watching pastry-making techniques, and participating in both conversation and commerce. Through these acts of participant observation, I came to understand that the Panadería Monterrey is a staple feature of the local community, much as were the panaderías that I saw in Mexico. The staff members function like a family – joking, teasing, and sharing meals– and they personally know a number of regular customers. Although the majority of the clientele is Hispanic or Latino, the bakery draws people of a variety of ethnicities and from different parts of the city. Delicious breads and pastries, meticulously decorated cakes, and a sense of cultural and communal hominess unite these diverse individuals in a unique cross-cultural family.

2:15-2:30 *Once Upon a Yarn: An Ethnographic Study of the Knitters of the Round Table*

Maria Yousuf

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Ethnography is a type of anthropological study in which researchers immerse themselves in cultural scenes in a manner of both participation and observation that produces empirical findings. A beginner knitter curious about the craft, I set out to conduct an ethnographic study of Yarniverse, a small, independent, yarn shop on Mendenhall Road. People converge there to engage in and bond over knitting and crocheting. I studied the scene at Yarniverse by interacting with the employees and customers there as well as by working on my own knitting project. By positioning myself as both an observer and a participant, I tried to learn by remaining open-minded rather than by setting out to answer predetermined questions. Some themes I am exploring at Yarniverse include the specific demographic of people who work at and frequent the shop, the function of knitting at the yarn shop in the knitters' lives, and what truly belonging in this cultural scene entails. As a small, out of the way yarn shop, Yarniverse can easily be overlooked by a passerby, but beneath the surface of a multitude of strands of yarn lies a nuanced cultural scene, worth visiting, participating in, and studying.

Ethnography at Home II

Clough 204

2:45-3:00 *The Cleveland Street Flea Market: An Ethnography of a Unique Space in Memphis*

Merare Sanchez

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

The Cleveland Street Flea Market is a space run by Crosstown Arts here in Memphis. The flea market has been open for fifteen years and houses unique and antique art, clothing, jewelry, furniture and other material items, as well as vendors that sell electronics and a barber shop. In order to understand a cultural setting unfamiliar to myself I utilized the ethnographic method, including participant-observation and in-depth interviews in order to learn more about this complex and unique cultural scene. Ethnography exposes one to experiences that challenge our assumptions and expectations about culture, cultural and social settings. The ethnographic method and my role as a participant and observant has given me the opportunity to experience and understand more than the surface level information that can be obtained by merely observing a setting. Through this observation I have been able to establish a relationship with vendors and employees in the flea market, as well as, clients that shop in this social setting. Through this ethnography I was able to touch, see, and smell fashion statements, electronic advancements, and material culture from the past and hear the stories that accompany items like these.

3:00-3:15 *'Caught in the Middle': An Ethnographic Study of the Middle Ground*

Rebecca Sillars

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

When studying and attempting to understand certain cultural scenes, the use of participant observation allows the ethnographer to engage in an active way in a cultural scene. It allows for the cultural scene to be observed in a natural and non intrusive way, which provides significantly detailed data. When applying this form of observation to the Middle Ground coffee shop a more in-depth and personal conclusion can be drawn from the data. Given that I am an exchange student from Scotland, the Middle Ground appealed to me as an interesting cultural scene as it is associated within my mind as a typical American setting where one might learn a lot about the culture of an American college. This study will not only be useful to myself, as an International student in understanding how American coffee shops differ from those from the UK, but will also provide insights for staff about the way that the Middle Ground works and how people react within it. Throughout this study I have become more appreciative of the practice of participant observation and the work that goes into producing an ethnographic study.

3:15-3:30 *Shear Genius: An Ethnographic Study of Dabbles Hair Company*

Kate Sullivan

Faculty Sponsor: Susan Kus, Department of Anthropology & Sociology

Dabbles Hair Company is a locally owned hair salon located in the Overton Square district of Memphis Tennessee. Dabbles is a unique, creative, and welcoming space. Dabbles' emphasis on individuality is embodied in their motto, "Dare to be different." The salon's eclectic décor, including a shrine to Elvis, reflects their deep ties to the Memphis community. Dabbles is a local favorite and has repeatedly been voted among the best hair salons in the Memphis area. By employing the ethnographic method of participant observation, I gained an in-depth perspective of the salon, its clients, and its place in the community. The value of the ethnographic method is based in its methodology. The researcher embeds themselves into the environment they are studying. By observing, asking, and listening, they can come to a richer understanding of the cultural scene. As a participant-observer, I learned the practices, customs, and peculiarities of the day-to-day operations of the salon. Watching how the employees interact with their clients, I realized it was more than a business interaction; it was often a friendship. Through my time at Dabbles Hair Company, I discovered how important community belonging is to the success and longevity of a thriving small business.

Artist Talks/Sessions

Clough-Hanson Gallery

12:30-1:50 *Senior Thesis*

Hannah Lewellen, Lara Johnson, Kat Millis, Lexi Perkins, Gloria Li, Sophia Mason, and Morgan Kulesza

Faculty Sponsor: Joel Parsons, Department of Art

Graduating senior studio art majors discuss their individual research, processes, and resulting artwork, which is currently on display in Clough-Hanson Gallery as part of the Senior Thesis Exhibition.

Evergreen 1st Floor

3:30 – 4:30 *Experimental Drawing*

Sara Lynn Abbott, Hayden Fox, Lily Huo, Rebecca Meng, Aylen Mercado, Sheridan Phelan, Hannah Selner, Shaina Teters

Faculty Sponsor: Joel Parsons, Department of Art

Students in Experimental Drawing have developed drawing portfolios based on areas of personal interest, including religion, youth culture, the relationship between cities and nature, and self-image. In thinking expansively about what drawing is and does, they have pursued multiple strategies, including drawing in time (performance and participation) and drawing in space (installation and sculpture). Their portfolios, on view on the first floor of the Evergreen education building, advance drawing as an expression of sophisticated and engaged thought, whether on or off the page.

Frazier-Jelke Sessions

(Art, Biology, Chemistry, Mathematics & Computer Science, Music, Physics, and Theatre)

Quantitative and Computational Science I

Frazier-Jelke A

1:30-1:45 *Automorphism Groups of k -star n -path Saturated Connected Graphs*

Shushangxuan Li

Faculty Sponsor: Eric Gottlieb, Department of Mathematics & Computer Science

In this project, I will study a Ramsey-theoretic aspect of graph theory. The main question is: how many edges must a tree contain in order to guarantee the presence of a k -star or an n -path? Another way to think about this problem is: what is the maximum number of edges that a tree with no k -star or n -path can contain? We have established a general formula for the number of edges using induction and classified the trees that achieve this maximum. In addition, we described the automorphism group of these saturated trees. The same questions are studied for connected graph following a similar studying procedure.

1:45-2:00 *Monotonic Onto Mappings of Planar Graphs*

Preston Tunnell Wilson

Faculty Sponsor: Chris Mouron Department of Mathematics & Computer Science

We define a monotonic mapping as a function f from graphs A to B as one with the following qualities: for all vertices in B , the inverse image of a vertex is connected; for an edge e in A , if e intersect the inverse image of a vertex b in B is nonempty, then the vertices which comprise e are in the inverse image of b ; and if $e = (x,y)$ is an edge in A and if $f(e)$ is an edge in B , then $f(e) = (f(x), f(y))$. Loosely, one can think of this as mapping some subgraphs of A to single vertices in B while preserving the edge connections not in the subgraphs. My work serves to extend the progress made by C. St. J. A. Nash-Williams contained in On well-quasi ordering infinite tree. The idea of his paper is that for any partial ordering of trees, there is no infinite anti-chain, a sequence of trees which are incomparable to the others. One can think of this result as for a sequence of trees, it is eventually impossible to include a new tree in this sequence which does not contain a previously used tree. My work is seeing whether this result extends to multi-graphs, graphs where loops and multiple edges between the same vertices are allowed.

2:00-2:15 *Symplectorphisms of Torus Invariant Quotients* ■

Ethan Lawler, Chris Seaton, Rhodes College; Hans-Christian Herbig, Departamento de Matemática Aplicada, Universidade Federal de Rio de Janeiro.

Faculty Sponsor: Chris Seaton, Department of Mathematics & Computer Science

The phase space of a closed system consisting of a finite number of particles in classical mechanics can be completely described by an operation called the Poisson bracket. Some of these spaces arise from the invariant rings of an l -dimensional algebraic torus acting on C^n . Using methods of Groebner bases, we can compute structural information for an arbitrary torus invariant ring, such as the Hironaka decomposition, Hilbert series, Hilbert basis,

and ideal of relations. Using different methods, we explicitly state the general form of the Hilbert basis and ideal of relations, as well as other structures for a large class of torus actions. First we will give a description of the algebraic and symplectic (Poisson) structure of a large class of these invariant rings, as well as the relevant proof techniques. Then we show which of these invariant rings give rise to symplectomorphic (Poisson isomorphic) systems.

The Natural World I

Frazier-Jelke C

1:30-1:45 *Synthesizing SA-002 to inhibit outer membrane formation in Gram-negative bacteria*

Andrea Pajarillo, Gene Lamanilao, Sarah Malkowski, Mauricio Cafiero, and Larryn Peterson

Faculty Sponsor: Larryn Peterson, Department of Chemistry

Gram-negative bacteria, or bacteria with a layer of peptidoglycan between an outer and inner membrane, cause many serious and deadly infections which are increasingly resistant to current antibiotic treatments. Inhibition of the LpxC enzyme, a key enzyme in the biosynthetic pathway of the lipopolysaccharide component Lipid A, would kill the bacteria. Lipid A is the toxic component of the outer membrane, and is highly conserved throughout Gram-negative bacteria. The active site of LpxC includes a hydrophobic passage, a polar region, and a zinc ion. This study aims to synthesize organic compounds which can competitively inhibit the LpxC enzyme. Preliminary results have shown the success of compound SA-002 against E. coli, and steps have been taken to improve the synthesis process.

1:45-2:00 *Characterizing the functional differences between EZH1 and EZH2 in human embryonic stem cells*

Arishna Patel, Jamy Peng, Department of Developmental Neurobiology, St. Jude Children's Research

Hospital

Faculty Sponsor: Larryn Peterson, Department of Chemistry

Stem cells are specialized cells that can self-renew and differentiate into multiple cell types during development and regeneration through gene expression changes. These changes in stem cells are achieved, in part, via chromatin modifications, which include histone methylation, phosphorylation, and acetylation. Polycomb Repressive Complex 2 (PRC2) is a protein complex that methylates lysine 27 of histone H3—a histone modification associated with global silencing of gene expression, especially during stem cell development and differentiation. The PRC2 contains an enzymatic subunit, which can be enhancer of zeste homolog 1 or 2 (EZH1 or EZH2). Previous findings suggest that EZH1 and EZH2 serve different roles in ESC development and differentiation, despite both having EED-dependent histone methyltransferase activity. Here, we report our investigation of the distinct roles of EZH1 and EZH2 by generating their mutations separately in human embryonic stem cells by using the CRISPR/Cas9 genome editing technology. The effect of EZH1 and EZH2 mutations on the expression of pluripotency (e.g. OCT4 and NANOG) and differentiation genes (e.g. NESTIN, Brachyury, and GATA4) was assayed by RT-qPCR. We find that neither EZH1 nor EZH2 mutations affect cell pluripotency; however, EZH2 mutations markedly up-regulate GATA4 expression, while EZH1 mutations up-regulate SOX1 and SOX9 expression.

2:00-2:15 *Investigating the Active Site of LpxC from Gram-Negative Bacteria through Interactions with Synthesized Natural Substrate Analogues* ■

Gene Lamanilao, Kayla Wilson, Sarah Malkowski, Mauricio Cafiero, and Larryn Peterson

Faculty Sponsor: Larryn Peterson, Department of Chemistry

The purpose of this research is to study the active site of UDP-(3-O-((R)-3-hydroxymyristoyl))-N-acetylglucosamine deacetylase from Gram-negative bacteria through the synthesis, characterization, and biological assay of originally designed natural substrate analogues. The enzyme, also known as LpxC, is involved in the formation of lipopolysaccharide within Gram-negative bacteria and possesses an active site containing three characteristic structural elements: a polar region, a zinc ion, and a hydrophobic tunnel. Two natural substrate analogues have been synthesized and characterized, SA-002 and GL-001, each containing a triazole linker that couples a nucleoside for interacting with the polar region and a hydroxamic acid to bind the zinc ion. However, GL-001 also includes a hydrophobic moiety in the form of a biphenyl for occupying the hydrophobic tunnel. Biological assays will then allow for comparative analysis of both analogues to determine the significance of the hydrophobic tunnel within the active site.

Quantitative and Computational Science II

Frazier-Jelke A

2:30-2:45 *Not the Same Old Paper Test: A Technological Alternative for Measuring Knowledge*

Evan Deere, Corrie Moore, Katie Wiener, and Max Tilka

Faculty Sponsor: Phillip Kirlin, Department of Mathematics & Computer Science

Paper or hand-written tests have been the standard to assess student performance within academic foundations. During this current semester our team has created a gaming application as a replacement for standard paper-based tests. Through the embedding of interactive questioning and categorization of questions, our group believes a computer-based web application can assess student performance better than traditional methods. Conventional testing only evaluates accuracy of knowledge within students. Through the gaming application our group can analyze the time to start and complete the test, time to start and complete each question, number of visits to each question, accuracy of answers, and accuracy of answers after changing the initial answer. Testing involved two groups. One group took the paper test first followed by the gaming application test. The second group completed the gaming application followed by the paper test. With this information our group can prove an interactive gaming application helps improve student test scores. Additionally, variables from the paper test and gaming application helped find further correlations.

2:45-3:00 *Using Eye-Tracking and Voice Analysis to Detect Lies*

Matthew Jackoski, Alex P. Hofman, Daniel Morris, and Eric DeWitt

Faculty Sponsor: Phillip Kirlin, Department of Mathematics & Computer Science

Lie detection tests are widely used throughout law enforcement and are employed within numerous other agencies. The current standard for lie detection hardware is the polygraph test. While these tests are mostly accurate, the expense and cumbrance of the polygraph hardware is a hindrance. In order to tackle this problem, we are testing three new methods of detecting a lie that are both inexpensive and mobile. These three methods include: voice analysis, pupil tracking, and eye-gaze tracking.

By using these three methods to measure the stress levels in an individual, we are able to effectively determine the probability that the subject is lying. When the frequencies of the voice vary from the test subject's normal levels, their pupils dilate more than a normal level, or the subject diverts his gaze, it is an indication that the subject is experiencing stress. This therefore means that the subject is more likely to be telling a lie.

By comparing our results to a standard success rate of polygraph tests, we are able to discuss if any of these three proposed methods are viable lie detection approaches. We also address if any of these methods work best as a stand-alone method or in combination with one another.

3:00-3:15 *Children and Coding*

Keely Hicks, Mike Shield, Trey Tamura, and Khang Nguyen

Faculty Sponsor: Phillip Kirlin, Department of Mathematics & Computer Science

Are children ready to begin coding in elementary school? Our research sought to answer this question by introducing Computer Science fundamentals to a fifth grade curriculum. These principles were employed through a child friendly platform – MIT's Scratch – with drag-and-drop blocks. Furthermore, our research was an effort to expose the youth of the Memphis public school system to Computer Science concepts that they would not have the opportunity to learn otherwise. Our initial meetings with the Snowden School children began by showing them how to use Scratch. Next we walked through several projects with the children, checking their work as they followed along. Lastly, we constructed a final project that was handed out on paper with specific instructions. Our data groups were children with previous knowledge of Scratch and those without. We discuss which group benefited and gained the most from our time with the children.

Analysis & Technique

Frazier-Jelke B

2:00-2:15 *Marisol's Mothers, or Class Distinction in America*

Lees Romano

Faculty Sponsor: David McCarthy, Department of Art & Art History

Marisol Escobar, or simply Marisol, is best known for her large figural sculptures that address a variety of subjects such as women's roles, families, and historical and contemporary figures. Her sculptures are boxy and frontal, overlaid with figurative drawing and bright, patterned paint. Art critic Irving Sandler dubbed her body of work "a mélange defying classification." For this reason, it is difficult to not only categorize Marisol's work within the post-war art historical cannon, but also to maintain her relevance as an artist. Amid the Pop art revolution of the 1960s and '70s, Marisol came to terms with her identity as a female Pop artist. Her wooden tableaux is inflected by various Latin influences stemming from her Venezuelan parents, as well as American folk art. She maintains both airs of satire and resilience in her family sculptures. The use of these devices in her sculptures indicates that her status and fame as an artist are the products of her own heritage, interests, and perseverance. At the height of her fame, Marisol was frank about her situation: "It has happened because I made it happen."

2:15-2:30 *A Digital Toolbox: Facilitating 3D Modeling for Students in Art and Archaeology* ■

Kayce Boehm

Faculty Sponsor: Miriam Clinton, Department of Art & Art History

3D modeling technology holds great potential as a tool for education in the fields of archaeology and classical studies. Students poised to enter these fields stand to benefit greatly from this technology. By publishing such models online for Internet users to explore, they might inform a wider public about the past. However, these students may be hindered by their lack of experience with modeling. Not all programs are accessible or easy to use by those unfamiliar with computer science or design. This research project investigates what tools are best adapted to modeling ancient structures by students more experienced with archaeology than computer science. It creates videos geared specifically toward creating ancient objects, such as rhyta from the House of the Rhyta in Pseira, Crete. It then studies how students interested in classical studies interact with these videos versus existing tutorials for Google Sketchup 2016. It compares how quickly such students come to grips with the program and the end product of their work. The end result is a series of tutorials that effectively teach students practical experience with models that will aid them in future work.

2:30-2:45 *The Second Coming Out: Andy Warhol's Devotional Commitment to Consumer Capitalism*

Schaeffer Mallory

Faculty Sponsor: David McCarthy, Department of Art

Exactly one month before he died, Andy Warhol's Last Supper series was exhibited in Milan. Commissioned to produce a body of work in response to Leonardo Da Vinci's Last Supper, Warhol exceeded expectations, producing almost 100. However, Warhol's Last Suppers have by and large been simplistically reduced to so-called "heretical irreverence." Yet to posit that Warhol would undertake a commission of overtly religious subject matter only to blaspheme the Catholic Church requires that one downplay if not altogether ignore his lifelong piety.

2:45-3:00 *Conservative Among the Moderns: Tom Wesselmann and the Great American Nude Series*

Corinne Nabors

Faculty Sponsor: David McCarthy Department of Art

This paper examines the counterintuitive suggestion posed by Tom Wesselmann's Great American Nude series that modern art is actually quite conservative. While other artists of the 1960s manifested Pop Art as a means of rejecting the artistic movements that dominated the previous decades, Tom Wesselmann relied on the great artists of the preceding generations and aimed to stand alongside them. Begun in 1960, the Great American Nude series, his first extensive series of paintings, combined these traditional themes. His choice of subject matter derived from his renewed sexual desire and the growing public acceptance of sex in American culture. By preserving the convention of the reclining female nude and the traditional methods of painting, he not only positioned himself in the larger art historical canon, but he aimed to Americanize it. Wesselmann once described himself as a "Rousseau among the Cubists," but he might more accurately be considered a conservative among the moderns. Tom Wesselmann used the Great American Nude series to come to terms with his latent sexual desires, Americanize the canon, and explore the clashing realities of contemporary American culture, and, through this process, he emphasized and affirmed the surprisingly conservative foundations underlying modern art.

3:00-3:15 *Masculinity in Richard Hamilton's Towards a definitive statement... Series*

Sophia Mason

Faculty Sponsor: David McCarthy, Department of Art

The British painter and contested father of Pop Art, Richard Hamilton (1922-2011), began a series of collage paintings in 1962 which he titled, Towards a definitive statement on the coming trends in men's wear and

accessories, after the title of a Playboy fashion forecast. Scholars have written extensively about Hamilton's concurrent series which depicts women, cars, and fantastical home appliances, and articulates how post-WWII advertising fetishized the female body and the consumer product. However, no art historians have fully analyzed the Towards a definitive statement... series depicting male bodies, technology, and leisure. Hamilton himself never felt satisfied with this series, but I argue that its unresolved air actually defines the changeability and untethered quality of masculinity. The pop paintings depict the post-war, America-saturated context where the idea of masculinity was rapidly changing. The collage medium insinuates that propaganda used masculinity to "sell" ideas, and the technological boom in the 60's encouraged Hamilton to link these paintings with Marcel Duchamp's gendered machine metaphor.

The Natural World II **Frazier-Jelke C**

2:30-2:45 *The Synthesis of Unnatural Amino Acids in Order to Synthesize Antibiotic Polypeptides* ■

Barry Rich, Kimberly Brien, and Roberto de la Salud Bea

Faculty Sponsor: Kimberly Brien, Department of Chemistry

It has been reported that modifications of the primary structure of peptides can result in changes of their original properties. Our goal is to develop a synthesis of novel peptides with potential antibiotic activities by introduction of novel, unnatural amino acids. We have designed a library of amino acids with specific hydrophobic and hydrophilic properties. In this talk, we are going to report our progress in synthesizing an intermediate product for nucleophilic substitution, (R)-2-amino-3-iodopropanoic acid, and our plans to achieve the completion of this library of unnatural amino acids.

2:45-3:00 *DFT Study of the Selectivity of DOPA-decarboxylase* ■

Abby Ritter, Emily C. Harrison, and Larryn Peterson

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

L-DOPA is commonly used as a xenobiotic for patients with conditions such as Parkinson's disease. Clinically administered L-DOPA is transformed into dopamine by DOPA-decarboxylase. In order to be pharmacologically effective, L-DOPA must not be metabolized before it crosses the blood brain barrier. In order to prevent premature metabolism, DOPA-decarboxylase may be inhibited in the periphery. By selectively designing an inhibitor for the DOPA-decarboxylase enzyme, the effectiveness of the L-DOPA can be extended. A suite of dopaminergic derivatives have been developed as potential inhibitors of the DOPA-decarboxylase enzyme. The inhibitory effectiveness of these dopaminergic derivatives has been measured via in silico models in which the strength of interaction between each substrate and the enzymatic active site was analyzed. A crystal-structure of the DOPA-decarboxylase active site, docked with a known DOPA-decarboxylase inhibitor, Carbidopa, was isolated from the Protein Data Bank (PDB ID: 1JS3). The positions of novel dopaminergic derivatives were optimized in the active site using M062X/6-31G with implicit solvation and with flexible amino acid side-chains. Interaction energies between the ligands and the protein were calculated using M062X and MP2 with the 6-311+G* basis set. At present, 6-nitrodopamine appears to be an effective competitive inhibitor of the DOPA-decarboxylase enzyme.

3:00-3:15 *Toward the Synthesis of 6-Ethenyldopamine for Analysis in SULT1A3* ■

C. Skyler Cochrane, Jennifer C. Rote, Gabrielle E. Bailey, Diana J. Bigler, Mauricio Cafiero, and Larryn Peterson

Faculty Sponsor: Larryn Peterson, Department of Chemistry

Sulfation, an important metabolic process in the human body, is an essential pathway through which endogenous catecholamine and xenobiotic substances can be inactivated and/or have their solubility increased to facilitate removal from the body. One family of enzymes that implement this sulfation, the sulfotransferases (SULTs), catalyze the transfer of a sulfonyl group (-SO₃-) from 3'-phosphoadenosine-5'-phosphosulfate to various substrate molecules. Of particular interest is SULT1A3 because, while it shares 93% amino acid sequence identity with SULT1A1, the two sulfotransferases demonstrate very unique substrate selectivity with SULT1A1 preferentially sulfating simple phenols and SULT1A3 preferentially sulfating catecholamines, such as dopamine. In an effort to determine the molecular basis of its substrate selectivity, a library of compounds with various electron donating/withdrawing groups has been designed, synthesized, and analyzed for their binding affinities in SULT1A3. This study will focus on the multiple synthetic routes that have been attempted to synthesize 6-ethenyldopamine.

Quantitative and Computational Science III

Frazier-Jelke A

3:30-3:45 *Comparing Various Locomotion Methods within Virtual Environments* ■

Preston Tunnell Wilson, Ansel MacLaughlin, and Will Kalescky

Faculty Sponsor: Betsy Sanders, Department of Mathematics & Computer Science

Two inexpensive methods of exploring a virtual environment are “walking in place” (WIP) and arm swinging. These techniques are compelling because they seem to provide more proprioceptive cues than traditional inexpensive virtual navigation techniques such as joysticks or controllers. Specifically, WIP and arm swinging seem to result in better spatial awareness of the environment. For example, in our prior work, we had success in implementing a WIP method using an inexpensive Nintendo Wii Balance Board and later with Microsoft Kinect sensors. We showed that participants’ spatial orientation was the same as normal walking and superior to joystick navigation. We used an inexpensive wearable device called the Myo armband (199 USD) to implement a simple arm swinging algorithm that allows a user to freely explore an HMD-based virtual environment. We found that our arm swinging method outperforms a simple joystick and that spatial orientation is comparable to physically walking on foot. We expand on this work by comparing many locomotion methods to each other: WIP to arm swinging to physical locomotion; seated joystick to standing joystick; and other permutations as we obtain our results.

3:45-4:00 *Quadcopter Safety Function*

Yuanshuo Li, Thomas Threlkeld, Connor Jerow, and Tara Lehman

Faculty Sponsor: Phillip Kirlin, Department of Mathematics & Computer Science

Quadcopters are multi-rotor unmanned aerial vehicles. Quadcopters are becoming increasingly common among hobbyists. Although lower end quadcopters can be purchased relatively cheaply, they also tend to crash and break easily. The aim of our research is to determine the effectiveness of a hover safety function in preventing expensive crashes. The study compares two groups of users, one with and one without this function, both with limited experience flying quadcopters. This experiment was run using an LHI CC3D quadcopter controller. We ran the experiment in an indoor obstacle course setting, measuring how many times the hover function was used and how many crashes occurred in each run. This data was then used to determine the effectiveness of the hover safety function in preventing crashes.

4:00-4:15 *A Polyphonic Model for Computational Music Analysis*

Alex Abdo, Kris Baker, Bryton Herlong, and Casey Means

Faculty Sponsor: Phillip Kirlin, Department of Mathematics & Computer Science

Two-factor authentication is a security method that uses two separate sources to verify identity. Usually, it requires that users provide both pieces of verification, which are usually a username/password combination and a code sent over SMS. Our system, LAVA, automates the second verification by using location instead of an SMS code. LAVA consists of a web application, a Parse database, and an iPhone. Parse’s cloud database is used to communicate between the webapp and the iPhone. When a user logs into the webapp, Parse stores the location of the access point. After confirming a valid username/password, Parse then retrieves the location of the iPhone through the iOS app. We assume the smartphone’s location to be the user’s physical location. If the locations of the phone and the computer logging in approximately match, then it is assumed the actual account user has logged in and is verified; otherwise, the user must use an SMS code. We compare the time of the LAVA log-in with single-factor authentication and standard two-factor authentication. We investigate whether there is a humanly perceptible difference between LAVA and single-factor authentication.

The Natural World III

Frazier-Jelke C

3:30-3:45 *The Potential Impact of a Prophylactic Vaccine for Ebola in West Africa*

Connor Cook and Kayla Shorten

Faculty Sponsor: Erin Bodine, Department of Biology

The 2014 outbreak of Ebolavirus disease (EVD) in West Africa has been multinational and of an unprecedented scale primarily effecting the countries of Guinea, Liberia, and Sierra Leone. One of the qualities that makes EVD of high public concern is its potential for extremely high mortality rates (up to 90%). A prophylactic vaccine for the

Ebolavirus has been developed, and preliminary results are promising, showing near perfect efficacy. We have developed an ordinary differential equations model which simulates an EVD epidemic and takes into account (1) transmission through contact with infectious EVD individuals and deceased EVD bodies, (2) the heterogeneity of an individual's risk of becoming infected with EVD, and (3) the increased survivability of infected EVD patients through increases in the number of healthcare workers available in the population. Using parameter values which closely simulate the dynamics of the 2014 outbreak in Sierra Leone, we utilize our model to predict the potential impact of a prophylactic vaccine for the Ebolavirus. Our results show that if as little as 36% of the general Sierra Leone population had been vaccinated prior to the most recent epidemic, then no outbreak would have occurred.

3:45-4:00 *The effects of dopamine 1 and 2 agonists and antagonists on sexual and aggressive behaviors in male green anoles.* ■

Alexis Smith and David Kabelik

Faculty Sponsor: David Kabelik, Department of Biology

Dopamine is a neurotransmitter that modulates social behaviors, and is conserved among vertebrates. Dopaminergic receptors of the D1 and D2 subtype are also conserved among taxa, and are involved in many different kinds of social behaviors, such as sexual and aggressive behaviors in mammals and birds. However, the functions of the receptors vary across taxa. In reptiles there have been two limited studies examining the relationship between the receptors and behaviors. This study examined the effects of D1 and D2 agonists and antagonists on sexual and aggressive behaviors in the male green anole lizard (*Anolis carolinensis*). Neither the agonists nor antagonists affected social behaviors. These findings differ from previous research, which demonstrated an effect of D1 and D2 agonists and antagonists on social behaviors in mammals and birds. A possibility is that the drug is binding to various regions in the brain that could have opposing effects on social behaviors.

4:00-4:15 *Next-generation Sequencing of 28 Mitochondrial Genomes in the Core Goodeniaceae for Usage in Phylogenetics*

Pryce Michener and Rachel Jabaily

Faculty Sponsor: Rachel Jabaily, Department of Biology

Efforts are ongoing to phylogenetically characterize the relationships within the predominantly Australian plant family Goodeniaceae. Previous phylogenies built from Sanger sequencing of the chloroplast were sufficient to place all species within the Core Goodeniaceae into multiple major clades with strong support. However, relationships between those clades have been under-resolved, particularly within the clade *Goodenia* s.l. Furthermore, Sanger sequencing of the biparentally inherited nrITS locus revealed conflicting relationships along the backbone, suggesting the role of ancient hybridization events. An exceptional increase in sequence data is required for a fully-resolved phylogenetic backbone necessary for naming of new genera. Next-generation sequencing was performed to generate over 300 gigabytes of data for 28 taxa spanning Core Goodeniaceae. The chloroplast reads accounted for only 2% of the total reads for these 28 species. Here, I present my approach for diving into the other 98% of reads to look for data that can be utilized to help resolve the backbone of the Core Goodeniaceae. My project has been to create a parallel mitochondrial phylogeny of the 28 species for comparison to the chloroplast phylogeny. Mitochondrial genes, while commonly used in animal phylogenetics, are rarely utilized in plant systematics, and little is known about how they evolved.

The Natural World IV

Frazier-Jelke D

3:30-3:45 *Exact and approximate closed-form capacitance expressions for charged spheres of equal size* ■

McKenna Davis and Shubho Banerjee

Faculty Sponsor: Shubho Banerjee, Department of Physics

Capacitance is a measure of how much charge an electric conductor is capable of storing at a given voltage. Exact closed-form expressions for the capacitance coefficients between two charged spheres of equal size involve the q-digamma function, which necessitates the use of expensive software and advanced mathematics. Such requirements are unrealistic for a variety of settings, including student research and many engineering applications. Thus, there is a need for simpler expressions of these capacitances that preserve the accuracy of the exact closed-form expressions. Using the original formulas for capacitances, we calculate series expansions for the case in which the spheres are about to touch each other. We use those series expansions to create two approximate formulas for the capacitance,

which are much simpler than the original equations because they do not involve the q-digamma function. The capacitance approximations are, to the best of our knowledge, the most accurate in the literature.

3:45-4:00 *Ultrasonic Characterization of Trabecular Bone Phantoms at 5 MHz* ■

Matthew Huber and Brent Hoffmeister

Faculty Sponsor: Brent Hoffmeister, Department of Physics

Understanding how sound propagates through bone is of great importance in a variety of research endeavors. Ultrasound techniques, ranging from conventional through-transmission measurements to backscatter evaluations, are currently being developed and used for diagnosing osteoporosis in humans. Assessing the quality of these measurement techniques is difficult without a standard sample set. Using trabecular bone from humans or other mammals provides a method of comparison, but such bone can be difficult to obtain and store, is not uniform, and is of limited size and density ranges. Open cell polyurethane foam, known as “Sawbones”, is a trabecular bone mimic that has advantages over bone in these areas. The bone phantoms come in a range of densities from 5.5 to 30 pounds per cubic foot. In this study, bone mimics over this density range were acoustically characterized for 5 MHz ultrasonic waves by looking at backscatter from the samples, attenuation through the material, and speed of sound in the blocks. The results of this study will be presented, along with a comparison between the properties of the Sawbones material and human trabecular bone.

4:00-4:15 *Ultrasonic Backscatter Difference Measurements of Cancellous Bone Using a 3.5 MHz Transducer*

Luke Fairbanks, Sheldon Ebron, and Brent Hoffmeister

Faculty Sponsor: Brent Hoffmeister, Department of Physics

Osteoporosis is a degenerative bone disease that affects millions of people worldwide. The disease causes normally porous bone tissue, called cancellous bone, to become increasingly porous and susceptible to fracture. The goal of this project is to investigate an ultrasonic technique that may be able to detect changes in cancellous bone caused by osteoporosis. The technique measures the power difference between two different portions of a backscatter signal from bone. Backscatter occurs as an ultrasonic wave interacts with the porous structure of cancellous bone, acting like an echo. The backscatter signals were analyzed to determine the normalized mean of the backscatter difference (nMBD) which represents the frequency average power difference. Measurements were performed on 50 cube shaped specimens of human cancellous bone using a 3.5 MHz ultrasonic transducer. Results will be presented in which four different portions of the signal are analyzed, varying according to their location (in time) relative to the front surface echo from the specimen.

HASSELL SESSIONS

(Music and Theatre)

The Gladys Cauthen Soloist Competition

Tuthill Performance Hall

1:00-2:00 *The Cauthen Competition*

Rhodes College, Department of Music

Faculty Sponsor: Leah McGray

Gladys Cauthen was one of the founding influences in the development of Rhodes' Department of Music. Showcasing the instrumental and vocal talents of Rhodes College, the final round of competition and judging for the Gladys Cauthen Soloist competition will take place in Tuthill Auditorium of Hassell Hall. Students who are enrolled in applied music lessons have applied and completed an initial qualifying round of performances, and a winner will be selected from the finalists for a monetary award and the opportunity to perform their work as the featured soloist with the Rhodes College Orchestra next season.

Judging will begin at 1:00 pm, with the final results announced at the end of the program, approximately 2:00 p.m. Rhodes community members are invited to come by and listen to these wonderful musical offerings.

Production & Analysis

Hassell 100

2:30-2:45 *'Rediscovering' the Masters: The Alleged Forgeries of Henri Casadesus*

Kristen Bright

Faculty Sponsor: Carole Blankenship, Department of Music

Although both the Bach/Casadesus and Handel/Casadesus viola concertos have become standards within the viola repertoire, their origins are ambiguous. Scholarship on these pieces is sparse, but some modern scholars believe that they were wholly written by Henri Casadesus although they were passed off by him as arrangements of pieces originally by Bach and Handel. In my lecture, I will discuss the compositional styles of J.C. Bach and G.F. Handel, as well as specific musical elements that are characteristic of their time periods. I will also explore reasons why Casadesus might have forged these pieces and examine the concertos themselves by discussing elements of these pieces that are more indicative of Casadesus's contemporary Romantic period.

2:45-3:00 *These Best of All Possible Dystopias: A Production Concept for Mark Ravenhill's Candide*

Sophia Deck, Nicole Batson, Zoe Gresham, Carolyn Parks, and Roc Sherrell

Faculty Sponsor: David Jilg, Department of Theatre

What do we do if we're not acting? How do we "create the delicate illusionary reality that we call theatre?" In Fall 2016, the McCoy Theatre will produce RSC Playwright in Residence Mark Ravenhill's *Candide*, an exploration of "rampant optimism," social media, parallel universes and genetic engineering in this "best of all possible worlds." In his contemporary adaptation inspired by Voltaire's classic satire, Ravenhill creates a string of narratives in which his characters "sleep walk" through a variety of dystopic landscapes. We as student collaborators analyzed Ravenhill's text as a blueprint for production, researched visual and aural sources for inspiration, and developed "a creative interpretation of the script" to unify artistic elements of the production, including ideas for set design, costume design, music composition and staging. This presentation articulates our process and results.

3:00-3:15 *Music as a Language: An Introduction into Musical Improvisation*

Ladd Caballero

Faculty Sponsor: Carole Blankenship, Department of Music

Learning to improvise is learning the language of music. When we speak, we do not create new sounds for every situation; rather we combine words and phrases we already know to create new meanings. This concept can be applied to learning musical improvisation. In the same way, improvisation in music does not rely entirely on nuanced musical phrases and ideas. In fact, it is the familiar phrases composed in new ways that makes improvisation so powerful. Even without a musical background, everyone inherently understands this language—what sadness, happiness, fear sound like. These different emotions can be elicited in improvisation by using the same musical phrases. In this lecture recital, I will pinpoint popular musical idioms, and I will demonstrate how understanding the language of music is a tool to learning musical improvisation.

3:15-3:30 *The London Stage Fellows Formally Invite the Public to a Grand, Serious Presentation on the Nineteenth-Century London Stage* ■

Sarah Catanzaro, Kristen Bright, Alex Hofman, Ethan Lawler, and DeSonya Tyms

Faculty Sponsor: Vanessa Rogers, Department of Music

Theatre in nineteenth-century London was integral to the cultural life of the city, and encompassed a variety of topics and genres. Feats of horsemanship, circus acts, operas, oratorios, dances, aquatic dramas, and Shakespeare plays were some of the many forms of entertainment featured on London stages, and these various entertainments catered to almost all demographics within the city of London. The stages of London, with their elaborate sets and their varied productions, captivated the people of the city, and allowed for performers like the renowned and prolific Madame Grimaldi to garner considerable fame. The operations of these London theatres, too, also represent a capitalist endeavor, as stages clamored to obtain and maintain the interest of the public with new works, as well as old favourites. Throughout the year, we have read about the London stage in the eighteenth and nineteenth centuries and have begun to decipher how London theatres and theatrical productions operated. This spring, we have begun to examine adverts for theatrical productions in the London Times and code that information for researchers who will compile our data and create a searchable database of London stage productions.

KENNEDY SESSIONS

(Economics, Environmental Studies and International Studies)

International Studies 221: Population and National Security

Kennedy 205

1:30–3:00 *Population and National Security – Part I*

3:30–5:00 *Population and National Security – Part II*

Mary Cat Cleavinger, Meredith Clement, Roarke Dooney, Caleb Fowler, Nick Hallmark, Tazio Heller, Stuart Hines, Frances James, Roz KennyBirch, Natasha Main, Anya McKay, Natalie Palmer, Robert Rector, Caroline Sutton, Emily Wozena, and Akvile Zakarauskaite

Faculty Sponsor: Jennifer Sciubba, Department of International Studies

These presentations from the course INTS221 Population and National Security will describe the military, political, economic, and social implications of national and sub-national population issues, including age structure, ethnic composition, etc.

Research in the Social Sciences

Kennedy 208

Moderators: Nicholas Cavin and Cari Harris

1:30-1:45 *Profile of a Student Offender at Rhodes College* ■

Nicholas Cavin

Faculty Sponsor: Courtney Collins, Department of Economics

This study uses campus safety indictment data combined with student's demographic and academic data to determine what characteristics are correlated with certain illicit behavior. Though many studies have been done regarding why individuals commit crimes (Becker being the most prominent) as well as how prevalent certain illicit activities are on college campuses (such as underage drinking and cheating), there are none which look at the characteristics of student offenders who have been caught. The data is taken from campus safety incident reports written by campus safety officers as well as students' basic demographic information (the students' identifying information has been deleted from the data set by the faculty supervisor in order to ensure confidentiality) and information given to the college during the admission process (such as high school GPA, standardized test scores, etc.). The study has yet to produce any meaningful results due to the large amount of cleaning the data set requires, but the initial hypothesis is that white, male, Greek-affiliated athletes will be the most likely to commit any given offense.

1:45-2:00 *Employment and Adverse Pregnancy Outcomes: An Examination of the Causal Effects of Unemployment on Birth Weight* ■

Erin Hart

Faculty Sponsor: Erin Kaplan, Department of Economics

Birth weight is a leading predictor of neonatal mortality, decreased intelligence, and many developmental difficulties. Adverse employment changes during pregnancy have been linked to significantly lower birth weight. Compared to births in which mothers are employed or out of the labor force before their pregnancies begin and do not become unemployed during pregnancy, births in which mothers shift from pre-pregnancy employment to unemployment during pregnancy have been shown to result in children of lower birth weight. This paper aims to analyze the effects of maternal unemployment not only in women who were employed before their pregnancies but rather in all pregnancies. Moreover, this paper includes county unemployment rates to determine whether higher rates of unemployment lead to decreased birth weight through unobserved channels, such as stress, even if mothers did not experience unemployment during their pregnancies. Data from the National Longitudinal Survey of Youth 1997 cohort is used to analyze 5,013 births occurring between 1996 and 2014. Our results suggest that county unemployment rates do not significantly affect birth weight, but longer periods of unemployment during pregnancy compared to periods of employment during pregnancy result in significantly lower birth weight children.

2:00-2:15 *Tank Me Out To The Ballgame*

Matthew Dsida

Faculty Sponsor: Erin Kaplan, Department of Economics

Major League Baseball, or the MLB, is a statistician's dream. With thousands of games being played over the course of a season, the data source is rich enough to allow teams to maximize their efficiency. Michael Lewis' *Moneyball: The Art of Winning an Unfair Game* took this analysis to the next level. Teams began to squeeze every advantage they could out of simple statistics. There is speculation that MLB teams are purposefully losing, or tanking, in order to attain high draft positions, and with them players that will be beneficial to their team in the future. Although there is evidence that tanking occurs in the NBA, there is currently no research on this question in the MLB. My research analyzes data from every season for every team over the past ten years to test whether the probability of winning changes once a team is statistically eliminated from the playoffs, by examining the difference in a team's predicted probability of winning each remaining game and their actual probability of winning that same game while holding opponents win loss percentage and if the opponent has been eliminated from the playoffs constant.

2:15-2:30 *Putting Your Best Foot Forward: Left-Footedness in Base-Stealing*

Sam Williams

Faculty Sponsor: Erin Kaplan, Department of Economics

Desks, gearshifts, scissors, base-stealing? This paper tests whether being left footed gives players in Major League Baseball an advantage in stealing bases. This is done using data from the Rodney Fort database and the John Lahman database. Using left handedness as a proxy for left-footedness, preliminary results show that left handed increases "measure of base steals" by .639 ($p < 0.001$). I will extend this analysis by using ticket and broadcasting revenues to compute how gross marginal revenue product for the respective player is affected by left handedness. I will then compare these findings with predicted salary changes caused by left-footedness in a basic linear regression followed by a discussion concerning possible monopsonistic exploitation found in the results.

2:15-2:30 *Optimal Course Allocation*

Sam Reid

Faculty Sponsor: Nick McKinney, Department of Economics

This paper applies economics to the problem of inefficient course allocation at colleges and universities by optimizing course matching algorithmically using the Gale-Shapely Algorithm as a guide. My model takes into account both professors and departments' preferences for a course and a student's needs for a course to graduate versus another. Class trees enable students to indicate their course preferences in a structured format where the top branch of each successive branch represents their preferred choice and the bottom branch represents their backup. Professors enter their preferences for their courses (i.e., grade level, major, etc.) and then the algorithm is run on the data. Once a class is full, students can be removed and assigned to other classes until the application has processed all the data. At that point, every student's schedule will have been generated. The algorithm guarantees every student and faculty the best schedule possible by taking everyone's preferences into account. No student or faculty will have any incentive to "game" the system or need to enroll in classes outside of the registration process. Applying the algorithm to data from Rhodes College showed considerable gains in efficiency over the current one-sided system currently in use.

3:00-3:15 *Minimum Wages vs. Poverty: A case study of the Fair Minimum Wage Act of 2007*

Patrick Knight

Faculty Sponsor: Nick McKinney, Department of Economics

Despite frequent political claims about how minimum wage changes affect poverty rates, there is actually not very much evidence to support any sort of relationship. Many of the studies that do examine the connection contradict each other, making the true relationship between the two unclear. This study aims to take the most recent federal minimum wage increase and analyze the changes in poverty rates during that time frame, including descriptive variables like high school graduation rates and crime rates for clarity. Using both OLS and panel data regression models, I estimate the actual effects minimum wage levels and minimum wage increases have on poverty rates across the United States on both a county and state level. I found evidence that minimum wage increases cause an immediate increase to poverty rates across all levels. There is also some evidence that having a higher minimum wage estimates a particular area to have a lower poverty rate, suggesting that the poverty rate might correct downward beyond the time frame in this study.

3:15-3:30 *A Geostatistical Analysis of Terrorism Violence in Iraq and Syria (2011-2014)*

Brooke Kuminski

Faculty Sponsor: John Murray, Department of Economics

What I want to do for my paper is establish rational actor theory in terrorism, and then use game theory & terrorism research on trends to compare their findings to my findings in GIS through a large scale geospatial/temporal analysis over time. I am going to use the Global Terrorism Database out of University of Maryland because it includes both domestic and foreign attacks. The time frame I am using is 2011-2014, and I am going to focus my trends on the countries of Iraq and Syria (I will obviously be examining trends in ISIS and Al-Qaeda, amongst others, in the region). My goal was to integrate GIS into economics in an interdisciplinary project that encompasses my love for international affairs and my employment trajectory into the intelligence sector.

3:30-3:45 *Energy Equity in Memphis*

Cari Harris

Faculty Sponsor: Tait Keller, Department of Environmental Studies

The poverty problem in Memphis is complicated, pressing, and pervasive. As Memphis begins a new year with a new mayor at the helm, it is important that energy poverty and housing conditions be at the forefront of political priorities. Although for many the problem is hyper visible in their everyday lives, energy poverty has gone largely unnoticed and unacknowledged by the general public. In accordance with this, my research focuses largely on housing conditions, energy efficiency and inefficiency, and the cost burden on low income and impoverished residents. It pulls from a variety of sources including MLGW and City of Memphis data and utilizes GIS to analyze related variables. This research attempts to bring the issue of energy poverty into the Memphis context, as well as highlight the wide-ranging implications for energy efficiency and sustainability outside of Memphis.

PALMER SESSIONS

(English, Greek & Roman Studies, History, Philosophy, and Spanish)

Explorations in Greek and Roman Studies

Palmer 207

1:30-1:45 *“Medea and New Media: Analyzing Euripides’ Tragedy through the Medium of Video Games”*

Ashton Murphy

Faculty Sponsor: Geoffrey Bakewell, Department of Greek and Roman Studies

Women play an astonishingly prominent role as characters in ancient Athenian tragedy; we have only one extant tragedy—*Philoctetes*—which does not feature at least one female character. The number, and perhaps more importantly the depiction, of these characters has given rise to a search for proto-feminism in tragedy, with Euripides as an especially prominent target. Was Euripides a proto-feminist? Were any ancient Greek authors? As our understanding of the history of the Medea myth stands, it appears that Euripides was the first to write a Medea who murders her own children. Therein lies the ambiguity behind the feminism of the play: for Euripides portrays a strong, intelligent woman challenged by unjust forces beyond her control; and he has this same woman commit one of the worst offenses in the Hellenic world—the murder of one’s own blood. In my research I analyze Euripides’ *Medea* through a new lens: comparing and contrasting Medea’s depiction to those of female characters in modern entertainment, specifically, video games. Can we, as a modern audience with vastly different social institutions and outlooks on gender, consider the work feminist?

1:45-2:00 *“3rd Century Roman Coins in the Rhodes College Collection”*

Ansel MacLaughlin

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

In the third century CE, the Roman Empire suffered a military, political, and social crisis. There is compelling evidence that an economic crisis also occurred, but scholars still debate the severity of the crisis and its causes and characteristics. One significant aspect of the third century is the debasement of imperial coinage. Debasement of silver coinage accelerated in 235 and had already caused disastrous effects by 253. In March 2015, Rhodes acquired the coin collection of Auben Gray Burkhart, a good friend of the college who had recently passed away. This paper describes and examines nine coins from the collection, selected due to the significance of the emperor who minted them. The coins of the last emperors of the Gallic Empire mark the nadir of Roman coinage during the 3rd century, whereas Aurelian and Diocletian both made attempts to restore and reform the coinage system. Although there is significant variation between coins minted even by the same emperor, the selected coins demonstrate the differences in fineness, workmanship, and weight between the coins of the Gallic Empire and those of the Central Empire.

2:00-2:15 “*Social Status of Roman Doctors: A Re-evaluation based on Epigraphic Evidence*”

Michael Stierer

Faculty Sponsor: David Sick, Department of Greek & Roman Studies

This paper focuses on the status of doctors in the city of Rome, as best can be determined from the epigraphic database known as the Corpus Inscriptionum Latinarum (CIL). Using an original translation of epitaphs from the CIL, along with statistical analysis, I extrapolate the various factors contributing to a doctor’s social status in Rome, including race, gender, and family lineage. In addition to this, I compare the evidence which I have compiled to the extant literature about doctors in the city of Rome, including the work of such authors as Vivian Nutton and Ido Israelowich. Through my own statistical analysis, combined with the cross-examination of current literature, I hope to illustrate a more accurate picture of the average life of the Roman doctor.

Writing, Ethics, and Society

Palmer 210

1:30-1:45 “*The Role of Jonathan Franzen's Novel The Corrections (2001) in Contemporary American Society*”

Lauren Albright

Faculty Sponsor: Gordon Bigelow, Department of English

Jonathan Franzen, a prominent contemporary novelist and essayist, confronts a world of consumerism, where technology pervades private life and a rapidly evolving mass culture renders a novel written only a year before largely irrelevant. Given these contemporary circumstances, and because he has chosen to be a novelist, Franzen must engage with an ongoing literary debate concerning the relationship between the novel and the society it depicts. In many theorists’ anxious essays, from the modernists, to the post-modernists, to the post post-modernists, a dark and ultimate question looms over their arguments: can an increasingly fast-paced and technologically-dependent culture with a dwindling community of serious readers kill the novel? Franzen must reconcile this fear that the novel is moot with the immense success of his third novel, *The Corrections* (2001), considered a “culturally engaged” novel that harks back to the social novels of Dickens. This paper analyzes *The Corrections* in the context of its success within a post-9/11 American culture, using a variety of critical perspectives alongside Franzen’s non-fiction essays to highlight the breadth of the novel’s impact in a digital era when everything—including books—can be accessed instantly through a screen.

1:45-2:00 “*Fostering Love for Academic Writing at The Soulsville School*”

Jeremy Breddan and Olivia Thomas

Faculty Sponsor: Rebecca Finlayson, Department of English

We were given the wonderfully enriching opportunity to create a student-run Writing Center in a partnership with The Soulsville Charter School in Memphis. This partnership began as a project in Dr. Rebecca Finlayson’s class “*How to Write: Academic Writing and Pedagogies that Support It*”. The goal of the class was, and is, to explore writing pedagogies from Current Traditional Rhetoric to Expressivism and Critical Pedagogy and their inherent strengths and weaknesses as they have been changed and adapted throughout time. In addition to exploring these pedagogies, we were tasked with putting them to practice with actual students at local Shelby County schools including Central High School and Wooddale High School. This hands-on experience proved rewarding because we were able to mentor students in an underprivileged area on how to write effectively and academically. Most importantly, however, our work afforded these students agency in the creation of their own Writing Center which serves as a safe, peer-lead academic space that actively strives to educate with an aim towards progress rather than simply remediate - an unfortunate stigma often associated with Writing Centers.

2:00-2:15 “*The Essentials of Forgiveness: A Virtue-Focused Philosophical Analysis*”

John Leverett

Faculty Sponsor: Patrick Shade, Department of Philosophy

In this project I offer a philosophical exploration of human forgiveness based in virtue theory, that pays special attention to the development of the self in relation to others. I argue that humans are fundamentally social beings, and that maintaining healthy relationships with others is therefore essential to our realization as flourishing individuals. Thus, so long as people harm one another in ways that threaten their relationships, we will have need of a faculty that reverses the damage we inflict: forgiveness. Characteristic of this faculty, I argue, is its ability to revive dead or dying relationships by transforming the dispositions of forgiver and forgiven. In the best cases, offender and offended become friends. But what exactly is forgiveness? I argue that forgiveness is best analyzed in

terms of three component virtues: humility, faith, and care, each of which require repeated, real-world practice to develop. My discussions of virtue and the self draw on the philosophies of Aristotle, William James, Julia Annas, and others. I illustrate my theory with examples drawn from fiction, such as *Les Misérables*, historical non-fiction, such as Weisenthal's *The Sunflower*, and current events, such as the forgiveness exhibited in the wake of the Charleston shooting.

Memphis History

Palmer 207

2:30-2:45 *Assimilation and Acceptance: Chinese Americans in Memphis, 1850-2016*

Jessica Shinker

Faculty Sponsor: Jeffrey Jackson, Department of History

Although Chinese have lived in Memphis since the mid-19th century, there has never been a Memphis Chinatown or any other fully cohesive Chinese community. For most of Memphis's history, there weren't even any unified Chinese New Year celebrations, one of the most important events on the Chinese calendar and a fundamental signifier of Chinese unity and pride within a city. Rather, 20th century Chinese Memphians chose to assimilate, as the benefits of assimilating into white American society outweighed the downsides of conforming to the stereotype of the "model minority." As succeeding generations of Chinese Memphians began to push back against racist assumptions, they occasionally faced harsh resistance in the form of racially motivated crimes and received little protection or support from city officials. Recently, young Chinese Memphians have finally begun to reclaim their heritage through large, public Chinese New Year celebrations that have gained popularity with every passing year. However, it is still important to acknowledge the struggle that Chinese Memphians have faced in the historically intolerant South. We must recognize that pervasive racial stereotypes, even seemingly positive ones, are harmful, defining entire populations as "Other" and making it difficult for minorities to establish their identities on their own terms.

2:45-3:00 *Entrance to the Accademia, and then to America: Mary Solari as a New Age Business Woman Fighting Prejudice, 1849-1929*

Roz KennyBirch

Faculty Sponsor: Jeffrey Jackson, Department of History

Mary Solari, a prominent Memphis artist, immigrated from Italy to Memphis in the mid 1800s, a time in which immigrants from all corners of the globe began to flock to the "land of opportunity". However, these groups were not always welcomed by Americans, particularly working class whites, who felt economically and socially threatened by them. Italian immigrants, labeled as "wops" and "descendants of bandits and assassins," were met with intense hostility by white Americans, and were victims of malevolence, violence, and even lynchings. Yet, Solari, by presenting nostalgic images of Italy in her artwork, as well as by exercising her agency as a female, escaped the prejudice that many Italians experienced during the late nineteenth and early twentieth century. In this presentation, I will explain how Solari not only used her gender to her advantage in a time in which females were not afforded many opportunities, but also used her prominence to recreate the depiction of Italians in a society which persecuted them. Indeed, Solari's life is crucial to the understanding of the past because it demonstrates how marginalized peoples broke down socioeconomic barriers and began to assert themselves in a culture dominated by white American males.

3:00-3:15 *The History of a Place: Land Ethics, Shared Spaces, and Memphis's Overton Park*

Brooks Lamb

Faculty Sponsor: Robert Saxe, Department of History

Overton Park has been the heart of Memphis—both geographically and culturally—for over a century. With a thriving zoo, an old-growth forest, a concert venue, an art museum, and multiple playgrounds, the 342-acre park is a place of beauty and peace at the center of the city, a refuge whose history speaks to the changing political and cultural landscape of American life. Focusing on the people and places within the park is, of course, essential to learning the history of this place. When trying to fully understand Overton Park, though, we cannot confine ourselves to the park's borders. We must broaden our perspective, focusing on the ways in which the park's history relates with the city of Memphis, the American park system, and broader environmental philosophies and movements. This presentation explores these relationships in an attempt to better contextualize the history of Memphis's shared haven. Further, the paper that this presentation is based on will serve as the introduction to a

larger book project that explores Overton Park's history through individuals who have experienced it first-hand. Through both oral and conventional history, this work will help tell the story of a park and its people.

Spanish Senior Seminar I: *Borges y nosotras*

Palmer, Language Learning Center

1:30-1:45 *La superación de los límites: Borges y Unamuno*

Isabelle Bruner

Faculty Sponsor: Eric Henager, Department of Modern Languages

Tanto Jorge Luis Borges como Miguel de Unamuno frecuentemente exploran los límites de la literatura y los géneros literarios. En “El Aleph”, Borges indaga en conceptos de la infinitud y en *Niebla*, Unamuno complica la relación entre autor y personaje. Estas dos obras narran un proceso de descubrimiento por parte del personaje principal, Borges en “El Aleph” y Augusto en *Niebla*. El aspecto de los dos textos que forma la base de mi lectura comparativa es que para llegar a este descubrimiento, el personaje principal tiene una experiencia con una amada que no le corresponde el amor y que pone en movimiento una trayectoria en la cual el protagonista puede encontrar algo más allá de los límites de su propia existencia. Por eso, los descubrimientos de los personajes masculinos en las dos obras están parcialmente motivados por una figura femenina central. Este ensayo analiza la superación de los límites en dos planos: el de los personajes y el de los autores. Elabora una lectura del papel que juegan los personajes femeninos en la superación de los límites que enfrentan los personajes masculinos y la superación de los límites literarios que se abordan en los proyectos metaliterarios de los dos textos.

1:45-2:00 *El yo, la memoria y Borges en El olvido que seremos*

Mariam Ebeid

Faculty Sponsor: Eric Henager, Department of Modern Languages

En *El olvido que seremos*, una autobiografía de Héctor Abad Faciolince, el autor frecuentemente habla de su memoria, estableciendo distinciones entre los recuerdos de la niñez y los de la adultez. Mi estudio propone que en ciertos momentos de la obra de Jorge Luis Borges hay herramientas útiles para leer la intensa subjetividad autobiográfica de este texto. El libro de Abad Faciolince, que toma su título de un verso de Borges que el autor encuentra en el bolsillo de su padre asesinado, mantiene un diálogo intertextual sutil con Borges, el cual analizo en mi estudio. Partiendo de un análisis de conceptos de infinitud, realidad y memoria en el cuento, “El Aleph”, el estudio propone una lectura borgeana de estos mismos conceptos en *El olvido que seremos*

2:00-2:15 *De libros, libertades y loterías. El libre albedrío y el azar en dos cuentos de Borges*

Tasha Heller

Faculty Sponsor: Eric Henager, Department of Modern Languages

Este estudio toma como su punto de partida la idea de que existe una tensión entre el deseo humano de disfrutar de la libertad y las realidades de la existencia que parecen limitar al ser humano a una serie de experiencias predeterminadas o fuera del control del individuo. Este proyecto usa nociones filosóficas y teológicas del libre albedrío y de la predeterminación para elaborar una lectura comparativa de “La lotería en Babilonia” y “La biblioteca de Babel”, dos cuentos de Jorge Luis Borges en los que se representan en intensa proximidad conceptos de la infinitud y el azar. El análisis hace referencia además a otros cuentos, poemas y ensayos de Borges en los que se desarrollan nociones parecidas y a veces contrastadas con estos mismos conceptos.

Spanish Senior Seminar II: *En busca de utopías*

Palmer, Language Learning Center

2:30-2:45 *Mujeres inmigrantes en narratives fronterizas: la doble subyugación y la maternidad en cuatro obras*

Elizabeth Poston

Faculty Sponsor: Eric Henager, Department of Modern Languages

In the year leading up to a presidential election, immigration issues become one of the more popular topics for debate, especially this year in the wake of Donald Trump. This paper studies fictional representations of undocumented, Hispanic immigration to the US in the novel *La fila india* by Antonio Ortuño and in the films *Sin nombre*, *La misma luna*, and *María llena eres de gracia*. These four pieces were produced in the last twelve years and represent a select but varied group of immigration stories that all feature female protagonists. Through the study of social realism and melodrama genres, my study of these works reveals a double subjugation of women by both

their gender and immigrant status, a situation further exacerbated by their role as mothers. I argue that the two forms of marginalization are inextricably bound and present one of the biggest obstacles to achieving a better life in these pieces. In a psychological journey that mirrors the geographical one, overcoming double subjugation leads to surprisingly hopeful endings where the newly-independent female protagonists can create a safe place for their family in the US, free from male dominance.

3:00-3:15 *Río arriba: un análisis del río en Waslala, de Gioconda Belli*

JaVorah Davis

Faculty Sponsor: Eric Henager, Department of Modern Languages

Gioconda Belli,-- author, novelist and poet born in 1948 in Managua, Nicaragua--, incorporates, in several of her works, elements of nature which have a central role in aesthetic and critical projects of the texts. This essay is a study of one of those works, the novel *Waslala*, published in 1996. Central geographical reference of the novel is a river that flows through Faguas, a fictional Latin American country. In this essay, I analyze the river as a central factor in the development of concepts of time, memory and the journey. I also read the river as a geographical element and an important aspect of the narrative structure that guides the characters as well as the readers towards the utopia while simultaneously takes you through time. I close the analysis focusing on the influences that the river exerts on the journey to utopia and the implications that it has for a historical reading of the text.

3:30-3:45 *La ecocrítica y un lugar que no es: utopía y medio ambiente en Waslala, de Gioconda Belli*

Isabelle Tehrani

Faculty Sponsor: Eric Henager, Department of Modern Languages

Este estudio emplea estrategias de la ecocrítica para analizar la representación del mundo natural en *Waslala* de Gioconda Belli, una novela cuyos personajes principales buscan un lugar utópico sin estar seguros de su existencia. Este lugar, *Waslala*, funciona como símbolo del sueño de una vida mejor que se propone en discursos políticos de los países en vías de desarrollo. Este estudio analiza las múltiples descripciones de la naturaleza que se desarrollan a medida de que los personajes centrales viajan hacia Waslala. Al hacerlo traza yuxtaposiciones entre cuestiones de respeto por el mundo natural y representaciones de las jerarquías sociales en las que se observa una falta de respeto por la vida humana. El ensayo además toma en cuenta la agencia de personajes femeninos de la novela y sus vínculos con el ambiente natural.

Spanish Senior Seminar III: La búsqueda, la ciencia y la psicosis: enloquecer en Cortázar y Cervantes

Palmer, Language Learning Center

4:00-4:15 *Estructura y función: una lectura biológica de Rayuela*

Ally Limmer

Faculty Sponsor: Eric Henager, Department of Modern Languages

En la biología, la estructura indica la función. Es decir que si una molécula tiene cierta secuencia característica en el código genético, se puede pronosticar que se va a encontrar en una parte específica de la célula. Se puede aplicar esta teoría a la novela *Rayuela* por Julio Cortázar. La novedad del libro reside en la estructura única del texto, o quizás la “desestructura” del texto – una resistencia a seguir las estructuras heredadas. Aunque Cortázar recomienda dos opciones para leer *Rayuela*, saltar desde capítulo a capítulo se indica como el orden sugerido. Al tratar de explicar el plan de Cortázar, se hace claro que el libro no solo tiene múltiples interpretaciones por la alternancia esporádica de capítulos sino también por la omnipresencia de la rayuela dentro del texto, un juego en el que tanto los personajes como el lector participan. En este estudio empleo nociones biológicas para proponer una lectura de los puentes de *Rayuela*. Comparo los puentes construidos por Cortázar, las estructuras que conectan y dan coherencia según un plan narrativo, con los puentes que de repente se materializan en la lectura sin ningún plan previo aparente.

4:15-4:30 *Una vida en movimiento perpetuo*

Matthew Anderson

Faculty Sponsor: Eric Henager, Department of Modern Languages

Mi proyecto para URCAS se enfoca en la novela *Rayuela* del escritor argentino Julio Cortázar, que formó parte del boom latinoamericano de literatura. Voy a examinar cómo el protagonista Horacio Oliveira se siente oprimido internamente entre la carga cultural del mundo occidental que limita la libertad de su ser y el deseo de trascender estos límites. Mi investigación demostrará que la búsqueda ontológica para unir esta división dialéctica interna le

quita la posibilidad de disfrutar una vida feliz y establecida. Su existencia se vuelve pierde en un movimiento perpetuo a fin de que obtener un tipo de centro, una autenticidad de vida que ni siquiera puede definir. La filosofía del existencialista francés Jean-Paul Sartre conjuntamente con las ideas de Søren Kierkegaard y Martin Heidegger establecerá que la búsqueda de Oliveira lo lleva a una crisis metafísica de la cual no hay escape. Sin saber lo que está buscando, la búsqueda de Oliveira sigue siendo interminable, sin que encuentre ni la vida feliz ni la resolución de su ser. La tragedia del protagonista se halla en el hecho de que la humanidad no puede liberarse de la acumulación de unos mil años de cultura occidental que prohíbe la autenticidad del individuo en la época contemporánea.

4:30-4:45 *¿Qué tipo de psicosis sufre don Quijote? Una lectura psicoanalítica de dos versiones del hidalgo de la Mancha*

Elyssa Geer

Faculty Sponsor: Eric Henager, Department of Modern Languages

El propósito de este proyecto es el de abordar la figura de don Quijote desde un punto de vista interdisciplinario. Más específicamente, empleo técnicas del psicoanálisis para trazar una lectura comparativa de episodios selectos del Quijote de Cervantes y del Quijote de Avellaneda, conocido a veces como el “Quijote falso” o el “Quijote apócrifo”. Al examinar una serie de diferencias en la representación de la locura de las dos versiones del Quijote, considero especialmente las consecuencias de la supuesta enfermedad mental y la manera en que otros personajes reaccionan a momentos de locura. Con referencia a estudios psicológicos, comparo episodios de estas dos versiones con atención a las diferencias en la manifestación de los síntomas de don Quijote. Concluyo el estudio proponiendo posibilidades para diagnosticar la psicosis de don Quijote según los estándares psicológicos de hoy y aplicando tal diagnóstico a mi lectura comparativa.

POSTER SESSION I

Multi-sports forum of the Bryan Campus Life Center

11:30am – 1:30pm

Poster numbers are listed with each title.

Fellowships

1 Deaf Studies 1: Deaf Culture and Sports ■

Gabrielle Gafford

Faculty Sponsor: Lori Garner, Department of English

More than just a physical activity, sports requires “organization, communication and interaction with people” (Stewart, 1986). Communication barriers are part of the reason for a longstanding disconnect between sports and Deaf culture, the community shared by users of American Sign Language. Deaf athletes were stigmatized early in sports because “a disability that was physical in origin was interpreted...as being indicative of a mental incapacity” (Stewart, 1986). Despite the obstacles, deaf athletes have greatly impacted the athletic world, like William “Dummy” Hoy, who became the first deaf athlete to enter Major League Baseball. An inspiration for generations to follow, “Hoy...demonstrated that the best way for a deaf person to achieve both success and acceptance...was to embrace one's identity as a Deaf person” (Edwards, 178). Deaf culture has made progress with sports culture in the increasing number of deaf athletes participating in hearing sports, but advancement remains to be made with disparaging social stigmas. My research examines factors that contribute to the isolation of Deaf athletes, like lack of provisions in public schools, limited social interactions between Deaf and hearing athletes, and the societal construct that perpetually feeds this disconnect.

2 Deaf Studies 2: Health Care Services for Deaf Individuals ■

Adrian Klemm

Faculty Sponsor: Lori Garner, Department of English

The accessibility of medical care to the D/deaf population has been often overlooked and caused a large number of people to fall through the cracks of an understandably imperfect healthcare system. Disparities are found in many sections of medical care for the deaf including health education, mental health services, and adequate care for patients with additional complex needs. A recent study in Rochester, NY showed that “sign language-using deaf adolescents appear to have significantly weaker knowledge” concerning cardiovascular health than their hearing

counterparts (Smith 2015). Limited accessibility to some health services and treatment for the deaf has led to “[d]eaf inpatients’ average length of hospital stay [being] twice that of hearing inpatients” in mental health facilities (Baines 2010). Care becomes even more complex for D/deaf individuals with the multiple special needs because they “require access to the full range of services available [to deaf]... and also full access to the full range of services appropriate to their additional complex needs” (McCracken 2011). This poster focuses on these disparities, their effects on patient health, and ways in which inequalities can be rectified.

3 Deaf Studies 3: Film’s Influence in Deaf Culture ■

Jill Fredenburg

Faculty Sponsor: Lori Garner, Department of English

Deaf culture has been greatly enhanced by developments in film over time. Film has facilitated development of Deaf education and cultural progress by allowing the rich language of American Sign Language (ASL) to be recorded. Even before ASL was finally documented visually in the 20th century, Deaf people were making a place for themselves in cinema. The years of silent films are often called the “golden era” in the cultural history of the American Deaf community (Schuchman 2004). Video has made Deaf individuals less of an isolated community, increasing outside understanding of the value of ASL as a language and not as simple gestures (Krentz 2006). Even “the use of educational videos or television programs is a promising method for engaging deaf children in both language and literacy activities” (Golos 2016). This new inclusion of Deaf children’s culture in video has enabled both hearing and deaf parents to more actively engage their children in Deaf culture in its entirety. From the era of silent movies to ASL video documentation and current educational impact, film has allowed the Deaf community’s culture to be as easily recognized and celebrated as many hearing cultures.

Humanities

4 Pre-Hispanic Cultures within Cartonismo: Considering the Importance of Native Voices’ Representation within a Movement that Advocates Accessible Literacy

Merare Sánchez, Aylen Mercado, and Diana Azcárate Barreto

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

The Cartonera Movement began in the early 2000’s during the economic crisis in Argentina as a response to the lack of access to literature. Adopting cooperative principles for publishing, these groups focus on providing a space where artists disseminate their work without the restrictions brought by corporate publishing models. In our “Community and Literature in Latin America and Memphis” class, we learned about the philosophical and pedagogical principles informing Cartoneras, and about the many kinds of literature published under these collaborative projects. We applied this knowledge in our workshops. By designing and implementing our Danza Azteca Quetzalcoatl workshop with the Centro de Arte Latino de Memphis we work together with community members to foster the preservation and dissemination of the indigenous literary traditions and cultures of Mexico. This initiative enriches our city’s understanding of the cultural wealth of an important constituency: Latinos and Hispanics in Memphis. Additionally, we were able to draw connections to the importance of the representation of indigenous languages and cultures in a movement like this one. Our collaborative work with Danza Azteca speaks to the physical manifestation of art through the practice of indigenous traditions and the application of it in a manner that furthers the vitality of identity, creativity, literacy, and collaboration that is the foundation of Cartonismo.

5 Hitting the Ground Running: Memphis Cartonera at Latino Memphis, Abriendo Puertas ■

Ally Limmer, Matt McKeand, and Tucker Nichols

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

Originating in Buenos Aires, the cartonera movement aims to make literature accessible, affordable, and innovative. Cartoneras use cardboard (cartón) and hard work to craft hand-made books by emerging and best-selling authors, the rights to which have been released to individual cartoneras, abandoning the traditional “copyright” in favor of the “copyleft.” Inspired by the mission as well as the collaborative nature of this movement, Dr. Pettinaroli in the Spanish department has set out to bring the “cartonera spirit” to Memphis. As members of the Spanish 325 course, we have not only educated ourselves regarding the logistics of and mindset behind cartoneras, but have also bought into its purpose: we see a place for it in the Memphis community and are playing an active role in fulfilling our class’s vision. We intend to demonstrate how and why we began a cartonera workshop through Latino Memphis, specifically their branch Abriendo Puertas which hosts programming aimed at high school students. Through the cartonera movement, these youths found a means for promoting literacy, raising awareness about environmental

preoccupations, and expressing artistic creativity. Deeply inspired by our experience at Abriendo Puertas, we hope to encourage participation by others moved by the goal of the cartonera.

6 *Cultivating Literacy through Creativity: Memphis Cartonera and Caritas Village* ■

Emily Gibson, Emily Cerrito, Judith Denham, Meg Healy, and Emily Teague

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

Memphis presents a unique opportunity to foster literacy and art through Cartonismo – the Latin American movement committed to democratizing literature and art through cooperative publishing houses that repurpose recyclable materials. Working with the after school reading program at Caritas Village, our goal is to create learning environments which spark children’s curiosity about reading, foreign language, and the arts. Combining the study of Latin American literature, community outreach, and sustainable methods in the region, our Cartonera experience sheds light on new ways to envision civic engagement to create novel paths to literacy and social change.

St. Jude Summer Plus

9 *Alert Adherence Assessment for Etoposide Allergy Alerts* ■

Saunders Alpaugh, James Hoffman, Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital

Faculty Sponsor: Kimberly Brien, Department of Chemistry

Etoposide is an antineoplastic chemotherapy agent that is used to treat pediatric cancer. While common among oncology treatment regimens, its use may result in moderate to severe adverse drug reactions. Symptoms of reactions include flushing, respiratory problems, changes in blood pressure, and abdominal pain with or without nausea and vomiting. In an effort to enhance patient safety, many electronic health record systems are enabled with clinical decision support, which has features to interrupt clinician workflow with alerts that warn of a potential adverse drug reaction. This study reviewed clinician responses to interruptive alerts for potential adverse drug reactions in patients who had previously documented reactions to etoposide. Data were collected retrospectively from St. Jude electronic health records from 2009 to 2015. Alerts were presented to clinicians upon ordering or modifying etoposide orders, with discrete or non-discrete instructions on how to prevent adverse drug reactions. Alert adherence was defined by conforming to instructions within the alert content. We observed that 94.1% of etoposide allergy alerts were adhered to clear instructions. Furthermore, as practices have changed, clear prescribing instructions increased each year within the study. These findings suggest that clear drug-allergy instructions can enhance the rate of clinician adherence to interruptive alerts.

10 *Modified prodrug interactions by carboxylesterase inhibitors from *Salvia przewalskii** ■

Ellie Fratt, M. Jason Hatfield, Philip M. Potter, Department of Chemical Biology and Therapeutics, St. Jude Children's Research Hospital

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

Salvia miltiorrhiza is a Chinese herbal medicine used to treat a variety of cardiac ailments. Previous work in the Potter lab has shown that the roots of *S. miltiorrhiza* contain compounds that act as selective carboxylesterase (CE) inhibitors and prevent normal enzymatic function. Extensive chemical and biochemical analyses of extracts of *S. miltiorrhiza* have shown that the active molecules contain a 1,2-dione group that potently inhibits the active site of human CEs. CEs are responsible for detoxification of ester-containing xenobiotics and the metabolism of drugs that maintain this chemotype. Therefore, inhibition of CEs can alter drug efficacy, biological half-life, and toxicity due to their interference with the normal activation process. Such prodrugs include commonly prescribed pharmaceuticals such as Lunesta and Tamiflu, opioids, and the anti-cancer drug CPT-11. We have recently obtained roots of *Salvia przewalskii*, a closely related species of *S. miltiorrhiza*, and demonstrated that extracts of this material can inhibit CEs. To date we have determined that crude extracts have low IC₅₀ values when assayed with both liver and intestinal enzymes, indicating potent biological activity and effective CE inhibition. The compounds present in these extracts also likely contain 1,2-dione groups that afford enzyme inactivation; purification and structural confirmation is currently underway. Our results indicate that, like *S. miltiorrhiza*, *S. przewalskii* should not be ingested while patients are taking esterified drugs to minimize any unwanted drug-drug interactions that may alter the efficacy of the agent.

#11 *Using *Drosophila melanogaster* to identify genes regulating muscle wasting.* ■

Ben Haugen, Liam Hunt, Fabio Demontis, Department of Developmental Neurobiology, St. Jude Children's Research Hospital

Faculty Sponsor: Gary Lindquester, Department of Biology

Our goal for this study was to identify genes that mediate muscle cell size. Atrophy of muscle cells is a common outcome of cancer, aging, and diabetes and can exacerbate the other effects of these diseases. We began tests on previously identified negative regulators of muscle size via tissue specific overexpression and RNAi silencing in *Drosophila melanogaster*. The genes identified in this experiment were subsequently tested for influence on other tissue types by measuring eye size of *D. melanogaster* flies; we found several genes that negatively affected eye size. To test whether the mammalian homologues are associated with muscle wasting we examined mouse and muscle cell culture models. qPCR showed up-regulation of these genes under starvation and other atrophy conditions, giving evidence that these genes could mediate atrophy in starvation-induced muscle wasting. We also identified a gene of interest, *Ubr4* which was shown to mediate muscle hypertrophy by RNAi silencing. Work is currently underway to transduce muscle cells with genes we have identified as possibly inducing atrophy—those found to be up-regulated under atrophic conditions—to test whether it is the up-regulation of these genes that induces atrophy.

#12 *UCP1* does not appear to have a role in Rhabdomyosarcoma Tumorigenesis ■

Alana Joyce Heyrana; Catherine Drummond, Matthew Garcia, Mark Hatley, Department of Oncology, St. Jude Children's Hospital

Faculty Sponsor: Kim Gerecke, Department of Psychology

Rhabdomyosarcoma (RMS) is the most common soft tissue sarcoma in children. Embryonal RMS (ERMS) is the most common subtype. RMS has been thought to come from derailed muscle progenitors based on previous work on a mouse model cross, *Rosa26-SmoM2* with *ap2-cre*, that leads to constitutive Hedgehog activation. This causes ERMS in the form of neck tumors, similar to those in human patients. The tumors appeared to have less brown adipose tissue (BAT) and more undifferentiated muscle possibly due to the mutant, *SmoM2*, as myoblasts and brown adipocyte cells originate from the same precursor cell. It is not known if the same ratio between fat and muscle would occur in mature brown fat. *UCP1* is an uncoupling protein found in mature brown adipose tissue that helps with metabolism. Assays were done using a *UCP1-Cre* mouse cross to activate Hedgehog in mature brown fat, and another mouse cross with *UCP1* knocked out. Real Time showed high levels of *SmoM2* in the *UCP1-Cre* mouse and no *UCP1* in the *UCP1-Knockout* cross. Imaging, Real Time and observation showed tumorigenesis solely in the *UCP1-Knockout* mice and that they were the same tumors seen in the *ap2-cre*. The results obtained show that BAT metabolic activity does not play a part in tumorigenesis, narrowing down the possible cell of origin. Future work on *Prdm16* conditional knockout mice will determine if BAT progenitors are the origin of the tumor model.

#13 *A potential partnership between UTX and 53BP1 in human cells* ■

Sam Jordan; Jamy Peng, Brett Mulvey, Department of Developmental Neurobiology, St. Jude Children's Research Hospital

Faculty Sponsor: Dhammika Muesse, Department of Chemistry

Stem cells are unique in their ability to self-renew or to differentiate into a variety of cell types. These characteristics are regulated by epigenetic factors, which mediate heritable changes in gene expression without changing genomic sequences. *UTX* is one of the epigenetic factors critically influencing stem cells. Through interaction with known chromatin remodeling complexes, *UTX* mediates the activation of developmental genes that are important for stem cell differentiation. The *UTX* gene locus is of particular interest because it has been shown to be mutated at high frequencies in numerous human cancers. These results suggest *UTX* exhibits a regulatory role in human development and cancer. Previous data revealed *53BP1* as a potential binding partner of *UTX*. *53BP1* is involved in the repair of DNA double-stranded breaks. The main objective of my research project is to confirm the interaction of *UTX* and *53BP1* and to determine if *UTX* functions in DNA damage repair. To accomplish this, I examined the localization of *UTX* and *53BP1* in H9 human embryonic stem cells (hESCs) by immunofluorescence before and after DNA damage induction. Upon gamma irradiation, I observed enrichment of *UTX* at DNA damage foci with *53BP1* providing further evidence of their partnership.

#14 *Identifying the Cleavage Site of Drosophila Dispatched* ■

Jordan Kugler; Daniel Stewart, Stacey Ogden, Department of Cell and Molecular Biology, St. Jude Children's Research Hospital

Faculty Sponsor: Jonathan Fitzgerald, Department of Biology

The Hedgehog (Hh) signaling pathway, known to play a conserved role in embryonic development, can be deregulated in human cancers. The Dispatched (Disp) transmembrane protein is necessary for Hh release from the cell. Exogenously expressed *Drosophila* Disp proteins in western blot analysis reveal two distinct forms of Disp, ~145 kDa and ~110 kDa. Our proposed model is that the ~110 kDa form results from a cleavage event. We wanted to identify the site of cleavage within the Disp DNA sequence. Our lab used multiple methods to find the cleavage site. This study set out to identify the site by recreating the ~110 kDa form in western blot analysis. We inserted one stop codon at a time into the *Drosophila* Disp sequence around the extracellular loop 1, the proposed site of cleavage. We transfected the DNA with early stop codons into c18 cells and then examined protein size by western blot analysis. We were able to create a form of Disp around 110 kDa, helping us narrow down the real site of cleavage. These results have implications for better understanding the release of Hh.

15 *The utility of patient characteristics for differentiating Gram-negative and Gram-positive pathogens among pediatric cancer patients with febrile neutropenia* ■

Alisha Patel; Martha J. Avilés-Robles, Department of Infectious Diseases, Hospital Infantil de México Federico Gómez, Mexico City; Rohit P. Ojha, Department of Epidemiology and Cancer Control, St. Jude Children's Research Hospital

Faculty Sponsor: Carolyn Jaslow, Department of Biology

Currently available clinical prediction models use patient characteristics to inform decisions about initiating empiric antibiotic therapy for pediatric cancer patients with febrile neutropenia but are not designed to differentiate between Gram-negative and Gram-positive pathogens. We aimed to assess whether patient characteristics can differentiate between Gram-negative and Gram-positive pathogens among pediatric cancer patients with febrile neutropenia. Our eligible population included pediatric cancer patients admitted for febrile neutropenia at Hospital Infantil de México Federico Gómez (Mexico City) between November 2009 and September 2010. We assessed the discriminatory accuracy (estimated by the area under the receiver operating characteristic curve, which ranges between 0.50 and 1.0) of 12 patient characteristics for predicting Gram-negative and Gram-positive pathogens compared with no documented pathogen. Our study population comprised 141 pediatric cancer patients. We observed 21 Gram-negative and 14 Gram-positive infections. Discriminatory accuracy was generally higher for Gram-negative pathogens (AUCs between 0.57 and 0.74) than Gram-positive pathogens (AUCs between 0.50 and 0.73). The greatest absolute differences in AUCs between Gram-negative and Gram-positive pathogens were observed for temperature, C-reactive protein, and procalcitonin. Our results suggest that some characteristics may reasonably differentiate between Gram-negative and Gram-positive pathogens among pediatric cancer patients with febrile neutropenia, which could help refine antibiotic selection.

16 *The WISP1 Signaling Pathway: Effects of SMAD4 and MMP13 Knockdowns on Tumor Metastatic Capability* ■

Saniya Rashid; Sharon Wu, Hong Jia, Ophélie Martinot, Myriam Labelle, Department of Developmental Neurobiology, St. Jude Children's Research Hospital

Faculty Sponsor: David Kabelik, Department of Biology

Tumor metastasis is the leading cause of cancer-related deaths worldwide. To metastasize through the body, tumor cells must invade surrounding tissues, travel through the circulation, and seed in distant organs. WNT1-inducible-signaling pathway protein (WISP1) is a secreted protein that regulates cell migration, and its expression has been linked to the metastatic capacity of cancer cells. The goal of our research is to define the molecular pathways associated with WISP1 expression and their effect on metastasis. Our laboratory has identified the matrix metalloproteinase 13 (MMP13), as a candidate downstream element of the WISP1 signaling pathway. I was able to knockdown Mmp13 in tumor cells, which was verified through quantitative PCR assays (MMP13KD1= 90.50% KD, MMP13KD2= 96.73% KD, MMP13KD3= 93.97% KD vs. non-targeting vector control). We will next perform in vivo and in vitro assays to test whether these knockdowns of Mmp13 phenocopy knockdowns of Wisp1 and influence metastasis. My project also investigates the involvement of the transcription factor SMAD4 on Wisp1 regulation. I am now working to knockdown Smad4 to determine its role in TGFβ1-induced Wisp1 expression. We hypothesize that SMAD4 will act as a key transcription factor mediating Wisp1 expression and that its downregulation will lead to reduced TGFβ1-induced Wisp1 expression. Our hope is that this research will lead to a better understanding of the role of Wisp1 in cancer metastasis.

17 *Effect of Interfractional Changes on Quality of Proton Therapy* ■

James Stuckey, Renin Lukose, Chia-ho Hua, Department of Radiation Oncology, St. Jude Children's Research Hospital Biology and Therapeutics, St. Jude Children's Research Hospital

Faculty Sponsor: Shubho Banerjee, Department of Physics

Among treatments in radiation oncology, proton therapy leads the way in quality of treatment and life. However, because protons are particles, they are sensitive to bodily changes and fluctuations—any change in density will impact the stopping point of the proton. This is especially important in pediatric patients since the side effects of radiation on growing tissue can hinder development and impact quality of life. In our research, we looked at the effect of daily changes in bowel gas location and skin thickness in 10 pediatric patients with tumors in the pelvic area to see how much impact these changes had on the delivering of the prescribed dose. Cone Beam Computerized Tomography (CBCT) scans that were taken from each fraction were used to contour the location of the bowel gas and the outline of the body for each day of treatment, and a higher quality Computerized Tomography (CT) was used for creating the proton plans. In general, it is evident that the effect on the quality of plan is highly dependent on the location of the tumor in the pelvis, so results vary from patient to patient.

Natural Sciences

18 *An Analysis of the Prevalence of Plasmodium, Leucocytozoon and Trypanosoma sp. Within Raptors of the Mississippi Valley Region.*

Mary Crowell, Gizman Abdijabar, and Michael Collins

Faculty Sponsor: Jackie Denson, Department of Biology

Avian species are commonly infected by multiple parasites. The presence of parasitic protozoa within the blood has the potential to increase avian mortality as well as the potential to lead to a state of duress that can lead to injury to the animal. This study presents a survey of the prevalence of Plasmodium, Leucocytozoon, and Trypanosoma species within a number of bird species, with a particular focus on raptors undergoing rehabilitation from specimens obtained within the immediate vicinity of Memphis, Tennessee. DNA was extracted from blood specimens and a variety of nested PCR reactions were performed in order to detect the overall prevalence and patterns of co-infections of these parasites within these populations. Samples exhibiting positive results were further analyzed through DNA sequencing and phylogenetic analysis for confirmation. The results and significance of this survey are presented and future directions of this course of study are discussed.

19 *Phylogenetic characterization of Australian wildflower species in Goodenia Clade B of conservation interest*

Olivia Hughes and Bailey Choudhury

Faculty Sponsor: Rachel Jabaily, Department of Biology

Efforts are ongoing to build a comprehensive phylogeny, or evolutionary tree, of *Goodenia* sensu lato., the largest clade of the predominantly Australian angiosperm family Goodeniaceae. The species-rich *Goodenia* Clade B includes two smaller clades that are of conservation interest. Australian collaborators have collected rare or unusual specimens from several widespread species in remote locations (e.g. the Pilbara region) that may represent cryptic or otherwise distinct species. Past efforts by our lab only included one accession of each of the widespread species *Goodenia pascua* and *Goodenia pinnatifida*, along with closer relatives in phylogenetic analyses. Our current efforts have expanded sampling to include multiple accessions of these and other species, including potentially new species with different appearances, to test for monophyly of all of the taxa in the *G. pascua* and *G. pinnatifida* species complexes. We have extracted DNA from 45 new accessions from 14 species, including 33 unnamed accessions, and sequenced the chloroplast region trnL-trnF, and the nrITS locus for phylogenetic analysis to test for monophyly. The outcomes of this study will inform species definition and subsequent conservation status for these species endemic to Western Australia.

20 *Kinetics of Proton Transfer for Ligands in the SULT1A1 Active Site* ■

Danielle Wilson, Amelie Weems, Larryn Peterson, and Mauricio Cafiero,

Faculty Sponsor: Mauricio Cafiero Department of Chemistry

We have studied the substrate selectivity of the sulfotransferase enzyme (SULT1A1) by identifying important protein-ligand interactions in the active-site through electronic structure calculations. The sulfotransferase enzymes (SULTs) catalyze the addition of a sulfate group to a variety of small molecules, including neurotransmitters and xenobiotics. This reaction can activate or deactivate bio-active molecules or change their pharmacokinetic behavior. A set of dopamine analogs with substituents in the 6 position were chosen for study. In previous work, we have studied the interaction energies between the ligands and the amino-acids of the active-site using MP2 and M062X with 6-311+g*; these energies were used to determine the thermodynamic stability of the ligand in the active site. The addition of the sulfuryl group to the ligand depends on deprotonation of a phenol group on the ligand. Thus, the activation energies for proton extraction from the ligand to the histidine residue were calculated for all ligands using

M062x/6-31++g*. Our results show a strong dependence of the activation energy of the proton transfer of the substituent on the 6 position.

21 DFT design of inhibitors of the LpxC enzyme ■

Carolyn Dishuck, Allison J.L. Dewar, Larryn Peterson, and Mauricio Cafiero,

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

In recent years bacterial infections have become more resistant to treatments, posing a challenge for both researchers and health professionals. It has become imperative that novel, effective therapies against these resistant bacterial infections be discovered. Gram-negative bacteria present an additional challenge due to the presence of a selectively permeable outer membrane. Among the components of the outer membrane is Lipid A, which is responsible for the growth and pathogenicity of Gram-negative bacteria. The enzyme LpxC is responsible for catalyzing the first committed step in the biosynthetic pathway of Lipid A. The inhibition of LpxC would therefore, prevent the production of Lipid A, and hence result in a corrupted outer membrane. Starting from a LpxC crystal structure with a natural substrate bound in the active site, we have designed and optimized the position of several novel ligands in the active site. The structure for these ligand-protein complexes were optimized using m06l and the 6-31G basis set both in vacuo and in solution phase. Interaction energies for the ligand and protein complex were calculated using m06l with the 6-311+G* basis set. Desolvation and simplified zinc binding studies have also been performed to confirm that our model chemistry describes the zinc binding in the protein appropriately. Initial work shows several promising candidates for the inhibition of LpxC.

22 DFT Study of the Selectivity of Monoamine Oxidase B (MAOB)

Samantha Jelinek, Mallory Morris, Larryn Peterson, and Mauricio Cafiero,

Faculty Sponsor: Mauricio Cafiero Department of Chemistry

MAOB is an enzyme located on the outer mitochondria that is responsible for degrading penylethylamine, benzylamine, and dopamine. MAOB inhibitors are generally used as a treatment for Parkinson's disease because they stop the breakdown of dopamine. By selectively designing an inhibitor for the MAOB enzyme, the breakdown of dopamine can be reduced leading to an increase of the neurotransmitter. A suite of dopaminergic derivatives have been developed as potential inhibitors of the MAOB enzyme. The inhibitory effectiveness of these dopaminergic derivatives has been measured via in silico models in which the strength of interaction between each substrate and the enzymatic active site was analyzed. A crystal-structure of the MAOB active site, docked with the widely employed diabetes drug pioglitazone, was isolated from the Protein Data Bank (PDB ID: 4A79). The positions of novel dopaminergic derivatives were optimized in the active site using M062X/6-31G with implicit solvation and with flexible amino acid side-chains. Interaction energies between the ligands and the protein were calculated using M062X and MP2 with the 6-311+G* basis set. At present, dopamine appears to be the strongest inhibitor of the MAOB enzyme.

23 DFT analysis of water clusters, dopaminergic derivatives, and their desolvation energies ■

Mallory Morris, Samantha Jelinek, A. Katherine Hatstat, Larryn Peterson, and Mauricio Cafiero

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

The catechol-O-methyltransferase enzyme is responsible for the metabolism of the neurotransmitter dopamine, a catecholamine involved in the degenerative disorder known as Parkinson's Disease. One treatment for Parkinson's disease is L-DOPA therapy, where this dopamine precursor is transformed into dopamine by DOPA decarboxylase. The dopamine derived from L-DOPA is degraded by COMT; therefore, inhibiting COMT would be ideal to prolong the effectiveness of L-DOPA and to increase pharmacological efficiency by preventing the premature metabolism of the medication. Computational models of dopaminergic analogs were used to examine the substrates' binding in the enzymatic active site. The binding of a ligand to an enzyme not only involves the interaction between the ligand and the enzyme but also the energy lost or gained by desolvation of the ligand. Desolvation of dopaminergic derivatives was examined using a series of hydration shells that increase in size. The desolvation energies were calculated using M062X with the aug-cc-pvdz, cc-pvdz, and cc-pvtz basis sets. Ligands with the carboxylic acid and nitro substituents exhibited the least favorable energies, whereas the nitrile substituents exhibited the most favorable desolvation energies in each of the explicit water models. The implicit Polarizable Continuum Model was also used together with explicit solvation to calculate desolvation energies of dopaminergic ligands. The use of implicit and explicit models was compared. This information will be combined with prior research done on ligand/enzyme interaction in order to get a more comprehensive understanding of ligand binding in this system.

24 DFT analysis of the selectivity of known bioactive ligands in the sulfotransferase and catechol-o-methyltransferase enzymes ■

Calli Pinckney, Caroline Magee, Larryn Peterson, and Mauricio Cafiero

Faculty Sponsor: Mauricio Cafiero, Department of Chemistry

We have studied the substrate selectivity of a number of known bioactive ligands in sulfotransferase enzyme (SULT1A3) and catechol-o-methyltransferase (COMT) by identifying important protein-ligand interactions in the active-sites through electronic structure calculations. SULT1A3 is responsible for activating and improving the solubility of catecholamines while COMT deactivates catecholamines. Understanding how ligands behave in both of these enzymes leads to a greater understanding of the fate of dopaminergic molecules in the body. The SULT1A3 and COMT enzymes catalyze the addition of a sulfate group and a methyl group, respectively, to a variety of small molecules, including catecholaminergic molecules. Crystal structures of the SULT1A3 (PDB ID 2A3R) and COMT (PDB ID 2CL5) enzyme active sites were isolated from the Protein Data Bank. A suite of molecules with known activity in COMT were chosen from PubChem and their positions in each active site were optimized using M062X/6-31G including implicit solvation and using flexible amino acid residues. Interaction energies between the ligands and the proteins were calculated using M062X with the 6-311+G* basis set. Calculations have shown that molecules active in COMT also show a promise of strong activity in SULT1A3. In addition, a QSAR model for binding in COMT has been developed and shows promise.

25 Inhibiting Lipid A biosynthesis in Gram-negative bacteria: The design, synthesis, and zinc binding analysis of natural substrate analogues of LpxC ■

Kayla Wilson, Gene Lamanilao, Sarah Malkowski, and Mauricio Cafiero

Faculty Sponsor: Larryn Peterson, Department of Chemistry

The emphasis of this study is the development of novel antibacterial compounds which combat Gram-negative bacterial infections via the inhibition of LpxC. LpxC, a zinc-dependent deacetylase, is involved in the biosynthesis of Lipid A, an important part of lipopolysaccharide, which makes up the outer cell membrane of Gram-negative bacteria. When LpxC is inhibited, the production of Lipid A is halted and the virulence of the bacteria is significantly reduced. The crystal structure of LpxC has provided vital information about the key regions of the enzyme's active site: a hydrophobic passage, a zinc ion, and a polar region. Using that information about the active site, this study focuses on molecules that mimic the enzyme's natural substrate and act as inhibitors. The design, synthesis, and zinc binding affinity of these molecules will be discussed.

#26 Method Development and Proof of Concept for Separation of Bituminous Hydrocarbons from Rock Art

Regan McCormick and Jon Russ

Faculty Sponsor: Jon Russ, Department of Chemistry

Bitumen is a natural oil product that was used in many applications in prehistoric Mesoamerica, mainly as an adhesive or for waterproofing. Previous analysis of black pigment from the rock paintings at Oxtotitlan, Mexico by scanning electron microscopy (SEM) and energy dispersive x-ray spectroscopy (EDS) suggest that the pigment is made from bitumen. Gas chromatography/mass spectroscopy (GCMS) can be used to identify families of biomarkers that are characteristic of oil products. Two families of aromatic hydrocarbons were used in this study: steranes and terpanes. A method for separation of the saturated and aromatic hydrocarbons from the polar compounds in bitumen has been optimized, and GCMS analysis of fractions obtained from natural and archeological bitumen samples shows the presence of both steranes and terpanes. The ability to recover these compounds from the matrix immediately surrounding the paint was demonstrated by spiking samples of the rock coating with 5 α -cholestane and performing the separation and GCMS analysis on the resulting sample. When performed on the paint sample, the separation and GCMS analysis should be able to detect the presence of bitumen.

27 Approaching Brownian-Driven CARMA (2,1) Process from CAR (1) Process

Shu Yang

Faculty Sponsor: Ibrahim Abdelrazeq, Department of Mathematics and Computer Science

Continuous-time Autoregressive Moving Average (CARMA(p,q)) process is a stochastic model that is used to represent the trend of economics and financial markets. In this project, we specially focused on two lower degree CARMA processes: CARMA(2,1) and CARMA(1,0)(equivalent to CAR(1)). We proposed a theorem that CARMA(2,1) can be approached by two CAR(1) processes and worked on passing some statistical properties from CAR(1) to CARMA(2,1). In particular, when a CAR(1) process is observed at discrete times, the unobserved driving Brownian motion can be approximated from the observed process and normality test can be conducted on


the approximated increments of the driving process. Therefore, if CARMA(2,1) is observed at discrete times, we will be able to compute the same tasks by testing its equivalent of CAR(1) processes.

28 *The Entropy of Different Tent Maps*

Shuo Yan

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

A tent map function in mathematics is the real-valued function f_μ defined by $f_\mu = \mu \min\{x, 1-x\}$. The beauty of tent map functions is that the images at first look so well behaved for the whole interval, but the motion of each point in the interval is so chaotic and bizarre. During my project, I am going to exploring of dynamic's pattern of with the tent map with different value μ . More specially, my focus on this poster presentation is the entropy of different tent map, and the how entropy of the tent map changes along with the change of value μ . In one hands, for the "regular" tent map with $\mu = 2$, we are going to use entropy definition from Adler, Konheim, and McAndrew; in other hands, for the "irregular" tent map, we will use entropy definition from Bowen and Dinaburg instead.

29 *Effect of Interfractional Changes on Quality of Proton Therapy* 

James Stuckey, Renin Lukose, Chia-ho Hua, Department of Radiation Oncology, St. Jude Children's Research Hospital

Faculty Sponsor: Shubho Banerjee, Department of Physics

Among treatments in radiation oncology, proton therapy leads the way in quality of treatment and life. However, because protons are particles, they are sensitive to bodily changes and fluctuations—any change in density will impact the stopping point of the proton. This is especially important in pediatric patients since the side effects of radiation on growing tissue can hinder development and impact quality of life. In our research, we looked at the effect of daily changes in bowel gas location and skin thickness in 10 pediatric patients with tumors in the pelvic area to see how much impact these changes had on the delivering of the prescribed dose. Cone Beam Computerized Tomography (CBCT) scans that were taken from each fraction were used to contour the location of the bowel gas and the outline of the body for each day of treatment, and a higher quality Computerized Tomography (CT) was used for creating the proton plans. In general, it is evident that the effect on the quality of plan is highly dependent on the location of the tumor in the pelvis, so results vary from patient to patient.

30 *Analysis of Low-Frequency Geostrophic Transport in the Southern Ocean Measurable with Ocean Bottom Pressure*

Jordan Meyer, Don Chambers, Ph.D., College of Marine Science, University of South Florida

Faculty Sponsor: Brent Hoffmeister, Department of Physics

We sought to understand the relative importance of barotropic transport as measured from bottom pressure to total transport in the Southern Ocean. We used ocean bottom pressure and velocity data from the Estimating the Circulation and Climate of the Ocean (ECCO) state estimate run at Jet Propulsion Laboratory to quantify the percentage of total transport in various areas of the Southern Ocean that can be explained by ocean bottom pressure measurements. Only low-frequency (> 1-year) transport variations from 1993 to 2011 were considered. We examined the standard deviations, correlation, and percent variance for low-pass filtered transport integrated from 65°S – 40°S for each 1° longitude from 50°E to 150°E by vertically integrating the zonal velocity, the zonal component of the bottom current, and geostrophic current from bottom pressure gradients. We found that the transport computed from bottom pressure explained more of the full transport variability than that calculated from the bottom current.

31 *Analysis of backscatter signals from bone using an exponential fit*

Phoebe Sharp, Joey McPherson, Department of Nuclear Engineering, Rensselaer Polytechnic Institute;

Faculty Sponsor: Brent Hoffmeister, Department of Physics

Osteoporosis is a degenerative bone disease that affects 54 million people a year. Ultrasonic techniques may be used to detect changes in bone caused by osteoporosis. As osteoporosis progresses, bone becomes less dense and less attenuating to ultrasound. Thus, techniques that are sensitive to attenuation may be useful for diagnostic purposes. The goal of this study was to measure a damping coefficient based on backscatter measurements of bone. Backscatter measurements were performed by propagating ultrasonic pulses into 29 cube shaped specimens of human bone and receiving the returned "backscattered" signal. The amplitude of the backscattered signal decreased exponentially as e^{-bt} , where b is defined to be the damping coefficient caused by attenuation. The damping coefficient b was found to increase with bone density. The damping constant demonstrated moderate to strong

correlations with bone density ($0.4 < R2 < 0.6$). Thus, techniques based on the damping of backscatter signals by attenuation may be a useful way to detect changes in bone caused by osteoporosis.

32 *Fine motor movement in children on the autism spectrum or chromosome 15q11.2-13.1 duplication syndrome compared to typically developing children.*■

Jessica Rogowiec, Kim Gerecke, Kathryn A. McVicar, MD, The Neuroscience Institute, The University of Tennessee Health Science Center; Shalini Narayana, PhD, Department of Neurology, LeBonheur Children's Hospital; Andrew Papanicolaou, PhD, The Neuroscience Institute, The University of Tennessee Health Science Center

Faculty Sponsor: Kim Gerecke, Department of Psychology

Children with autism spectrum disorders are known to have motor impairments and atypical movements such as stereotypies (2013, American Psychiatric Association). More recently it has been recognized that they may also have elements of apraxia, an impairment of the ability to execute movements, despite having the physical ability and desire to perform them (Rapin 1996). The underlying neurophysiology of these atypical movements remains largely unknown. This study proposes to characterize motor movements in children on the autism spectrum, Chromosome 15q11.2-13.1 Duplication Syndrome and compare it to typically developing children. Children are recruited from the Pediatric Neurology Clinic at Le Bonheur's Children's Hospital. A motor skills application, FingerTap, is used to measure fine motor movement time and accuracy. Measuring accuracy, duration that a finger is on the screen, and number of sequences accurately tapped will allow researchers to establish quantitative baselines to investigate motor movements in newly diagnosed autism spectrum disorder and dup15q children and gain more information about the underlying neurophysiology of these atypical movements in future studies.

33 *The Frozen Body Effect: Bodies in motion are more flattering than bodies frozen in time*

Malerie McDowell, Yoonkeong Chi, and Jason Haberman

Faculty Sponsor: Jason Haberman, Department of Psychology

The Frozen Face Effect (FFE) is the phenomenon in which a video of a face in motion is perceived as more flattering than the video's constituent static images (Post, R.B., Haberman, J., Iwaki, L., & Whitney, D., 2012). In the current set of experiments, we sought to determine whether this effect is unique to facial processing, or if it is present in other stimulus categories, such as bodies, (i.e., a Frozen Body Effect (FBE)). If so, a static image of a body should be significantly less appealing than a body in the context of a video. If, however, the FFE were specific to face processing, the ratings of the videos and static images should be equal. To examine this, we asked participants to rate 25 videos of bodies in motion along with the 30 constituent frames of each video. Images and videos were interleaved, randomly presented and rated from 1-7, with 1 being least flattering. Replicating the FFE, we found that participants rated videos as significantly more flattering than the corresponding still images, suggesting a FBE. These results support the notion that object categories beyond faces are perceptually more appealing when viewed in motion.

34 *Observers misperceive the size of artificial limbs*

Ritika Mazumder and Jason Haberman

Faculty Sponsor: Jason Haberman, Department of Psychology

In creating a prosthetic device for lower-limb amputees, prosthetists report making the limb smaller along the width dimension than the corresponding intact limb due to the patients' report that the limb appears too 'bulky' if exactly matched in size to the intact limb. These experiments investigated the veracity of this perceptual bias. We first verified that prosthetists do, in fact, make prostheses smaller than the corresponding intact limb — by an average of 3%. Next, we explored whether there was a perceptual bias in perceiving prostheses viewed in the context of a body. Participants adjusted the width of the prosthesis in a set of images until it looked 'right.' Unexpectedly, observers adjusted the prosthetic limbs to be larger than the intact limbs by about 7%, suggesting they perceived it as smaller than the intact limb. In a separate control experiment, when observers were instructed to adjust the size of the intact limb, the size bias was significantly reduced. Further, when observers adjusted the prosthetic limb without the context of a body, the size bias was again greatly reduced. Overall, the results suggest that observers underestimated the size of prosthetic devices, and this was most evident in the context of whole bodies.

35 *Attending to multiple ensembles across visual domains imposes no cost relative to multiple ensembles within a single visual domain*

Hayden Schill

Faculty Sponsor: Jason Haberman, Department of Psychology

The visual system efficiently perceives the average in a group of similar items. For example, we can accurately derive the average expression of a crowd of faces, the average orientation of a set of lines, and the average size of a group of circles. Although ensembles are created efficiently and with minimal effort, understanding the capacity limitations of ensemble representations remains an active area of research. In the current set of experiments, we explored ensemble capacity limitations by having observers attend to two sets of ensembles simultaneously and then report the mean of a post-cued set. We conducted three experiments, varying the presented ensemble domain in each version: face/gabor, face/color, or color/gabor. In each experiment, we contrasted performance in the mixed condition, when multiple ensemble domains were presented concurrently, (e.g., face/gabor), with performance in the unmixed condition (e.g., face/face or gabor/gabor). The results revealed a significant benefit of mixing ensembles in the color/gabor experiment relative to the unmixed conditions. Under no circumstances did mixing ensembles reduce ensemble representation precision. We may infer from these results that attending to multiple ensemble domains, in some instances, frees up neural resources relative to attending to multiple ensembles within a single domain.

36 *Average size estimation of dots completing behind an illusory surface is precise*

Sneha Suresh and Swati Pandita

Faculty Sponsor: Jason Haberman, Department of Psychology

The environment is replete with redundant visual information, which the visual system can compress into an efficient, ensemble representation. Ensemble perceptual systems operate with remarkable flexibility across a host of visual domains. In the current set of experiments, we tested whether ensemble information may be represented at a conceptual level, that is, derived in the absence of physical stimuli. We used illusory surfaces, Kanizsa triangles, to partially occlude sets of discs varying in size. Our results revealed that observers could represent the average size of discs that were partially occluded by an illusory surface just as well as when the discs were fully visible. In a series of follow-up experiments, we tested whether observers implicitly represented the amodally completed surface. Observers judged which of two successively presented pacman sets, one of which gave rise to illusory contours (Kanizsa configuration) and one of which did not, had the larger average size. To our surprise, there was no bias to perceive the average size of the Kanizsa configuration as larger, even though the pacman amodally completed behind the illusory surface. It seems that observers were unable to remove the missing ‘pie wedge’ in their estimation of mean size in either pacman configuration.

37 *Observers perceive the average identity of amodally completed faces*

Lauren Ulrich

Faculty Sponsor: Jason Haberman, Department of Psychology

Faces are thought to be processed holistically, as opposed to a part-by-part synthesis. This process is so robust that partially occluded faces (e.g., amodally complete behind bars) are nonetheless easy to recognize. This suggests that face recognition may operate despite incomplete visual information (i.e., conceptual representations). Here, we explored whether observers could derive high-level ensemble representations, that is, summary statistical representations, from sets of amodally completing faces. Observers viewed sets of faces varying in identity and adjusted a test face to match the perceived average identity. Faces were linearly interpolated morphs across three identities. The set comprised 360 images forming a ‘face wheel.’ In one condition, the faces amodally completed behind black, horizontal bars. In another, the identical facial information was presented, but in the foreground (i.e., faces appeared on three-dimensional, fragmented strips in front of a black background). Baseline performance was determined by having observers view and adjust the original, un-occluded faces. The results revealed that ensemble representations of amodally completing sets was significantly better than the fragmented sets and was not significantly different than the baseline condition. This suggests that high-level face ensembles may be represented conceptually, but that this representation is best when the faces amodally complete.

Social Sciences

38 *Zones of Acceptance at Rhodes College*

Eric Jones, Patrick Knight, and Bryan Peterson

Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business

Rhodes College has many positions that have authority over the student body. If authority is only as good as how well it is accepted, where are the limits of these authorities from the students’ perspective? To find those limits we tested the concept “zones of acceptance” by surveying Rhodes students for their varying degree of willingness to

comply with commands from collegiate authority figures. We asked ten questions that provided hypothetical situations involving different criteria of seriousness and/or complexity. These questions gauge which authority figures students would respond to and under what circumstances each authority could exert power. Scholars have frequently conducted research about zones of acceptance in workplaces, but not in educational institutions. This makes our study unique and specific to Rhodes. We hypothesized that Rhodes students will question authority and resist it in compromising situations. We also hypothesized there are different circumstances under which certain authority figures will have power and others may not. Our results display trends in student compliance with various campus authorities.

39 *The Varying Means of Success Related to the Honor Council*

Mason Childers, Matt Baldwin, Pat West, and Sam Yarborough

Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business

The purpose of this study was to gain a better understanding of the rewards that would motivate people to run for the Honor Council. Giving students this much authority makes Rhodes unique from other colleges and universities; however, it also constructs a hierarchical organization within the student body. To obtain this type of power, there must be some reward that motivates students to run for the position. Curt Tausky refers to these motivators as mobility interests, as reasons to why people want to move up in their organization. In our study, 20% of the students and alums we surveyed answered “yes” to whether they considered running for a position on the Honor Council. From the results, we concluded that those who strove for greater mobility found sufficient reward in being on the Honor Council, while those who did not, found that ascent was not relevant toward their self-interests. Regardless of whether a student answered “yes” or “no” to our survey, we received substantial evidence that being elected to the Honor Council is not the ultimate goal for students; but they think it will help propel them to higher positions in their career path.

40 *Survey of Rhodes Student Investing Attitudes*

Trevor Lew

Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business

College students have the most important commodity in long term financial planning: time. The goal of the project was to analyze survey results to identify if there were possible areas for student investing attitudes to be improved. This poster displays the results of a survey used to establish an understanding of student attitudes towards investing.

41 *Predicting Performance and Expectations for Rewards in the Nursing Profession Using Occupational Commitment and Task Intensity* ■

Samhitha Curpad, Dee Birbaum, and Mark Somers, School of Management, New Jersey Institute of Technology, Linda Finch, Department of Business, University of Memphis

Faculty Sponsor: Dee Birnbaum, Department of Commerce & Business

Task intensity and four dimensions of occupational commitment were used to predict two outcomes: performance in nursing school and the students’ expectations for rewards in their nursing careers. As expected, affective commitment was a predictor of both outcomes. Task intensity, unexpectedly, played no role in predicting either outcome. Surprisingly, normative commitment was negatively associated with nursing school performance. The accumulated costs and limited alternatives dimensions of occupational commitment predicted neither outcome. With these results, we suggest recruiting nursing students who have values congruent to those of the nursing profession. We also suggest that nursing schools admit students with an affective commitment for the nursing profession, and nursing programs should focus on further building an emotional attachment to nursing to help students ensure that their personal values align with those of nursing. This way, those who graduate from nursing school will remain in the profession.

42 *Experiencing the Rat: An Analysis of the Service Value Proposition*

Francis Chandler, Iris Hao, Kim Weiler, and Marion Fessler

Faculty Sponsor: Denis Khantimirov, Department of Commerce & Business

Our research objective is to evaluate service quality perceptions and investigate students’ expectations of the dining experience at Catherine Burrow Refectory. Provision of excellent meal services enhances students’ overall college experiences, boosts future enrollment, and increases the school’s brand recognition. High levels of satisfaction with dining services also strengthen the business relationship between the school and Aramark, the food service provider at Rhodes College. Our analysis aims to illustrate the structure of the services provided and to identify strengths and weaknesses of the present service value proposition; ultimately, the empirical evidence is used to facilitate strategic

suggestions aimed at enhancing the service experience at the Rat. An initial element of our market research has been centered on collecting qualitative data through conducting interviews about students' specific service experiences. Surveys have also been administered to evaluate students' ideas of adequate and desired service in order to advance our understanding of students' service quality perceptions. Based on our findings we have developed a "service blueprint" and analyzed the different points of interaction among employees and students to grasp a clearer understanding of the service delivery process. Finally, we have devised strategic suggestions for service improvements, as well as the associated risks with implementing our proposal.

43 *The Double Standard of Ethnic Minorities in the PRC: Tibet and Xinjiang*

Tiana Winstead

Faculty Sponsor: Renee Johnson, Department of Political Science

The international community has recently grown more attentive to the Chinese Communist Party's treatment of ethnic minorities in Xinjiang and Tibet. This poster proposal aims to explain the varying CCP treatment of Tibetans and Uyghurs by posing the question, "Why is the People's Republic of China more repressive towards certain ethnic regions than others?" While uncertainty remains in the political rationalization of discrimination against ethnic minorities in the PRC, it appears that there lies a pattern in the CCP's method of ethnic treatment. An international level explanation suggests that the international community's demands and opinions have a impact and influence on the CCP's approach to minority policies. Social identity theory suggests that minority treatment is a result of group identification. Overall, a state level explanation, bureaucratic authoritarianism, has the most comprehensive and thorough explanation, as it incorporates both the international and the individual in the making of minority policies.

44 *Parental Politics: Different for Liberals and Conservatives?*

Sarahanne Vaughan

Faculty Sponsor: Dane Wendell, Department of Political Science

Researchers have found that parents play an important role in the political development of their children. However, only a few studies have looked into the partisan nature of the parent-child relationship. We seek to explore this understudied question: does parental influence on politics work differently when the parent is a liberal versus a conservative? We utilized a survey questionnaire to explore how politics may be impacted by the partisan identities of the parents. Our project explores two main dimensions of partisan parental politics: first, the effect of ideological attitudes on the parent-child relationship; and, second, how these effects are different depending on the sex of the parent. Our study contributes to important questions of early childhood political behavior, and we discuss the implications of our findings for how politics affect family relationships (and how family relationships affect politics).

45 *Gender Effects on Candidate Competency*

Leighton Younger

Faculty Sponsor: Dane Wendell, Department of Political Science

Recently researchers have found that voters are more likely to associate certain perceived traits with candidates based on their gender. To test this, we developed a survey based experiment to isolate the qualities associated with each gender. We then created two groups of survey responders in which one candidate was female and the other male, and provided them with an identical biographic description of the candidate to eliminate any partisan discrepancies. Finally, we asked a set of identical questions relating to the candidate's ability to handle select contemporary issues of foreign policy. We hypothesized that despite the lack of information, voters would be more likely to say that male candidates were more competent in matters of foreign policy.

46 *High Degree of Interest in Technology Based Weight Loss Intervention in Northeast Arkansas* ■

Megan Denny, Keiko Asao, MD, PhD, Department of Preventive Medicine, University of Tennessee Health Science Center; Paul Koros, RN, NEA Baptist Clinic-Clinical Research Center; Mace Coday, PhD, Department of Preventive Medicine, University of Tennessee Health Science Center; Phyllis Richey, PhD, Department of Preventive Medicine, University of Tennessee Health Science Center; Ian Brooks, PhD, Department of Preventive Medicine, University of Tennessee Health Science Center; Elizabeth Tolley, PhD, Department of Preventive Medicine, University of Tennessee Health Science Center; Karen C. Johnson, MD, MPH, Department of Preventive Medicine, University of Tennessee Health Science Center

Faculty Sponsor: Kendra Hotz, Department of Religious Studies

Obesity is an important risk factor for diseases and disproportionately affects underserved populations, including people who live in rural areas. People in rural areas often have different cultural and social backgrounds, such as

limited access to technologies, than residents in urban or suburban areas, which may limit acceptability of a weight loss intervention proven to be efficacious in urban or suburban areas. Therefore, socially and culturally appropriate interventions in rural areas to help the populations achieve and maintain a healthy weight are urgently needed. Providing such efficacious, multicomponent lifestyle interventions using interactive technologies is considered especially suitable in rural settings. However, the readiness in rural areas for such interactive technology-based health programs is unknown. In order to explore the feasibility of implementing an interactive technology-based behavioral intervention for weight loss in a rural setting, we conducted a preliminary study to assess: 1) the level of interest in participating in a weight management program using digital media, 2) the perceived barriers for weight management, and 3) access to various digital communication technologies in adults at local ambulatory care clinics in Northeast Arkansas, whose catchment areas include rural communities.

47 *Breast Cancer Care in an Urban Underserved Setting*

Sarah Ferguson, Shelby Stoneking, B.S., Stephen B. Edge, MD FACS, Nia Zalamea, MD FACS, Church Health Center

Faculty Sponsor: Peter Hossler, Department of Urban Studies

The Church Health Center in Memphis, TN, is a center that cares for the uninsured working population. Founded in 1987, Church Health has grown to provide care for approximately 60,000 persons. This study examines the care of female breast cancer patients treated in 2008-2013 and the concordance of care with national breast cancer practice guidelines. Fifty-two patients met protocol for this study and several variables regarding their breast cancer treatment were recorded. The treatment plans were then compared to the practice guidelines of the National Comprehensive Cancer Network (NCCN) and if the patient was recommended care in line with these guidelines, the treatment was defined as concordant. If not, the patient's treatment was defined as non-concordant. Results found that stage II A was the most represented stage of cancer in the study. Additionally, of patients that qualified for BRCA testing, only 38% of them were tested. When looking at concordance of care, 83% of the patients received guideline based care and the other 17% were non-concordant due to system failure or the patient declining treatment. This study is important because it shows that quality care of patients in an underserved setting is possible but can still be improved.

48 *Pickin' Strings and Learnin' Things: An Ethnographic Study of the Memphis Area Bluegrass Association (MABA)*

Claire Norton

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Through participation and immersion within an unfamiliar culture, the practice of ethnography aims to give valuable and accurate insight into the way that cultural scenes engage us. Using the ethnographic method gives us the ability to merge both qualitative and quantitative methods in order to gain a more holistic understanding of a culture in an accurate and humanizing way. The Memphis Area Bluegrass Association (MABA), which meets once a week in a classroom at Hope Presbyterian Church, aims to help its members to play and learn more about bluegrass music. Positioning myself as a participant within this setting and becoming a member of the organization has allowed me to gain an insider's perspective of the way that MABA works and how its members interact. Through singing and playing the fiddle and banjo at the weekly bluegrass jam sessions, I have learned first hand the dynamics of MABA and in turn more about bluegrass music. Through this ethnography, not only have I found that there are much more methods of playing bluegrass music than I originally imagined, but that there are interesting ways that bluegrass songs and skills are passed through people and time. Engaging with MABA in order to obtain a more informed understanding of bluegrass music, and the ways in which this genre of music is passed on, will help us to be more informed of how groups of people facilitate and perpetuate musical knowledge.

49 *Ethnography Rocks! An Ethnographic Study of Bridges Rock Climbing*

Anna Singletary

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Before I visited Bridges, which is a youth leadership community center near downtown Memphis, I learned from their website that they have a rock-climbing program. I knew nothing about the sport but had a desire to learn the skill and culture surrounding it. Bridges and the ClimBridges team gave me the opportunity to use ethnography to study their space and culture. Ethnography is the study of nuanced meanings of rituals, customs, and materials within different cultures through the main method of participant observation. Through my research I observed and talked to the rock-climbing patrons as they socialized and climbed during open-gym blocks, while also learning the skill myself. I found that men and women physically climb differently, and I also saw how gender was played out in the space. These aspects became a theme for my research. The challenge of both learning about the culture and its

“local” vocabulary while also learning climbing skills showed me how people other than ethnographers can use ethnography to understand and appreciate subcultures right at home in Memphis.

50 *Sew You Think You Can Sew: An Ethnographic Study of SewMemphis*

Mackensie Brislin

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Over the course of a semester, I carried out an ethnographic study to glean information about the cultural scene at the fabric store SewMemphis in Overton Square. Each week I either participated in or observed sewing classes as well as store employees and patrons coming into the shop. The ethnographic method of participant-observation has allowed me to understand the richness of a cultural scene I was unfamiliar with. Throughout my time at the store, I have explored how a community has formed around this activity. While most initially think of sewing as a dated hobby, the thriving population at the store proves that sewing is still very much in-fashion. The store has taken the process of a traditional craft and embraced sewing conveniences, such as the sewing machine, to create a space where people of all ages can socialize with others who share this interest. Serving a mix of both young and old patrons, SewMemphis brings local Memphians together to learn and bond while expressing their creativity and unleashing their inner artist.

51 *“One Latte at a Time:” An Ethnographic Study of Avenue Coffee*

Nathan Smith

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

To understand “why we do what we do” we need to begin by appreciating that there are many cultural scenes all around us, some of which we participate in, others that are “foreign” to us. I chose the cultural scene, Avenue Coffee, as a location to conduct my ethnography in order to understand the social and cultural makeup of cafés in our society. My study will be centred around my experiences, observations, and reflections at this local, independent café. The ethnographic method is a process of gathering information through participation in order to create a scientific description that is understandable and relatable to others. By situating myself as an average coffee drinker in the café, I was able to appreciate and observe: interactions that customers would engage in, social queues in the process of ordering and the necessity to do so, and even acceptable behaviour such as personal space. Overall, by delving into the coffee shop cultural scene and examining many of the mannerisms that are commonly found there, I uncovered many social regulations that we engage in without realising. Over my cup of joe, I found several aspects of culture, socialisation, and even consumerism that exist in our daily lives. Through this, I not only began to understand and address the cultural significance and importance of this cultural scene, but I also learned to question my own view and observe myself throughout my investigation – perhaps the greatest purpose of the ethnographic method.

52 *Sois notre invité: An Ethnography of Café Society in Memphis*

Saira Clayton

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Café Society is a restaurant located in the Evergreen Historic District of Midtown Memphis, Tennessee. I chose Café Society over any other site in Memphis to carry out my ethnographic research because of its unique cultural scene. Café Society stands out for its French cuisine with Belgian influences. The restaurant also hosts monthly wine tastings, private parties, business functions, weddings events, and rehearsal dinners. Within this cultural scene, I adopted the role of observer, volunteer, and participant. After visiting the site for a few hours once a week over the course of one semester, I observed that the restaurant fosters a clear sense of community, while guests and employees both value the French experience. By employing the classic methodology of cultural anthropology, I was able to develop a thick description and a nuanced appreciation of this cultural scene. In a city with a diverse variety of dining options, Café Society fits in well, and offers a fascinating scene for both those with educated palates and the novice ethnographer.

53 *Grounded: Exploring Life on the Ground at a Flight School*

Sawyer Tucker

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Downtown Aviation is a small flight school located at General Dewitt Spain Airport in Memphis. It caters to a wide variety of aviation enthusiasts, from beginners to seasoned military pilots. Even though I am a longtime lover of aviation and a student pilot, I felt that I did not know much about the community surrounding aviation. Therefore, I employed the ethnographic method of participant observation at Downtown Aviation to explore the fascinating mix

of people who take part in the magic of flight. An ethnography is an observation, accompanied by a written documentation, of a certain culture or group of people, in my case, the people at the flight school. During my time at Downtown, I interacted with the instructors, students, and visitors on the ground. By doing this, I learned about the many different walks of life the pilots come from, how they each found their way to a life of flying, the importance of telling stories when teaching pilots, and most importantly, how accepting and friendly the aviation community is. Even if one is not actively flying with them, they will welcome you and find a spot for even a novice ethnographer in their family.

54 *An Ethnographic Study of Pure Barre Memphis*

Lindsey Conley

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

The ethnographic method allows one to acquire a better understanding of a culture through participant-observation. Over the past few months, I have used this method at a barre workout class here in Memphis. Pure Barre boasts being the fastest and most effective way to tone your entire body. This technique is designed to be low-impact, but it is not low-intensity. This is one of the hardest workouts I have done. The goal of this exercise program is complete exhaustion of your muscles and then a quick stretch afterwards to lengthen them. One very unique aspect of this workout is the emphasis on the mind-body connection. Strengthening your mind as well as your body makes this workout even more empowering. While this is a large franchise all over the country with over 400 studios, each is its own community. I have found that at Pure Barre Memphis, many people know each other very well and the instructors genuinely care about your fitness goals. Recently, one client reached their 1000th class and staff made sure to celebrate her. The sense of family and friendship is one of the main themes I focus on in my study.

55 *Shabbat Shalom: An Ethnographic Study of Temple Israel*

Lacey Jamerson

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Ethnography describes the complete immersion of a social scientist into a cultural scene that is foreign to them, and the subsequent analysis they produce on the site. An ethnographer can provide a third-party perspective on the nature of the culture that they study, as well as make that culture more accessible to a larger audience, bridging the gap between the familiar and the unfamiliar. My site of study is Temple Israel, the largest Jewish temple in Memphis, TN, in which I am attending religious services—Torah studies and Shabbat services, but also social events as they are available—as a fellow congregant. In my time at Temple Israel, I have found their non-proselytizing policy to be most important in maintaining their open, friendly nature, especially as compared to other religious services I have attended at which they made it clear that attendees should closely follow their beliefs. I do not attempt to claim, however, that this policy is necessarily “better” than any other which might condone or endorse proselytizing; rather, I mean to analyze (among congregants, administrators, and rabbis alike) the ways in which Temple Israel is able to establish itself among the Memphis community as a force of social change because of religious tolerance and acceptance.

56 *Where Super Mario Lives and Never Dies: An Ethnographic Study of the Rec Room*

Emily Crenshaw

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

The purpose of this study was to examine the cultural scene at The Rec Room, a new and unique bar located on Broad Avenue in Memphis. I recorded my findings through the ethnographic method of participant observation. Ethnography involves the immersion of the researcher in the everyday activities of a community with the intent of describing the social context, relationships, and processes relevant to the creation and animation of the cultural scene. Working as a participant observer at the Rec Room for a whole semester, from attending staff meetings to observing when the Rec Room is open, I gained a well-rounded sense of how the place asserts itself as a new and integral part of the eclectic, local culture Memphis prides itself on. With a variety of games and events, the Rec Room advertises itself as a place for everyone, ages eighteen to sixty, to come together and challenge each other to a classic game of... that’s for you to decide. In observing a place where “Super Mario lives and never dies,” the Rec Room brings various groups of people together through the use of a couch, a local beer, and a game console.

57 *The Daily Grind: An Ethnographic Study of Muddy’s Grind House*

Alexandra Overstreet

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Memphis, Tennessee is a very diverse and culturally rich city, but one quality that most Memphians have in common is the love of good food. Muddy's Grind House puts an interesting twist on the average bakery and coffee shop. Located in Midtown, Memphis, Muddy's Grind House provides a comfortable environment for people of all ages and backgrounds to enjoy coffee, baked goods, and each other's company. People come for the delicious baked goods and stay for the colorful and folksy ambience. In order to grasp why Muddy's is so appealing to Memphians, I chose it as my ethnographic site. Ethnography is a way to capture a nuanced snapshot in time through careful listening and observation of an unfamiliar culture or cultural scene. I have positioned myself as a frequent customer of Muddy's in order to have the opportunity to look at the shop holistically in terms of clientele, employees, and ambience. I have observed the changes in rhythm throughout the day and at different points in the week as well as the importance placed on material culture such as sound, taste, smell, and color. Upon learning about the culture of one of Memphis' most popular eateries, I have been able to understand why Muddy's in particular has situated itself so comfortably in the lives (and stomachs) of Memphians.

58 "Your Hattiloo": An Ethnographic Study of Memphis' Black Rep Theatre

Olivia Gacka

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Memphis is known for many things, but one of its best-kept secrets is its theatre scene. When choosing a cultural site for an ethnographic study, I knew I wanted to select a Memphis theatre because of my deep belief that theatre is essential to any and every culture. I chose Hattiloo Theatre because of my lack of familiarity with it, paired with my interest in its positioning as a Black Rep theatre that focuses on promoting works that are entirely foreign to me. Through employing the ethnographic method of immersing oneself in the field, I was able to acquire a more honest and organic understanding of Hattiloo Theatre. By taking on the role of participant-observer, I experienced firsthand the warmth and determination with which the staff of Hattiloo Theatre conduct their work at performances, fundraisers, youth programming, and in the daily running of the theatre. I was able to assess the richness of the Hattiloo mission through understanding the individuals who work there, and gained a greater appreciation for Hattiloo's place in Memphis' past, present, and future.

59 "Hit It Hard": An Ethnographic Study of the Memphis Fitness Kickboxing Center

Alex Clementi

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Fitness studios can serve as rich sites that allow us both to reflect upon and analyze larger cultural norms and processes in society, such as cultural conceptions around health, wellness, and body imagery. In order to investigate the way exercise studios function within a local context, I chose to conduct my ethnographic study at the Memphis Fitness Kickboxing Center. Ethnography is defined as a deliberately engaged and sensitive study of people and cultures, aimed to make the unfamiliar elements of a cultural scene more familiar. As an active participant in every kickboxing class as well as an observer of the studio, I have utilized qualitative research methods to examine the inner workings of and social interactions and engagements within exercise spaces. The findings of my study reveal that class participants are learning far more than just how to throw a punch in these exercise classes; in studying fitness centers in American society, the Memphis Fitness Kickboxing Center illustrates larger processes of community building within the context of a locally owned small-business.

60 Thank You, Come Again: An Ethnographic Study of the Midtown Mini Mart

Amber Sinclair

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

Ethnography is a method that "hits two birds with one stone", for it provides the ethnographer with knowledge of both oneself and society at large. An ethnographer actively engages in a particular cultural scene in an attempt to experience what others experience on a day-to-day basis. From this engagement, information that often goes unnoticed becomes knowledge that can be utilized in an assortment of ways. Overall, the data gathered can be put towards understanding and informing humankind about itself. Convenience stores are prevalent around the nation, yet there is no other store like the Midtown Mini Mart (MMM). Located on the corner of N McLean and Tutweiler, MMM serves as a neighborhood convenience store that local community members regularly stop in to grab beer, cigarettes, lottery tickets, snacks, etc. Although Midtown provides the community with material items, it also serves as a community unifier. During my research at the MMM, I actively conversed with the employees and customers I encountered. From my observations and conversations, I concluded that Midtown employees maintain a welcoming, laid back, down-to-earth attitude, with a family-like feel, which radiates throughout the store. As a result, local residents, Rhodes students, and whomever happens to wander in continue to return, oftentimes establishing Midtown

as their go-to store. At MMM, there is no need to say “Thank you, come again” when someone leaves, considering the fact that most customers do, in fact, come back regularly, even daily.

61 *Not Even One Letter: An Ethnographic Study of No Regrets Tattoo Emporium*

Lauren Wenzel

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

The cultural scene of Memphis is not stagnant, dull, or ordinary. Rather, it is a bustling atmosphere of character and vibrates across a vast array of entwined sub-cultures in the city. In my ethnographic study I sought to explore how one cultural scene of tattoo art and piercings exemplifies the element of individuality, if not eccentricity, of the larger Memphis culture. In an effort to understand this scene, I utilized the ethnographic method by engaging with and observing artists and patrons at No Regrets Tattoo Emporium on Madison Ave in Midtown Memphis. Founded in 2009, No Regrets quickly made itself known as Memphis’s number one destination for tattoos and piercings. During both weekend walk ins and scheduled sessions, I have had the opportunity to develop relationships with not only the artists, but also the clientele. Through such interactions, my familiarity with tattoo artistry and its fascinating qualities has blossomed over the course of the semester. I have come to appreciate the various styles of each artist, as well as understand the reasons many people receive tattoos or piercings. I will use the ethnographic method to provide a nuanced understanding of not only No Regrets, but also the unique culture that surrounds tattoos and piercings.

62 *Anthropology Unleashed: An Ethnographic Study of Overton Bark*

Genevieve Smith

Faculty Sponsor: Susan Kus, Department of Anthropology and Sociology

This study was conducted in accordance with the requirements for the Rhodes class ANSO 352: Ethnography at Home. The study served as an introduction to ethnography, a method of research that involves the immersion of oneself in a particular setting in order to develop an understanding a cultural scene and its participants. It employs the research technique of participant-observation, meaning that the researcher attempts to fully participate in the life of those he or she is studying in order to be able to effectively observe, interact with, and analyze the culture. For my ethnography, I studied Overton Bark, the dog park situated within Overton Park in Midtown Memphis. My goal throughout the process was to participate in the culture of the dog park by bringing my own dog to the park multiple times a week throughout the semester. In doing so, I have both learned about the unspoken ‘rules’ of the park and have developed an increased appreciation for Overton Park and what it provides for Memphians (both two legged and four) every day. differing rates of substance abuse in the emotion regulation and control groups. Results will be discussed within theories of gender minority stressors and emotion dysregulation.

Biology 141

63 *Effects of food odor on aggression between crayfish.*

Will Raines, Rutvi Patel, Will Stone

Faculty Sponsor: Carolyn Jaslow, Department of Biology

64 *The effect of nitrogen on root length and the number of leaves in Duckweed plants.*

Tanner Martinez, Diana Vincent, Lekha Vuppalapati

Faculty Sponsor: Carolyn Jaslow, Department of Biology

65 *Effects of texture on crayfish substrate preference.*

Sarah Clifton, Abby Ritter, Noelle Schmitter-Schrier

Faculty Sponsor: Carolyn Jaslow, Department of Biology

66 *An analysis of stomatal density of the inner and outer leaves of Brussels sprouts.*

Robert DelBello, Isabelle Mikell, Bess Freeman, Alek DiMaggio

Faculty Sponsor: Carolyn Jaslow, Department of Biology

67 *Effect of wind on adaxial stomatal aperture size of water-stressed pansies.*

Jack Worthen, Ev Douglass, Anesu Nyawata

Faculty Sponsor: Carolyn Jaslow, Department of Biology

68 *Can crayfish find food faster with both visual and olfactory cues than with olfactory cues alone?*

Andrea Pajarillo, Reeta Bandyopadhyay, Ali Jamal

Faculty Sponsor: Carolyn Jaslow, Department of Biology

69 *Effects of pH on Rates of Duckweed Growth and Root Length*

Tasnim Chowdhury, Carter Embry, Delaney McDonagh, Cameron Tinker

Faculty Sponsor: Alan Jaslow, Department of Biology

#70 *The Effects of Pollution on Lichen Distribution on the Rhodes College Campus*

Madeline Estes, Elizabeth Gaudio, Nick Pappas, Madison Perchik

Faculty Sponsor: Alan Jaslow, Department of Biology

71 *Does the presence of a chrysanthemum-bases natural insecticide affect which food a cricket will eat?*

Mary Neil Hodl, Hannah Jane McCarthy, Matthew Smith, Charlie Hughes

Faculty Sponsor: Alan Jaslow, Department of Biology

72 *Varying effects of different light on Crayfish in gravel*

Peyton Antwine, Rishabh Mazumder, Aemal Nafis, Margaret Smith

Faculty Sponsor: Alan Jaslow, Department of Biology

73 *Effect of salt concentration on duckweed growth*

Jacob Menke, Morgan Jenkins, Sabine Lohmar

Faculty Sponsor: Alan Jaslow, Department of Biology

74 *The effects of acidity on duckweed shoot length, leaf area, and colonies.*

Dominic Voehler, Erika Fanous, Lauren Rowland

Faculty Sponsor: Alan Jaslow, Department of Biology

75 *Effects of Varying Auxin Concentrations on Wisconsin Fast Plant Growth*

Tevin Mathew, Erika McCormick, Brianna Sprague

Faculty Sponsor: Sarah Boyle, Department of Biology

76 *How Does Exposure to Different Light Colors Affect the Growth of Duckweed?*

Madeleine Mabante, David Bultena, Daly Colarossi, Smit Patel

Faculty Sponsor: Sarah Boyle, Department of Biology

77 *Are Crayfish Substrate Preferences Influenced by Color or Texture?*

Brianna Maniscalco, Katie Imperial, Megan Jackson, Thomas Wik Fowler

Faculty Sponsor: Sarah Boyle, Department of Biology

78 *The Effect of Organic Acids on Duckweed Growth*

Avani Alapati, Mounika Aramandla, Luis Milburn, Kendall Henry

Faculty Sponsor: Sarah Boyle, Department of Biology

79 *Nitrogen's Influence on Duckweed Growth*

Faith Blanchard, Tia Herman, Hamid Shirwany

Faculty Sponsor: Sarah Boyle, Department of Biology

80 *Do Crayfish Have a Sweet Tooth?*

Ariana Mancieri, Andrew Frantz, Ian McConnell, Mia Kinsey

Faculty Sponsor: Sarah Boyle, Department of Biology

81 *Are movement patterns in diatoms influenced by sensing dissolved silicate acid (dSi)?*

Lauren Hamm, Megan Simons

Faculty Sponsor: Melody Durrett, Department of Biology

82 *Will competition have a significant effect on plant height and biomass?*

Kayla Chevis, Sarah Newbern, Azeez Shala

Faculty Sponsor: Melody Durrett, Department of Biology

83 *The effects of food smell on aggression in male crayfish*

Clint Favre, Terra Martin, Joel Sabio, Isabelle Tehrani

Faculty Sponsor: Melody Durrett, Department of Biology

84 *Can crayfish be conditioned to perform tricks?*

Dale Boardman, Caroline Cole, Mason Cothran, Rebecca Evans

Faculty Sponsor: Melody Durrett, Department of Biology

85 *Testing the triple response: effects of touch on plant growth in Phaseolus vulgaris*

Rheedi Dasani, Elizabeth George, Samir Rassoul, Sydney Rogers

Faculty Sponsor: Melody Durrett, Department of Biology

86 *Do crickets determine their diets by nutritional content, or do they have no preference at all?*

Katrin Arango, Connor Frost, Tripp James

Faculty Sponsor: Melody Durrett, Department of Biology

87 *The effect of CO₂ emissions on male cricket behavior*

Elizabeth Anne Land, Walker Lee, Anoushka Mullasseril

Faculty Sponsor: Melody Durrett, Department of Biology

POSTER SESSION II

Multi-sports forum of the Bryan Campus Life Center

4:30pm – 6:30pm

Poster numbers are listed with each title.

Fine Arts

1 *Harp for Healing*

Petra Dhinakaran, Xuyan Chen, Sidney Long, Nicole Quinones, Zhiyu Zhao

Faculty Sponsor: Gina Neupert, Department of Music

The power of music not only inspires, it proves to be a successful tool when applied to various healthcare and educational settings. Research supports its effectiveness in areas of physical rehabilitation, emotional, cognitive and social needs of individuals. This project will illustrate the clinical and evidence-based use of musical interventions through music therapy and the harp.

Humanities

2 *“Cartonera in Memphis”* ■

Mariam Ebeid and Nolu McIlraith

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

Becoming increasingly popular throughout the Americas, Cartoneras bring accessible works of art to the local community by encouraging the use of recycled cardboard and other materials to create books. Our comic workshop collaborates with the Centro Cultural Latino de Memphis to celebrate the culture and traditions of Latin American and disseminate the movement of Cartoneras. These books offer so much more than intellectual stimulation to those whom they encounter. Cartoneras call for the formation of a community that reunites to celebrate the arts, while also providing ways of independently benefiting from the creation of such books. From the production stages, which include writing, editing and designing as well as through the distribution process, Cartoneras allow for art to be accessible, experienced, and created by all. Ultimately, Cartoneras are a means of combining individual expression

with group collaboration in order to benefit the individual maker, or cartonero, as well as the adult/child who may buy or receive the book.

3 “Memphis Cartonera with Cazateatro: Setting the Scene One Libro at a Time” ■

Isabelle Bruner, Christopher Meadows, Isabelle Tehrani, and Kirkwood Vangeli

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

“Cartoneras” are cooperative, arts-based literacy and publishing programs that have engaged literature and art to promote civic agency in tackling problems rooted in urban poverty. Our project consists of spreading Memphis Cartonera throughout the wider Memphis area through collaborating with Cazateatro, Memphis’s first bilingual theatre group. The project includes the development of a “libro”, or Spanish book, containing the organization's experiences working on the many plays that the group has performed. An aspect that is unique to the “Cartonera” process is the production of these books through the sole use of recycled materials, primarily composed of cardboard. The overall idea is transparency, communication, and communal learning through the sharing of individual and group experiences. Through the engagement of pedagogical tools learned in our class and the tenets of cartonerismo, our goal is to strengthen our connection with Cazateatro and disseminate literature throughout the Memphis community. Our work with both adults and children sheds light on the many perspectives that the organization fosters. The creative and reflective activities developed and implemented by Memphis Cartonera and Cazateatro embody the spirit of the cartonera movement in the hope of establishing a template for future community partnerships.

4 “Cartoneras: Using Public Space to Encourage Multilingualism among Young Memphians” ■

Diana Azcárate Barreto, Emma Taylor, and Tasha Heller

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

Cartoneras are community-oriented publishing houses dedicated to increasing literacy by fostering community growth and organic globalization through environmentally sustainable artistic expression. Originally, Cartoneras served as resistance to the inaccessibility of literature in tough economic times, and encouraged a learning community through artistic expression and recovered materials. Combining the freedom of expression with affordable means of distribution provides people with an outlet for their experiences, leading to a more cohesive understanding of the human condition. Our project focuses on fostering a bilingual literary community in Memphis through the use of public spaces. Through this project we have seen that many children of Latino immigrants in Memphis are not as exposed to their parents’ native language as some might expect. Using the public spaces as a forum for our project allows for any child in Memphis to create art and be involved in a democratic literary learning community, while promoting the use of the Spanish language in academic life.

Natural Sciences

5 *Spatial and Interactive Data on Captive Meerkats of the Memphis Zoo* ■

Erica Carcelén, Brooke Rose, and Sarah Ferguson

Faculty Sponsor: Sarah Boyle, Department of Biology

Meerkats, *Suricata suricatta*, are gregarious mammals from southern Africa that live in genetically similar, altruistic colonies. At the beginning of this study the Memphis Zoo housed five meerkats (two females and three males), and currently only houses the three males. Aggression was prevalent when the five individuals lived in the colony, and the zoo requested a behavioral study on the social dynamics of the group. We analyzed spatial proximity and interactions between individuals before and after the removal of the females. We predicted that the males would show fewer aggressive interactions and closer spatial proximity toward each other after the females were removed. Additionally, we predicted that the two young males would be in closer proximity to their mother than the unrelated female in the colony. This is an ongoing project to monitor these social interactions as the colony faces future changes with the eventual introduction of new females.

6 *Over-Consumption of Water by Industrial U.S. Animal Agriculture*

Erin Burman and Ethan Jones

Faculty Sponsor: Sarah Boyle, Department of Biology

Factory farming is one of the most environmentally taxing commercial practices on natural resources. Agriculture is responsible for 80-90% of U.S. water consumption, with one pound of beef requiring approximately 2,500 gallons of water to produce. In order to examine the environmental impact of factory farming, we used ArcGIS software to analyze the spatial association between the presence of factory-size beef facilities (defined by the possession of 500

or more cattle on feed) and water use in United States counties, employing data from the U.S. Geological Survey to track national water use from 1955 to the present. With this analysis, we intend to test the hypothesis that counties across the nation with industrial-level animal agriculture practices consume, on average, much more water than counties without. Although animal agriculture has been frequently criticized by the general public due to ethical considerations, it has received less opposition from the general public on environmental grounds. We hope that this GIS analysis will supplement the growing environmental movement resisting factory farming by demonstrating that unsustainable agricultural practices over-consume the natural resource water.

7 *Aggressive behaviors between two female hippos (*Hippopotamus amphibius*) in captivity.*

Samantha Ouyang, Annie Giarla, and Erin Burman

Faculty Sponsor: Sarah Boyle, Department of Biology

This project's purpose is to quantify agonistic behavior occurring between two hippos at the Memphis Zoo aiming to 1) identify patterns in the social interactions and dynamics between the two hippos, and 2) determine any behavioral changes due to a decreased available water space. We collected behavioral and spatial data using scan sampling at 2-minute intervals and determined an activity budget for each hippo. We quantified the proportion of time each hippo engaged in social behavior, noted the grid number for each animal at each interval, and recorded the water levels in each pool. The findings are important for quantifying the implications of spatial availability on the hippos' social relationships, and further determine how this relationship may change as new hippos arrive and the hippos move to a larger habitat.

8 *Land cover modification assessment for protected areas containing hippo study sites* ■

Brooke Rose

Faculty Sponsor: Sarah Boyle, Department of Biology

Recent assessments show that common hippopotamus (*Hippopotamus amphibius*) numbers are declining, largely due to human impact. Furthermore, the common hippo remains relatively understudied, particularly from a conservation perspective and the majority of hippo studies have been conducted in protected areas (PAs). In order to better understand the role that protected areas (PAs) play in mitigating habitat modification, the current study compared land cover modification within PAs in which hippos have been studied and the surrounding 10 kilometer area around each PA. I found that there was no difference in land modification within the 30 PAs in which hippos have been studied and the 10 km areas surrounding each PA. On average, both areas were comprised of less than 3% modified land cover, suggesting that the analyzed PAs have successfully mitigated land modification within their borders and in the surrounding 10 km area. Although these findings present a positive outlook for the common hippo's future, there were three PAs that showed high levels of modification: Masai Mara Game Reserve, Lake Naivasha, and Murchison Falls National Park. More research is needed to identify appropriate management solutions to ensure that natural habitat is preserved within these PAs.

9 *Measuring Active Behavior in an Aging African Elephant (*Loxodonta africana*) in Captivity.*

Claire Carr and Evan Tucker

Faculty Sponsor: Sarah Boyle, Department of Biology

African elephants may live around sixty years, though their aging process is not well understood. Tyranza, the Memphis Zoo's fifty-one year old female African elephant, is the one of the oldest captive African elephants in North American zoos. The objective of this study was to determine whether Tyranza's active behaviors have decreased during the last four years, and whether temperature impacted her active behavior. Using an ethogram, Tyranza's behavior was recorded at two-minute intervals using the scan sampling method. The percent of time that Tyranza engaged in active behaviors was calculated to determine her overall activity level during the months of September (141 total hours) and February (186 total hours) over four years. The findings of this study will determine to what extent Tyranza's activity levels have fluctuated over time, and if temperature correlated with these fluctuations. These findings may be important for understanding activity levels and patterns of aging in captive elephants.

10 *Hemoparasitic infection prevalence in small mammals living in forest fragments in Paraguay*

Patrick Leavey III, Katharine Goebel, Alisha Patel, Aubrey Howard, Monali Lipman; Pérez-Estigarribia, Centro Multidisciplinario de Investigaciones Tecnológicas; Noé de la Sancha, Chicago State University; Laura E. Luque, Texas Christian University

Faculty Sponsor: Sarah Boyle, Department of Biology

Parasite ecology can be affected by forest fragmentation. The purpose of this study was to characterize and compare the hemoparasitic infection prevalence in small mammals in relation to the size of their forest fragment habitat (six sampled fragments: 2-1200 ha) in the Tapytá Private Reserve, Paraguay. We collected blood samples from 134 individuals and then analyzed the slides from the specimens via light microscopy. Hemoparasitic infections were found in all six forest fragments and all four genera of small mammals captured. Of the individuals captured, 56.25% were healthy, while 43.75% were infected: 71.43% of *Gracilinanus*, 56.82% of *Oligoryzomys*, 51.85% of *Akodon*, and 50.00% of *Micoureus* were healthy. The most frequently observed infections were *Babesia* and bacterial infections including *Anaplasma* and *Mycoplasma*. By comparing infection rates with fragment size, we are able to explore relationships between forest fragmentation and parasite ecology within rainforest communities that may be applicable to other ecosystems.

11 Identifying the Cleavage Site of *Drosophila* Dispatched

Jordan Kugler, Daniel Stewart, Stacey Ogden, Department of Cell and Molecular Biology, St. Jude Children's Research Hospital

Faculty Sponsor: Jonathan Fitzgerald, Department of Biology

The Hedgehog (Hh) signaling pathway, known to play a conserved role in embryonic development, can be deregulated in human cancers. The Dispatched (Disp) transmembrane protein is necessary for Hh release from the cell. Exogenously expressed *Drosophila* Disp proteins in western blot analysis reveal two distinct forms of Disp, ~145 kDa and ~110 kDa. Our proposed model is that the ~110 kDa form results from a cleavage event. We wanted to identify the site of cleavage within the Disp DNA sequence. Our lab used multiple methods to find the cleavage site. This study set out to identify the site by recreating the ~110 kDa form in western blot analysis. We inserted one stop codon at a time into the *Drosophila* Disp sequence around the extracellular loop 1, the proposed site of cleavage. We transfected the DNA with early stop codons into c18 cells and then examined protein size by western blot analysis. We were able to create a form of Disp around 110 kDa, helping us narrow down the real site of cleavage. These results have implications for better understanding the release of Hh.

12 Placing the *Aspergillus nidulans* SepA gene under control of an AlcA Promotor ■

Peter Daniels

Faculty Sponsor: Terry Hill, Department of Biology

The fungus *Aspergillus nidulans* is closely related to the opportunistic infectious fungus *Aspergillus fumigatus*. By understanding the mechanisms of growth and reproduction in *A. nidulans* we can gain knowledge of the same processes in *A. fumigatus*. Prior research has shown that the protein SepA is involved with the cytokinesis of *A. nidulans* cells by specifically interacting with the contractile actin ring (Harris et al, 1997). By placing the SepA gene (AN6523) under the control of the AlcA promoter the gene expression can be controlled via the addition of ethanol if grown in a glycerol medium (Romero et al, 2003). Using Fusion PCR and performing a fungal transformation lead to the creation of a mutant *A. nidulans* strain with the AlcA promoter directly in front of the SepA gene. The new mutant strain will be used to monitor the growth of the fungus while controlling the expression of SepA.

13 Investigation of a gene governing cell wall integrity in *Aspergillus nidulans*

Jennifer Loome

Faculty Sponsor: Terry Hill, Department of Biology

Previous work with *Aspergillus nidulans* identified several strains exhibiting hypersensitivity to Calcofluor-white (CFW), which binds to fungal cell walls and weakens their integrity (Hill et al., 2006). A plasmid containing wild-type gene AN2880 complemented one such strain (calF7), producing a wild-type phenotype. I performed a deletion and knockdown of AN2880, which both produced the hypersensitivity phenotype, further suggesting that the gene AN2880 is responsible for the hypersensitivity. A GFP tag of AN2880 showed that its protein localizes in the Spitzenkörper, an organelle that is active in hyphal tip growth. Bioinformatics data revealed that the AN2880 protein has a structure characteristic of membrane proteins. This analysis also showed that AN2880, while it has no homologous sequences to well-studied fungal genes, has a sequence homologous to the DUF221 domain in plants. This domain occurs in calcium-ion channels that regulate the tip-high calcium gradient in growing pollen tubes. Because growing hyphae also have a tip-high calcium gradient and the AN2880 protein localizes in the tip, AN2880 may also code for a calcium ion channel. I engineered a genetically encoded calcium ion indicator (GCaMP) and transformed *Aspergillus nidulans* with it. I will visualize cytosolic calcium levels in wild type, AN2880 deletion, and AN2880 knockdown strains in order to determine whether the gene's function affects the tip-high calcium ion gradient.

14 *Localization of Paxillin B in Aspergillus nidulans is affected by separate gene deletions*

Mac Williamson

Faculty Sponsor: Terry Hill, Department of Biology

Paxillin B (PaxB) is a protein found in the fungus *Aspergillus nidulans* that is suspected to play a role near the cell membrane and cell wall as a scaffolding protein. We have used GFP tagging to show that PaxB localizes to growing hyphal tips and to sites of septation (sites of cell division). This finding led us to hypothesize that PaxB plays an integral role in growth and division. Part of this hypothesis was supported when we deleted the gene that encodes for PaxB from the *A. nidulans* genome and found that formation of septa was impaired. Most recently, we generated strains expressing GFP-tagged PaxB, but which are aseptate due to mutations in other proteins. We have observed that absence of these separate gene functions has little effect on localization of PaxB to sites of cell growth and strong inhibitory effect of localization of PaxB to sites of septation.

15 *Visualization and downregulation of SepG, an IQGAP protein in Aspergillus nidulans*

Ben Haugen

Faculty Sponsor: Terry Hill, Department of Biology

The SepG gene has great significance in *Aspergillus nidulans*. It is a member of the IQGAP family of scaffold proteins, playing a role in cytokinesis (cell division). There has also been a twenty year mystery of the identity of the SepG1 mutation, which prevents cells from forming septa during division. Previous work by Dr. Terry Hill and student Kristen Wendt identified the SepG gene as AN4963 by crossover mapping. They identified the SepG1 mutation as a G-to-A transition at position 5082 of the 5333-nucleotide open reading frame, and were able to conclude that IQGAP has a role in enabling the actin/myosin ring to contract during cytokinesis, but it is not required for ring formation. My current work is a follow-up to this study, and we are attempting to tag SepG with an N-terminal GFP tag again. My aim is to achieve a more reliable method for tagging that gene than was used in the previous work. A construct has been generated and transformed, we are currently waiting to see if that work has been successful.

16 *Using Drosophila melanogaster to identify genes regulating muscle wasting*

Ben Haugen, and Gary Lindquister, Liam Hunt, Department of Developmental Neurobiology, St. Jude Children's Research Hospital; Dr. Fabio Demontis, Department of Developmental Neurobiology, St. Jude Children's Research Hospital

Faculty Sponsor: Terry Hill, Department of Biology

Our goal for this study was to identify genes that mediate muscle cell size. Atrophy of muscle cells is a common outcome of cancer, aging, and diabetes and can exacerbate the other effects of these diseases. We began tests on previously identified negative regulators of muscle size via tissue specific overexpression and RNAi silencing in *Drosophila melanogaster*. The genes identified in this experiment were subsequently tested for influence on other tissue types by measuring eye size of *D. melanogaster* flies; we found several genes that negatively affected eye size. To test whether the mammalian homologues are associated with muscle wasting we examined mouse and muscle cell culture models. qPCR showed up-regulation of these genes under starvation and other atrophy conditions, giving evidence that these genes could mediate atrophy in starvation-induced muscle wasting. We also identified a gene of interest, Ubr4 which was shown to mediate muscle hypertrophy by RNAi silencing. Work is currently underway to transduce muscle cells with genes we have identified as possibly inducing atrophy—those found to be up-regulated under atrophic conditions—to test whether it is the up-regulation of these genes that induces atrophy.

17 *A novel gene shows characteristics of microtubule-based movement in Aspergillus nidulans*

Brian Lenny and Terry Hill

Faculty Sponsor: Terry Hill, Department of Biology

In order to investigate the role of a gene (known as AN1156) in the filamentous fungus, *Aspergillus nidulans*, we have inserted the gene encoding GFP (green fluorescent protein) into the genome in such a way that the normal gene product of AN1156 will carry a fluorescent tag at its C-terminus. Results from this GFP-tag show localization of the AN1156 gene product to small cytoplasmic particles, which exhibit rapid movement. This rapid motion is consistent with the activities of certain microtubule interacting proteins. To test whether the motion of these particles is indeed microtubule based, we added a microtubule destabilizing chemical benomyl to the GFP tagged fungi and observed the AN1156 particles through a fluorescence microscope. After destabilizing the microtubules, we observed that the AN1156 particles stopped moving. Furthermore, a strain of fungi that expresses the GFP tagged AN1156 product and contains a dynein mutant known as nudA shows that the AN1156 protein localizes to the tip of the hyphae instead of

the cytoplasm. Since dynein interacts with microtubules and travels from the tip towards the cytoplasm it makes sense that when the function of dynein is reduced, the particles containing the AN156 protein are left in a higher concentration in the tip. This is more evidence that this novel protein is associated with particles whose motion is microtubule-based.

**# 18 *The WISP1 Signaling Pathway: Effects of SMAD4 and MMP13 Knockdowns on Tumor Metastatic Capability* ■
Saniya Rashid, Sharon Wu, Hong Jia, Ophélie Martinot, Myriam Labelle, Department of Developmental Neurobiology, St. Jude Children's Research Hospital**

Faculty Sponsor: David Kabelik, Department of Biology

Tumor metastasis is the leading cause of cancer-related deaths worldwide. To metastasize through the body, tumor cells must invade surrounding tissues, travel through the circulation, and seed in distant organs. WNT1-inducible-signaling pathway protein (WISP1) is a secreted protein that regulates cell migration, and its expression has been linked to the metastatic capacity of cancer cells. The goal of our research is to define the molecular pathways associated with WISP1 expression and their effect on metastasis. Our laboratory has identified the matrix metalloproteinase 13 (MMP13), as a candidate downstream element of the WISP1 signaling pathway. I was able to knockdown Mmp13 in tumor cells, which was verified through quantitative PCR assays (MMP13KD1= 90.50% KD, MMP13KD2= 96.73% KD, MMP13KD3= 93.97% KD vs. non-targeting vector control). We will next perform in vivo and in vitro assays to test whether these knockdowns of Mmp13 phenocopy knockdowns of Wisp1 and influence metastasis. My project also investigates the involvement of the transcription factor SMAD4 on Wisp1 regulation. I am now working to knockdown Smad4 to determine its role in TGFβ1-induced Wisp1 expression. We hypothesize that SMAD4 will act as a key transcription factor mediating Wisp1 expression and that its downregulation will lead to reduced TGFβ1-induced Wisp1 expression. Our hope is that this research will lead to a better understanding of the role of Wisp1 in cancer metastasis.

19 *Serotonin activity in the male brown anole (*Anolis sagrei*) after social behavior encounters*

Jacob Hartline and Alexis Smith

Faculty Sponsor: David Kabelik Error! Bookmark not defined., **Department of Biology**

Currently, the role of serotonin (5-hydroxytryptamine) in social behavior regulation is not fully understood. While it has been shown to have an inhibitory effect on aggression in mammals, reptiles, and birds, much less is known about its effect on courtship. This study utilized immunohistochemistry to examine the colocalization of 5-HT and fos, an immediate early gene product and marker of neural activity, in brown anoles (*Anolis sagrei*) exposed to aggression, courtship, and control social interactions. Consistent with previous research, percent activation of 5-HT neurons was negatively correlated with frequency of aggressive behaviors. Interestingly, animals exposed to the courtship interaction showed significantly lower 5-HT neuron percent activation than controls, while those in the aggression interaction trended towards the same effect. This study is part of a larger study looking into the interaction of multiple neurotransmitter systems and their effect on target nodes of interest to the social behavior neural network.

20 *gB gene shows neurovirulence in clinical and natural strains of herpes simplex virus 1.*

Cassidy Guida and Gary Lindquister

Faculty Sponsor: Gary Lindquister, Department of Bioogy

Herpes simplex virus 1 (HSV-1) is the herpes simplex virus associated with cold sores of the mouth. The virus through initial primary infection with mucosal surfaces, replicates and the capsid is transported retrograde by neurons to the dorsal root ganglia where it can continue replication and establish latency (1). Herpes simplex encephalitis (HSE) is still one of the most fatal central nervous system infections despite antiviral therapy (2) and understanding the viral DNA of herpes simplex can help to design better-prolonged therapy. Several genes have been associated with HSV-1 neurovirulence in mouse models including gB (UL27) (3,4), ICP34.5 (5), and UL49 (6). Our study has taken virulent HSV-1 strains, grew them in primate culture cells and then isolated viral DNA from those cultures. Isolated DNA was amplified through PCR with gB primers, known regions of neurovirulence. Comparative analysis of the amplifications across the different clinical and natural strains are expected to show genetic similarity, however, there is a possibility that some of the viruses do not carry changes in the genes that are associated with neurovirulence or present other unidentified genes that would have significance in future research.

21 *Determining the DNA sequence requirements for heterochromatin formation in *S. pombe**

Patrick Smith

Faculty Sponsor: Bayly Wheeler, Department of Biology

The genomes of eukaryotic organisms are packaged into two distinct types of chromatin: heterochromatin and euchromatin. Heterochromatin is a highly condensed form of chromatin that has essential roles in partitioning genetic information during cell division and in silencing gene expression. In the fission yeast *S. pombe*, and higher eukaryotes, heterochromatin is associated with repetitive DNA sequences. The L5 element is a 1.6 kb repeat that is sufficient for heterochromatin recruitment in fission yeast. While the protein machinery that establishes heterochromatin at L5 has been well studied, the specific sequence features that recruit heterochromatin to this repetitive DNA sequence are unknown. To identify the DNA sequences within L5 that are required for heterochromatin formation, we are using an error-prone PCR technique to engineer versions of L5 containing a limited number of random mutations throughout the repeat. Mutations that abrogate the ability of L5 to recruit heterochromatin and silence gene expression will be identified based on monitoring the expression of a reporter gene. This work will allow us to identify the specific base pairs that are important for the function of L5 and will inform future studies determining how key heterochromatin proteins are recruited to repetitive DNA in *S. pombe*.

22 Alert Adherence Assessment for Etoposide Allergy Alerts

Saunders Alpaugh

Faculty Sponsor: Kimberly Brien, Department of Chemistry

Etoposide is an antineoplastic chemotherapy agent that is used to treat pediatric cancer. While common among oncology treatment regimens, its use may result in moderate to severe adverse drug reactions. Symptoms of reactions include flushing, respiratory problems, changes in blood pressure, and abdominal pain with or without nausea and vomiting. In an effort to enhance patient safety, many electronic health record systems are enabled with clinical decision support, which has features to interrupt clinician workflow with alerts that warn of a potential adverse drug reaction. This study reviewed clinician responses to interruptive alerts for potential adverse drug reactions in patients who had previously documented reactions to etoposide. Data were collected retrospectively from St. Jude electronic health records from 2009 to 2015. Alerts were presented to clinicians upon ordering or modifying etoposide orders, with discrete or non-discrete instructions on how to prevent adverse drug reactions. Alert adherence was defined by conforming to instructions within the alert content. We observed that 94.1% of etoposide allergy alerts were adhered to clear instructions. Furthermore, as practices have changed, clear prescribing instructions increased each year within the study. These findings suggest that clear drug-allergy instructions can enhance the rate of clinician adherence to interruptive alerts.

23 Utilizing Ultraviolet-Visible Spectroscopy to characterize transition metal chelation of 2,6-bis-hydrazinopyridine-derived complexes

Maggie Jones

Faculty Sponsor: Kimberly Brien, Department of Chemistry

Hydrazinopyridines have remarkable promise as platforms for the construction of new transition metal ligands. Previous work has demonstrated that 2,6-bis-hydrazinopyridine (BHP) gives access to a wide variety of 2,6-bis-pyrazolopyridines. However, hydrazones of BHP have hardly been reported and have not been evaluated as metal ligands. We undertook the preparation of hydrazones from 2-hydrazinopyridine and BHP for evaluation as metal ligands, as well as a tetraphenyl compound derived from BHP. The characterization of the chelation of these ligand complexes via Ultraviolet-Visible Spectroscopy allows for quantification of chelation, versus qualitative color changes previously seen in these studies. We report the synthesis and characterization via Ultraviolet-Visible Spectroscopy of these readily prepared, stable compounds.

24 Synthesis of Novel, Unnatural Amino Acids and Their Use in the Design of Antibiotic Peptides

Zain Virk, Quentin Buck, and Roberto de la Salud Bea

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

It is well known that modifications in the sequences of peptides can produce significant changes in their original properties. Building off this principle, our group has previously synthesized a library of peptides with antibiotic activity by making systematic substitutions of amino acids on well-defined points in the sequence of original antibiotic peptides found in scorpion venom. Despite our success, we were limited by the use of natural amino acids for the substitutions. To have greater control over the characteristics of these peptides, we decided to create a library of novel, unnatural amino acids with specific properties such as hydrophobicity or hydrophilicity that can then be used to modify the original peptide sequences. In order to prove this principle, we have already synthesized three peptides with two unusual hydrophilic amino acids: ornithine, which is not one of the essential amino acids, and methionine sulfoxide, which is unnatural. Descriptions for the synthesis of these peptides and their sequences will be presented.

25 Synthesis of Zn(Tp*)Cl and Binding of Anti-Microbial Substrates

Daniel Oliver and John Dewar

Faculty Sponsor: Will Eckenhoff, Department of Chemistry

The LPXC enzyme is needed for the first committed step in the biosynthesis process of cell membranes in bacteria. The active site of LPXC contains a zinc ion, which can be artificially inhibited using compounds that mimic the substrate, to prevent growth of harmful bacteria. The active site of LPXC can be modeled using ZnTp complexes and binding of various substrates can be investigated. Zinc models using Tp and Tp* (Tp = tris(1-pyrazolyl)borohydride, Tp* = tris(3,5-dimethyl-1-pyrazolyl)borohydride) ligands were attempted in this work. Using the TP ligand lead to the formation of the bis-TpZn complex, which would be inactive for binding studies. Alternatively, using Tp*, we were able to synthesize Zn(Tp*)Cl, which will be an ideal mimic of the LPXC active site. Binding of acetohydroxamate as a mimic of the drug substrate was confirmed through ¹H NMR. Binding studies of the antimicrobial substrates were then carried out using UV-vis.

26 Synthesis and Characterization of Cobalt and Nickel Schiff Base Complexes for Artificial Photosynthesis

Omid Taghavi

Faculty Sponsor: Will Eckenhoff, Department of Chemistry

Over the next century, the world's population is expected to increase at a drastic rate; therefore it is essential to consider new and more efficient sources of energy such as the use of artificial photosynthesis to generate hydrogen gas. Hence, the development of more active and robust catalysts is necessary in order to make artificial photosynthesis a viable method of hydrogen generation. Recent studies have shown that cobalt complexes with polypyridyl groups are highly active and thus lead to a lower overpotential and higher turnover rate of hydrogen gas. Using 1,1'-(pyridine-2,6-diyl)bis(2-(pyridin-2-yl)ethyl)ethan-1-imine is a promising ligand to study due to its electronic similarity to previously used ligands for cobalt catalyzed hydrogen production. However, the two pyridine substituents may act as pendant bases, enhancing its activity. Furthermore, these pendant base groups can be changed to other basic substituents, allowing for the first example of such a catalyst to be "fine-tuned" for its ligand pKa. Cobalt and nickel complexes were synthesized with this ligand and were spectroscopically and electrochemically characterized.

27 PkcA/SepA interactions during fungal cell wall synthesis

Zainab Atiq, Elizabet Olsen, P.C. Parish, Terry Hill, and Loretta Jackson-Hayes

Faculty Sponsor: Loretta Jackson-Hayes, Department of Chemistry

Our work explores proteins that localize to sites of cell wall synthesis in filamentous fungi. In our model organism *Aspergillus nidulans*, protein kinase C (PkcA) is activated when the organism experiences cell wall stress. Here, we report our work on exploring a protein-protein interaction between PkcA and the formin SepA and investigating their roles in growth and cell wall integrity. PkcA and SepA localize to hyphal tips and septation sites. Using bimolecular fluorescence complementation, we found that SepA and PkcA physically interact at hyphal tips and septation sites. A mutation in sepA (sepA1) inhibits PkcA::GFP (green fluorescent protein) localization to septation sites, but not hyphal tips. Overexpression of PkcA in the sepA1 mutant strain does not complement the strain's hypersensitivity to the cell wall perturbing agents, but overexpression of sepA in a hypersensitive strain bearing a mutation in pkcA does. To further confirm the interactions between PkcA and SepA, a GAL4-based yeast two-hybrid experiment will be implemented. This entails fusing PkcA with the transcriptional activation domain of GAL4 and fusing SepA with its DNA binding domain. Physical interaction of the two recombinant proteins restores functionality of GAL4 activation activity, which we will monitor in a yeast system.

28 A potential partnership between UTX and 53BP1 in human cells

Sam Jordan, Jamy Peng and Dr. Brett Mulvey, Department of Developmental Neurobiology, St. Jude Children's Research Hospital

Faculty Sponsor: Dhammika Muesse, Department of Chemistry

Stem cells are unique in their ability to self-renew or to differentiate into a variety of cell types. These characteristics are regulated by epigenetic factors, which mediate heritable changes in gene expression without changing genomic sequences. UTX is one of the epigenetic factors critically influencing stem cells. Through interaction with known chromatin remodeling complexes, UTX mediates the activation of developmental genes that are important for stem cell differentiation. The UTX gene locus is of particular interest because it has been shown to be mutated at high frequencies in numerous human cancers. These results suggest UTX exhibits a regulatory role in human development and cancer. Previous data revealed 53BP1 as a potential binding partner of UTX. 53BP1 is involved in the repair of DNA double-stranded breaks. The main objective of my research project is to confirm the interaction of

UTX and 53BP1 and to determine if UTX functions in DNA damage repair. To accomplish this, I examined the localization of UTX and 53BP1 in H9 human embryonic stem cells (hESCs) by immunofluorescence before and after DNA damage induction. Upon gamma irradiation, I observed enrichment of UTX at DNA damage foci with 53BP1 providing further evidence of their partnership.

29 *Devising a Method Detection Limit to Determine the Major Essential Oil Components of *Sassafras Albidum**
Treston Norphlet and Jon Russ

Faculty Sponsor: Jon Russ, Department of Chemistry

The essential oil components of *Sassafras Albidum* are of interest for their role in creating recreational drugs; however these essential oil components can yield clues to prehistoric culture and rituals. It is thought that the root bark of the *Sassafras Albidum* tree was among one of the components smoked in Native American smoking pipes. In order to quantitatively or qualitatively determine if the root bark was used in a smoking pipe first the essential oil of the tree must be isolated and identified. Using solvent extraction methods (including Soxhlet extraction) the essential oils from the root bark of *Sassafras Albidum* was isolated and analyzed using GC/MS. Two major components of the essential oil, safrole and methyl-eugenol, were found by using the library search function of the GC/MS instrument. Creating a method detection limit to determine the threshold of detection of the instrument will indicate the accuracy essential oil components can be distinguished from smoking pipe residues that have undergone combustion.

30 *Organic Analysis of Residues from Noded Vessels from the Lower Mississippi Valley* ■

Julio Alejandro Lima Hooven, Natalie Prodanovich, and Jon Russ, and David H. Dye, Department of Earth Sciences, University of Memphis

Faculty Sponsor: Jon Russ, Department of Chemistry

Analysis of organic residues in ceramic vessels recovered from archaeological excavations have the potential to identify the substances Native Americans stored or processed in ceramic pots of various shapes, sizes and designs. In this study we analyzed residues extracted from a particular type of vessel that has unique designs covering the outer surface. It was recently proposed that these noded pots were used specifically to process *Datura* for religious ceremonies. *Datura* contains tropane alkaloids that have psychoactive properties that also make the plant dangerous if ingested; thus, the unique markings on the external surfaces indicated that these pots were not to be used for other purposes. Three jars were analyzed non-destructively by ultrasonically treating the whole pots directly in a 2:1 chloroform:methanol solvent mixture. A fourth jar was analyzed by removing surface material from multiple areas of the artifact using a Dremel tool. The extracts were derivatized using BSFTA and analyzed using gas chromatography/mass spectrometry (GC/MS). Our results indicate that atropine, one of the most abundant compounds in *Datura*, was below the detection limit but other alkaloids were identified. Nicotine was found on multiple chromatograms, which was notable because nicotine was not expected to appear on any of the pots.

31 *Electron Capture Detection Analysis of Derivatized Nicotine*

Shannon Speer and Jon Russ

Faculty Sponsor: Jon Russ, Department of Chemistry

Chemical studies of residues from smoking pipes recovered from Native American archaeological sites can provide important information on the substances that were smoked for religious ceremonies. Cases where nicotine is detected in the pipes sheds light on when and how tobacco spread across the North and South American continents which occurred several thousand years ago. For our study, we investigated the ability to detect extremely low concentrations of nicotine in archaeological artifacts based on the limit of detection for nicotine using a Varian CP-3800 gas chromatogram with an electron capture detector (GC-ECD). A chemical derivatization process using heptafluorobutyric anhydride (HFBA) and pyridine was used to enhance the detection of nicotine. The successful completion of nicotine derivatization was verified using Varian CP-3900 gas chromatogram mass spectrometer (GC-MS). We then analyzed dilutions of the derivatized solutions using the GC-ECD to measure the limit of detection (LOD). The on column limit of detection of the di-halogenated nicotine derivative was 828 picograms. We also analyzed extracts from two noded pot samples to determine whether nicotine was present. The extracts from the artifacts were also derivatized with HFBA, and the results from GC-ECD and GC-MS analysis of the revealed no detectable amount of nicotine present.

32 *Chemical Residue Analysis of Archaeological Smoking Pipes from the Southeastern United States*

Ryan Hunt and Jon Russ, Stephen Carmody, Department of Environmental Studies, University of the South

Faculty Sponsor: Jon Russ, Department of Chemistry

The chemical analysis of organic compounds extracted from the residues of smoking pipes found at indigenous archaeological sites in the southeastern United States provides insight into the smoking traditions and rituals of Native American peoples. This study examined residues directly scraped from pipes and pipe sherds housed in collections at the Fernbank Museum of Natural History in Atlanta, Georgia, and the McClung Museum of Natural History and Culture in Knoxville, Tennessee. The study aimed to determine whether compounds of interest such as nicotine were present in the residue, thereby expanding our knowledge of the contexts in which materials such as tobacco were used by indigenous people in the southeast. To characterize the chemical contents of the residues, organic compounds were extracted by ultrasonating the samples in methanol/chloroform solvent. An aliquot of each extract was then analyzed directly using gas chromatography-mass spectrometry (GC-MS), which allows for the determination of the residue's chemical composition. The results suggest the early cultures of southeastern North America engaged in a complex and diverse smoking tradition that included a wide array of natural materials.

33 *Molecular Considerations Leading to Inhibitor Specificity of Human Histone Deacetylase (HDAC): Tools for Selective HDAC Inhibitor Development* ■

Xavier May, Shanna Stoddard, Davita Watkins, Department of Chemistry and Biochemistry, University of Mississippi

Faculty Sponsor: Shana Stoddard, Department of Chemistry

Development of selective histone deacetylase inhibitors (HDACi) would allow for targeted therapeutic interventions for several cancers. The expression of the 18 different HDAC isozymes changes for different cancers, which make HDACi development an ideal target for selective cancer therapy. However, many current HDACi, lack the appropriate selectivity. In our study, we compared the modes of binding of several HDAC inhibitors and proposed inhibitor compounds in several different class of HDACs. Our goal was to determine if any common molecular interactions that lead to poor selectivity of HDACi could be identified, and if there were any molecular interactions that could be taken advantage of to design selective HDACi. An analysis of the binding interactions showed that several HDAC inhibitors are capable of binding to different HDACs using the same molecular interactions. We observed a double pi-pi stacking interactions between the F152 and F208 in the core of the HDAC8 receptor, metal ion coordination at the base of the receptor, and hydrogen bonding throughout the receptor. These same interactions were represented in several different classes of HDAC receptors. This data also suggests that these similarities in the binding site of the HDAC contribute to the poor selectivity.

34 *Imaging Ultra Luminous Infrared Galaxies with Integral Field Spectroscopy*

Eleanor Hook and David Rupke

Faculty Sponsor: David Rupke, Department of Physics

Integral Field Spectroscopy (IFS) is an astronomical technique that allows for collection of spectra across a field of view. This allows for the creation of a three-dimensional data cube, with two spatial dimensions representing the field of view and a third spectral dimension. This research focuses on data collected with the Integral Field Unit capabilities of the VIMOS instrument on ESO's Very Large Telescope, in which ultra luminous infrared galaxies are shown as extended objects in the data cube. These galaxies are of interest because they are common at high-z and are triggered by major mergers. However, in order to construct a data cube, it is necessary to use a series of data reduction techniques to eliminate or reduce various effects on the spectrograph by the atmosphere and the instrument itself. This data reduction is the focus of my research.

35 *Initial Results from a COS Survey of PG Quasars*

Anthony To, David Rupke, Sylvain Veilleux, Department of Astronomy, University of Maryland, CP

Faculty Sponsor: David Rupke, Department of Physics

We investigate 27 low-redshift ($z < 0.3$) quasars in the far ultraviolet with high signal-to-noise spectra from the Cosmic Origins Spectrograph on the Hubble Space Telescope. One quarter of these galaxies are found to have O VI (1032, 1038 Å) or N V (1239, 1243 Å) doublet absorption features, often with corresponding Ly α and Ly β absorption. Some of these profiles are indicative of outflowing, highly-ionized gas. We find both narrow and broad, blended features. We will present the results from preliminary fits of the absorption profiles.

36 *The relationship between acute stress reactivity and motivation for food in chronically stressed women*

Caroline Sumner, Allie Baldassaro, and Saniya Rashid

Faculty Sponsor: Rebecca Klatzkin, Department of Psychology

Given the predominance of psychological stress and obesity worldwide, a greater understanding of the relationship between stress and eating has never been more important. Research has supported a strong relationship between

perceived stress, both acute and chronic, and an increased drive to eat. Although individuals under chronic stress tend to eat more when confronted with acute stress, little is known about how chronic and acute stress interact to influence the drive to eat. Thus, we sought to examine hunger and desire to eat following acute stress in women with high versus low chronic perceived stress. Thirty-four undergraduate females rated their hunger, desire to eat, and anxiety both before and after an acute stressor consisting of a speech and math task. Cardiovascular factors of blood pressure and heart rate, as well as cortisol measurements, were taken throughout the study. Participants were separated into high versus low quartiles of chronic stress based on a self-reported chronic stress score. Results showed that women with high chronic stress had greater cortisol reactivity in response to the acute stressor compared to women with low chronic stress. Only in the high chronic stress group were ratings of hunger and desire to eat following stress positively associated with cardiovascular stress measurements and anxiety ratings. These results suggest that the relationship between stress reactivity and the drive to eat following stress may be particularly salient for women with chronic stress. This relationship, in addition to heightened cortisol stress reactivity, may help to explain the increased stress-induced eating seen in this group of women. Future studies measuring consumption of comfort foods following stress in women with high versus low perceived chronic stress are warranted to support these findings.

37 Parent and Child Learning in Traditional Museums

Shannon O'Brien, Amelia Mathis, and Samantha Newman

Faculty Sponsor: Jamie Jirout, Department of Psychology

Informal learning environments, like art museums, offer a shared educational experience for families. Although interactive exhibits are found to be especially effective for children's learning, researchers predicted that children could have those same learning benefits in traditional art galleries with appropriate parental guidance. This study investigated whether visiting art galleries provides children with similar opportunities to learn by promoting curiosity, novel ideas, and connection-making. Family conversations were recorded throughout their visit and coded for levels of conversation initiation, child's question asking, the child's desire to remain or leave, and whether the child made personal or transfer connections between the artworks. Researchers predicted that frequency of parent initiation would inspire the child to have greater curiosity toward the art, formation of novel idea, and developed connections. Through researching how families, and more specifically children, learn in informal settings, museums can cater their traditional galleries more toward child learning and further improve the children's learning potential in similar informal environments.

38 Identification of helicases that promote meiotic entry in *C. elegans*

August John, Vahag Kechejian, Washington University in St. Louis; John Brenner and Tim Schedl, Genetics Department, Washington University School of Medicine

Sponsor: Tim Schedl, Genetics Department, Washington University School of Medicine

In the *C. elegans* germline, a pool of germ cells is required to maintain a balance between mitotically dividing cells which can continue to replenish the pool, or differentiate to create meiotically dividing cells. The *glp-1* gene, which codes for a Notch signaling protein, is the main regulator gene in the distal most end of the germline, inhibits a meiotic fate and the loss of *glp-1* results in all germ cells entering meiosis leaving the germline empty. The *glp-1* gene actively represses entry into two redundant genetic pathways: the *gld-1* and *gld-2* pathways that promote meiotic entry, inhibit proliferative fate, and code for mRNA UTR binding proteins. The direct transcriptional targets between *glp-1* and the *gld-1* and *gld-2* pathways remain poorly understood. The focus of this study is to identify RNA helicase genes that act to promote meiotic entry. A weak gain-of-function *glp-1* allele was used to increase expression, and an *ar202* mutation was used so that the RISC complex used in RNAi is only active in the germline. RNAi by feeding, a post-transcriptional knockdown technique using *E. coli* with a plasmid that produces dsRNA for specific genes, was used to knockdown helicases of interest.

Social Sciences

39 *Gender Stereotypes in Mid-20th Century Antidepressant Advertisements*

Mary K. Mills, Elise B. Lowry, Miriam A. Maloney, Chloe R. Burkhead, and Jonathan Cook

Faculty Sponsor: Jonathan Cook, Department of Psychology

Previous research has identified the presence of gender biases in many psychoactive drug advertisements including those for antidepressants. The purpose of the current study was to identify the extent to which gender biases were present in antidepressant drug advertisements published in the American Journal of Psychiatry (AJP) between 1955 and 1964. A content analysis of 373 antidepressant ads published in AJP between 1955 and 1964 identified gender stereotypes in both the ad text and image content. Language differed in both positive and negative descriptions of male and female patients in antidepressant ads. Although men and women were featured with equivalent frequency in the total number of published ads, the depicted patient behaviors varied by gender. Female patients were often depicted in domestic roles such as preparing food, cleaning the house or caring for children while men were primarily depicted in occupational roles such as working behind a desk or interacting with other professionals. This research aims to elucidate the impact of gender disparities on antidepressant advertisements in the mid-20th century, as stereotypical depictions have the potential to distort physician expectations of typical behavior and may have led to differential prescription and treatment practices for male and female patients.

40 *The influence of map similarity on spatial-relational reasoning in a spatial scaling task*

Alexandra Howard

Faculty Sponsor: Jamie Jirout, Department of Psychology

Spatial-relational reasoning is important in learning science and mathematics. This study investigates children's ability to use spatial representations by investigating how performance is influenced by similarity between the representation and space it represents. Children ages 6 - 8 played a hide-and-seek game, using a map to find a star. The maps are white rectangles with a black outline, representing 48 possible hiding spaces on either a "similar" board (all white flaps) and a "dissimilar" board (checkerboard pattern). Performance was measured by children's ability to use the map to locate the star. Preliminary results show significant main effects of board type ($F = 12.76$, $p = .001$, $\eta = .34$) and age ($F = 12.85$, $p = .001$, $\eta = .34$), with higher performance on the dissimilar board and improvement with age, but also a significant interaction of age x board ($p < .01$, $\eta = .30$). Older children performed equally well on both boards, while younger children had higher performance on the dissimilar board. Thus, it appears that, as argued by Kotovsky and Gentner (1996), similarity can impede relational matching, at least in cases where understanding of the nature of the analogical mapping is not firmly grasped.

41 *Ability to Describe Strategy as it Relates to Performance in Spatial Study*

Elyssa Geer, Jamie Jirout

Faculty Sponsor: Jamie Jirout, Department of Psychology

Spatial scaling is an important form of spatial-relational reasoning which involves the ability to apply information acquired from a representation of an object or space to another of a different size. In this study, we investigate the way in which children represent space by asking children to use spatial scaling in a hide-and-seek task to find a hidden star; more specifically we ask how the child's explanation of their strategy is related to the effectiveness of that strategy in the spatial scaling hide-and-seek-task. Children were asked two questions about the strategy they used after each of two rounds (12 trials each). Responses were coded for level of complexity of explanation of relational thinking strategies (e.g., using a counting strategy vs. simply 'knowing' where the star is located). We investigated whether children's strategy explanation would relate to their performance. Specifically, we tested whether giving more detailed explanations of strategies (i.e., counting vs. simply knowing) related to poorer performance, and, more generally, whether children were able to explain relational reasoning strategies.

42 *Follow the Leader: How Parenting Style Influences Child Interest in Art Museums*

Katie Keller, Caroline Taufic, and Lucy Pitts

Faculty Sponsor: Jamie Jirout, Department of Psychology

Curiosity is second nature to children, especially when it is fueled by supportive authority figures. Children need a model to follow when exploring the world and a parent is the perfect person. Parents and the approach they take to interacting with their child can influence that child's experience. Not only do parents affect the experience but also they determine the child's interest in the topic, which can develop into a learning foundation. In this correlational study, the researchers investigate the relationship between various parental styles and child's interest. The study was

conducted at Memphis Brooks Museum using recorders and self-report questionnaires for the parents. There are five main parenting styles ranging from demonstrator to absent. The research is aiming to understand the optimal amount of parental involvement that parents should have in the learning process outside of the classroom. Many studies focus on the knowledge outcome of the child's curiosity and measure with an assessment but this study emphasizes the process before knowledge is gained, which is interest. Parents can have an influence in this to create the motivation to learn in the classroom.

43 *To Persist or Not to Persist: The Possible Benefits of Interactive Praise*

Sara Ewel and Anna Wohlbold

Faculty Sponsor: Jamie Jirout, Department of Psychology

A child's ability to persist through failure can be enhanced through their external environment. Specifically, praise that is given to a child in the form of a gesture has shown to increase persistence over both non-specific and specific and verbal praise respectively. Little is known, however, about whether physical interaction with gestural praise influences how it is perceived. This study investigates whether a child is more likely to persist through failure when given interactive gestural praise (i.e. high five) or passive gestural praise (i.e. thumbs up). In addition, this study will test the relations among gestural praise, motivation orientation, and mindset. Motivation orientation is categorized by either mastery based or performance oriented motivation, mindset can be fixed or malleable theory of ability, and persistence is measured by time-on-task and decision to try again. We predict that children (ages 4-6) will persist longer on a challenging puzzle when receiving physical than passive gestural praise. Additionally, we will investigate whether motivation orientation and mindset relate to persistence and interact with praise type.

44 *Stereotype Threat in Spatial Activities: How Gendered Beliefs Affect Performance in Young Children*

Emily Doherty, Bryn Terry and Anna Freymeyer

Faculty Sponsor: Jamie Jirout, Department of Psychology

This study examined whether spatial gender stereotype beliefs are present in kindergarten age children and if so, whether these beliefs affect spatial performance via a phenomenon known as stereotype threat. Possible related factors include perceived difficulty, parental attitude and socioeconomic status. The target population included 64 Kindergarten age children, half from a school serving lower socioeconomic populations and half from a school serving middle to upper socioeconomic populations. Children's implicit spatial-gender associations were assessed using a modified Implicit Association Task. Other measures included the Children's Mental Transformation Task, Stroop Day-Night Task, a measure of explicit spatial-gender stereotype beliefs, and a measure of child toy preference. Perceived difficulty of item set was manipulated through experimenter presentation. Results and discussion will emphasize the importance of understanding the role of social determinants on spatial ability in young children and provide further knowledge about the potential influences of gender differences on spatial performance.

45 *How Can Establishing Goals Influence a Family's Experience in an Art Museum?*

Tierney Linville, Erika Dillman and Katherine Slatten

Faculty Sponsor: Jamie Jirout, Department of Psychology

Previous literature on family learning in museums has stated that family units display a significant difference between types of speech throughout their museum visit (Knutson & Crowley, 2009). These different types of speech were exhibited through various levels of deep versus shallow talk. The current study examined whether the types of speech utilized would align with those in previous literature and extended this research by assessing whether family goals for the art museum visit relate to types of conversation used. Hypotheses were that family units' visit goals would correlate with the types of speech, and that the goals of the participants' visit affected the rate of each type of speech as well as the overall rate of art-related speech. Types of speech for family units were audio recorded during their visit to an art museum, and family goals were measured using a post-visit questionnaire. Findings from this study can inform museum coordinators interested in optimizing their family learning exhibits, parents' facilitation of family learning, and can add more specific data to the currently general studies on family learning in art museums.

46 *Training in Spaced Retrieval Results in Strategy-Dependent Memory Improvement*

Tierney Linville

Faculty Sponsor: Geoffrey Maddox, Department of Psychology

Research indicates that memory is enhanced for material that is repeatedly studied across time versus material that is studied in a single session (i.e. cramming), a technique known as spaced retrieval. Young and older adult participants were trained to use one of two spaced retrieval techniques to enhance memory for faces and names. Participants were instructed to use equal-spaced retrieval (using equal time intervals between study sessions) or

expanded-spaced retrieval (increasing the interval between subsequent study sessions). We measured participants' ability to implement the trained strategies and examined how implemented strategies influenced recall accuracy for face-name associations. Results indicated that both younger and older adults implemented each strategy with training. Although young adults used the experimenter-instructed time intervals, older adults implemented each strategy using longer intervals than instructed. With successful implementation of strategies, expanded-spaced retrieval produced a benefit in memory over equal-spaced retrieval when the interval between the final study event and the test was short. Equal-spaced retrieval had a benefit over expanded-spaced retrieval when the interval between the final study event and the test was longer. Discussion will focus on how and why implementation of these strategies may vary with age.

47 *Examining the Contribution of Desirable Difficult Reminders to the Spacing Effect*

Jessica Gatewood and Geoffrey Maddox

Faculty Sponsor: Geoffrey Maddox, Department of Psychology

Research suggests that spacing repeated study events enhances long-term memory compared to cramming study of material into one session (i.e., the spacing effect). The purpose of this study was to examine one account of the spacing effect, the reminding mechanism. The reminding mechanism suggests that the spacing effect depends on detecting that material is being studied for a second time; moreover, the more difficult it is to detect that material is being repeated, the stronger the long-term memory will be for that material (Bjork, 1994). Across experiments, participants studied sixty words that were repeated after varying lags (i.e., 1 or 5 intervening items), and were asked to make a yes/no judgement about whether they had previously seen the word or not. After a 1 minute delay, participants completed a final recognition test (Experiment 1) or recall test (Experiments 2 and 3). Results indicated that reminding difficulty was similar across spacing conditions. Nonetheless, results revealed a significant spacing effect (i.e. repetitions separated by five items were better remembered than repetitions separated by one item). Although the results do not support the reminding and difficulty account, they are consistent with an alternative, encoding variability account.

48 *Examining the Influence of Task Difficulty on Participant Choices to Mass or Space Retrieval Practice*

Claira Winget and Zach Kauffman

Faculty Sponsor: Geoffrey Maddox, Department of Psychology

Two theories offer competing predictions regarding the way that people prioritize to-be-learned material and the strategies that they then use to learn that material. Dunlosky and Hertzog's (1998) Discrepancy-Reduction Model suggests that people will prioritize material that requires the most attention to be fully mastered. In contrast, Metcalfe's Region of Proximal Learning model (2004) suggests that people will prioritize material that requires the least attention to be fully mastered. In the current study, participants were asked to learn a series of names associated with pictures of faces and then to implement their own spacing strategies when re-studying those face-name pairs during a secondary task. Research suggests that the optimal way of mastering face-name associations in the current task is to repeatedly study the associations with time between each study instance. In this way, spacing difficult-to-learn material would lead to better memory performance of than massing that material. The current study manipulated difficulty of material in two ways. In Experiment 1, participants learned different numbers of face-name pairs across trials (4 vs. 12 pairs). In Experiment 2, participants learned the same number of face-name pairs across trials, but pairs were presented for different amounts of study time (2 seconds vs. 8 seconds per pair). Results will be considered with respect to how differing demands on encoding and retrieval practices influence the study strategies that participants choose to use.

49 *Remix to Cognition: Translating the Spacing Effect of Verbal Learning to a Rhythm Paradigm*

Camille Smith, Geoffrey Maddox and Courtenay Harter

Faculty Sponsor: Geoffrey Maddox, Department of Psychology

The benefit of spacing study events over massing study events has been established using verbal material. Individuals generally remember information studied multiple times with some space or time between study sessions better than information studied for one extended period of time (Balota, Duchek & Logan, 2007). However, does the spacing effect observed in verbal learning paradigms translate to non-verbal materials, such as memory for rhythmic patterns? Although research suggests that multiple exposures to music increases recognition of repeated musical units (Margulis, 2012), memory for these repeated units has not been measured. To address this question, the present study examined the effects of spacing on memory for repeated rhythmic patterns. Repeated rhythms were separated by varying intervals (0, 5, or 9 intervening musical measures) in which fillers between these repeated rhythms made them easy or difficult to detect as repetitions. Following each trial, participants were presented with the repeated

rhythms they had previously heard and lures that resembled those rhythms. Participants were then asked whether they heard the measure as well as their confidence level in their recognition. Results of this study will be considered with respect to the spacing effect of verbal learning's ability to explain rhythmic stimuli.

50 *"Oh shit—I wasn't expecting that!" The Influence of False Expectations on Cognitive Control During Speech Production*

Camille Smith and Clairia Winget

Faculty Sponsor: Katie White, Department of Psychology

Research indicates that emotional words, particularly taboo words, interfere with speech production. However, informing people of upcoming taboo words can minimize their interference, suggesting that people can engage proactive cognitive control to mediate interference. The current study investigated whether proactive control, a resource-demanding cognitive process, would be engaged when cues were not 100% reliable in anticipating taboo words. Participants completed a picture-word interference task where they named pictures in the presence of distracting words that were taboo, negative, or neutral in valence. Cues indicated which type of distractor would be present on the subsequent trial, but these cues were valid for either 75% of trials (Experiment 1) or 25% of trials (Experiment 2) Results of both experiments showed slower picture naming when distractors were taboo words compared to negative or neutral words. Furthermore, the presence of invalid cues slowed participants' picture naming times (for both validly- and invalidly-cued trials) relative to uncued trials. This research has implications for the Dual Mechanisms of Control theory, and more broadly for the study of emotion, cognitive control, and speech production.

51 *Caution Ahead: Using Anticipatory Mechanisms to Reduce Interference in Speech Production*

Lisa Hsi, Emily Watkins, Hannah Porter, and Nicolette Glidden

Faculty Sponsor: Katie White, Department of Psychology

There are two ways humans handle distracting information: by reacting after distraction is detected, or by anticipating it. This research investigated how these reactive and anticipatory cognitive control mechanisms reduce interference during speech production. Participants named pictures that were superimposed with distracting words that were emotional (taboo or negative) or neutral in valence. Previous research has shown that participants engage reactive control to inhibit distractors and name the pictures. In the two experiments, we manipulated the use of the anticipatory mechanism called proactive control by presenting cues that indicated whether the next trial would display a taboo, negative, or neutral distractor. Cued trials were either presented in blocks (Experiment 1) or mixed with uncued trials (Experiment 2). Experiment 1 showed that cues reduced taboo interference, i.e. picture naming was faster when taboo trials were cued relative to uncued. We expect a similar reduction of interference in Experiment 2. These results will provide better understanding of the role that cognitive control plays in regulating interference in speech production.

52 *Maladaptive Coping Behaviors: The Influence of Minority Stressors in the Transgender Community*

Amanda Toumayan, Rachel Farley, and Zach Kaufman

Faculty Sponsor: Rylan Testa, Department of Psychology

Prior research has found that minority stress can be caused by experiences of prejudice and is associated with maladaptive coping behaviors. While previous literature has shown that minority stress is related to substance use in the LGB community, little literature examines these outcomes in transgender people. In this study we investigate the role of minority stress, in particular internalized transphobia and negative expectations, and the role it plays on substance use. We predict that individuals with higher levels of these minority stressors will also report higher instances of substance use. A convenience sample of 1414 individuals who identify as a gender different than their sex assigned at birth participated in an online survey assessing gender-related stress, resilience, and mental and physical health outcomes. To assess internalized transphobia and substance use we will utilize the Transgender Identity Scale and the Negative Expectations for Future Events Scale, the Drug Abuse Screen Test (DAST), and the Alcohol Use Disorders Identification Test - Consumption (AUDIT-C). Analyses will explore how internalized transphobia and negative expectations influence substance use in people with different gender identities. This study aims to contribute to a better understanding of the negative effects minority stress has in the transgender community.

53 *Substance Abuse Differences in Transgender Participants with Eating Disorders due to Emotion Regulation*

Olivia Summitt, Conor Monks and Katie Gleason

Faculty Sponsor: Rylan Testa, Department of Psychology

Previous studies have shown emotion regulation similarities among people suffering from eating disorders and substance abuse. It has also been shown that the Transgender community are more at risk for eating disorders and substance abuse. However, there is not currently research discussing how emotion regulation relates to these factors in this population. A convenience sample of 1414 individuals whose gender identity was different from their sex assigned at birth participated in an online survey assessing gender-related stress, resilience, and mental and physical health outcomes. Only a subset of this sample who indicated that they had an eating disorder were used. In this study, substance abuse was evaluated with the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) and the Drug Abuse Screen Test (DAST). Based on answers to an open-ended question related to the connection between eating disorders and gender identity, we divided the participants with eating disorders into two groups, one that uses disordered eating for emotion regulation and one that does not. Statistical analysis will explore the differing rates of substance abuse in the emotion regulation and control groups. Results will be discussed within theories of gender minority stressors and emotion dysregulation.

54 *The Effects of Non-Affirmation on Social Anxiety in the Transgender Community*

Caleigh Shepard, Forrest Lloyd, and Molly Mulhern

Faculty Sponsor: Rylan Testa, Department of Psychology

Recent literature has shown that gender minorities experience greater levels of psychological distress and mental illness. Specifically, past literature has found that acceptance of gender-nonconforming individuals has led to a decrease in social anxiety and depression. Another study using a survey of 571 transgender women found that non-affirmation of their gender identity led to higher levels of major depressive disorder. However, past literature lacks information regarding the effects of non-affirmation on social anxiety. In our current study, a convenience sample of 1414 individuals whose gender identity was different from their sex assigned at birth participated in an online survey assessing gender-related stress, resilience, and mental and physical health outcomes. Non-affirmation was measured with a sub-scale of the Gender Minority Stress and Resilience Measure. The Mini-SPIN was used measure social anxiety disorder symptoms. In addition, questions about perceived affirmation by others and whether or not these individuals lived in their affirmed gender were asked. The correlation between social anxiety and non-affirmation will be analyzed. This research will lead to a better understanding of how non-affirmation can lead to mental illness, specifically social anxiety.

55 *Categorization by Race or Social Class: Do we, as a society tend to categorize people more by their race or by their perceived class*

Katrina Cymerman and Matthew Weeks,

Faculty Sponsor: Matthew Weeks, Department of Psychology

As a discipline, social psychology is putting more focus on membership in different social class standings. With the current national climate on race and the confound between an individual's social class identification and race, we believe it is important to disentangle judgments of others based on their perceived social class versus their race. Specifically, in this study, we were interested in the extent to which people categorize others by race and social class. Given the social significance of racial group membership, we expected social categorization to occur along racial lines, but we also expected to see significant categorization of others based on their social class membership. We used a statement recognition paradigm to assess the categorization of social targets along racial and social class group memberships, testing whether participants misattributed statements that were made during a discussion along racial or social class dimensions. Our results suggest that race categorization dominates over class categorization, but the latter effect could interact with a participant's social class identification. We can continue to use this paradigm to assess factors that influence social class categorization, such as motivational goals or interpersonal threat.

Biology 141

56 *Effects of various substrates on duckweed growth*

Meryl Musicante, Claire Levesque, Arati Joshi, Layla Jubrial-Jaber

Faculty Sponsor: Tara Massad, Department of Biology

57 *Effects of different N-P fertilizer ratios on pansy plant growth*

Sapna Kedia, Jessica Doan, Joseph You

Faculty Sponsor: Tara Massad, Department of Biology

58 *Varying acidities of saltwater on diatom growth*

Molly Litten, Ruth Scott, William Mitchell

Faculty Sponsor: Tara Massad, Department of Biology

59 *Effects of murkiness of water on crayfish habitat preference*

Jill Healy, Siena Mazzetti, Chelsea Dezfuli

Faculty Sponsor: Tara Massad, Department of Biology

60 *Effects of scent of lavender oil on crayfish aggressive behaviors*

McKay Warren, Sam Quinn, Sarah Normand

Faculty Sponsor: Tara Massad, Department of Biology

61 *Cricket preference for varying light intensities*

Jackson Vaughan, Christopher Parish, Casey Middleton

Faculty Sponsor: Tara Massad, Department of Biology

62 *Will a crayfish be more aggressive after exposure to its own reflection, when it is introduced to another?*

Colleen Hulsey, Elsabet Olsen, Ashmeet Singh

Faculty Sponsor: Tara Massad, Department of Biology

63 *Effects of Wave Action on Duckweed Growth*

Candace Hayes, Trey Sledge

Faculty Sponsor: Michael Collins, Department of Biology

64 *Effect of Light Intensity on Crayfish Agonistic Behavior*

Paul Passalino, Evan Roark, Rachel Windmueller

Faculty Sponsor: Michael Collins, Department of Biology

65 *The effects of circadian rhythm on stomatal aperture size in plants*

Mallory Earle, Will McIntyre, Filoteia Popescu

Faculty Sponsor: Michael Collins, Department of Biology

66 *The Effect of Various Light Conditions on the Male Chirping Patterns in Crickets*

Ben May, Allie Young, Celeste Bryant

Faculty Sponsor: Michael Collins, Department of Biology

67 *Do crayfish exhibit territorial behavior based mainly on visual cues?*

Darby Larson, Aileen Qin, Katie Stansberry

Faculty Sponsor: Michael Collins, Department of Biology

68 *Are male crayfish or female crayfish more aggressive?*

Priya Blackerby, Kyle Cahill-Patray, Andy Nguyen

Faculty Sponsor: Michael Collins, Department of Biology

69 *Is substrate preference of crayfish determined by color of substrate as a mechanism for defense?*

Lauren Gann, Emily Harrison, Jelly Henkelmann

Faculty Sponsor: Michael Collins, Department of Biology

70 *Red and blue light's influence on phototropic response of Brassica rapa*

Ericka James, Lana Nelson, Brennan Newton, Christopher Turrill

Faculty Sponsor: Melody Durrett, Department of Biology

71 *Can a crayfish be conditioned to differentiate color?*

Isabelle Blaber, JB Hayes, Callie Parsons

Faculty Sponsor: Melody Durrett, Department of Biology

72 *Male cricket aggressiveness toward other males of varying chirp pitch*

Tabitha Joyner, Patrick Richardson

Faculty Sponsor: Melody Durrett, Department of Biology

73 *Can crayfish be trained to distinguish color?*

Emma O'Donnell, Marlena Roberson-Bullard, Kaylin Ryan

Faculty Sponsor: Melody Durrett, Department of Biology

74 *Growing in Memphis: Does Memphis music affect plant growth in Zinnia spp.?*

Alexandra Bartlett, Laurel Sharp, Ellie Sommerkamp, Jessica Zweifel

Faculty Sponsor: Melody Durrett, Department of Biology

75 *Is the appetite of a hornworm influenced by the presence of a predator?*

Matthew Dale, Emily Forehand, Sarah Hatfield, Erin Patin

Faculty Sponsor: Melody Durrett, Department of Biology

Keynote Speaker

Michael A. Long, PhD

Assistant Professor, New York University School of Medicine
New York Stem Cell Foundation - Robertson Neuroscience Investigator
<http://longlab.med.nyu.edu/>

How does the brain generate behavioral sequences?

For us to interact with the outside world, the brain must plan and dictate our actions and behaviors. In many cases, we learn to reproducibly execute a well-defined series of muscle movements to perform impressive feats of motor skill, such as hitting a golf ball or playing the violin. Despite their centrality to everyday life, however, the neural basis of these behaviors are poorly understood. Our work seeks (1) to identify the relevant brain regions involved in these movements and (2) to investigate their functional properties during natural behavior. To accomplish this, we have developed a number of cutting-edge techniques to monitor and manipulate an identified cortical locus in the zebra finch brain that enables singing, and we have recently extended these observations to the production of human speech.

Wednesday, April 27th, 5 pm.

URBAN STUDIES

Buckman 103

Moderator: Annika Gage

#1 New Hope Christian Academy: A Case Study on the Impact of Urban School Gardens

Noelle Schmitter-Schrier

Faculty Sponsor: Peter Hossler, Department of Urban Studies

With a surge of momentum for local food movements, in recent years, community gardens have experienced tremendous growth, and have offered a counter-cultural critique, or push back against the destructive, disempowering, and alienating effects of large-scale political economic forces (Allen 2010). While extensive research has been done on community gardens, (Smith, Obeid, and Jensen 1999; Sidhua et al. 2008; Raja, Ma, and Yadav 2008; Wrigley et al. 2002), little has been done on school gardens, and even less on “Pay-What-You-Can” produce stands. School gardens are often initiatives directed to increase youth’s exposure to nature and bring about positive social change, and produce stands are often intended to promote equitable physical and monetary access. Using New Hope Christian Academy, a PreK-6th grade school in a suburb of Memphis, TN as a case study, this research project examines the impact of school gardens, particularly their unique “Pay-What-You-Can” produce stand. Specifically, a survey about the “Pay-What-You-Can” produce stand was distributed to the five hundred families of New Hope, and an opt-in focus group about impact and areas for improvement was conducted.

2 Race, Class and Local Food: An Examination of Alternative Food Practices in Urban Poor Communities in Memphis

Julia Lovett

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

An alternative food movement has taken root in cities throughout the United States. Urban farms, community gardens and farmers markets have been gaining popularity and challenge citizens to rethink how and where food is cultivated. These alternative practices are being implemented in urban poor neighborhoods, which are disproportionately impacted by cheap industrial food suppliers, to increase food accessibility and education. However, the movement has been driven by white ideals and principles and research has only just begun to explore the whiteness of the movement throughout the West Coast and North East. Therefore, there is a lack of scholarship on the intersection of racial privilege, local food and African American communities in Southern cities in the United States. This research will investigate how race and privilege impact the work of well-intentioned local food organizations in low-income communities of color in Memphis, Tennessee. Through participant interviews with leaders of local food organizations and neighborhood residents in low-income Memphis neighborhoods this paper intends to shine a light on the intersection of food, race and class and challenge leaders and communities of color to see the barriers to and benefits of participation in alternative food spaces.

#3 Analyzing the Effectiveness of the Church Health Center's Child Life and Movement Program Through Qualitative Research

Gizman Abdijabar

Faculty Sponsor: Peter Hossler, Department of Urban Studies

According to a 2012 study conducted by the Centers for Disease Control, 17.7% of children and adolescents in the United States are considered to either be overweight or obese. These rates have more than doubled in children and quadrupled in adolescents over the last 30 years. This rapid increase in the rate of obesity demonstrates the need for research and analysis in intervention and preventative programs that aim at addressing the various factors that contribute to this epidemic. In particular, I am interested in analyzing preventative programs that aim on increasing children’s knowledge in the areas of physical education and nutrition, with hopes of ultimately having an influence on the choices they make in regards to their health. I will be using a case study method to explore the effectiveness and impact of the Church Health Center’s Child Life and Movement program. Using interviews and surveys with participants between the ages of 9-11; this research evaluates qualitatively the impact of the program on the participants’ knowledge of exercise and nutrition, and how it has influenced their choices. Hopefully through the findings of this research will help the Child Life and Movement enhance their programs effectiveness in the future.

#4 *Are Kids Having Fun? The Development of Children Through Outdoor Play*

Pearlissa Harris

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

As some children in our new generation, Generation Z, are entering their adolescent years, their characteristics and developmental pathways are varying from that of prior generations. Generation Z is not getting the chance to experience quality outdoor play (Beyer 2015). Children are not being allotted the needed time to go outdoors and experience the ability to burn energy and develop cognitive skills. Adolescents are spending more time on electronics, more time in structured activities, and have less time to be creative. This research evaluates how the decline of outdoor play for our children, Generation Z, can inhibit critical areas such as, physical, social, and emotional development. Utilizing a national data set by the U.S. Department of Health and Human Services, the analysis of relationships between the rise in hours spent on the computers, the decline in unstructured outdoor play, the lack of greenspace, and the growth of anxiety are able to be examined. This study aims to contribute to better understanding of the rising generation, their rearing, and how they will add or change our current society.

#5 *Use of the Urban Farm and Forest at New Hope Christian Academy*

Will Montgomery

Faculty Sponsor: Peter Hossler, Department of Urban Studies

New Hope Christian Academy is an elementary school located in Frazier. The Urban Farm and the Forest are two green spaces that have been created at New Hope in the last four years for the school's students and faculty. While there is extensive literature surrounding urban farms with regards to the food that they can produce, there is not as much literature focused on the other ways in which green spaces can be used, particularly for children. Social development and play often go overlooked as valuable contributions that such spaces can make for children. As New Hope continues to develop these spaces and further implement them into the school's curriculum, it is essential to understand how the Farm and Forest have been used at New Hope Christian Academy. The school intends to continue to develop these areas and information regarding their usage could aid the process. Furthermore, it is important to examine if students' desired use of the space aligns with the goals of faculty and administration. Interviews with New Hope students and faculty are used to explore these questions while also contributing to the relatively unexplored field of academia concerning green spaces and their impacts on children.

#6 *(Art) Education as a Practice of Freedom: A Case Study Offering Best Practices for Urban Afterschool Programming*

Lexi Perkins

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Well-run and abundant afterschool programming has proven to be highly effective in creating a positive school culture. For urban youth, afterschool arts programming can provide an enriching and enjoyable environment for creative outlet and healthy social interaction. Previous research has identified best practices for the creation and maintenance of an afterschool arts program, and effective pedagogy for urban classrooms. Through a blend of bell hooks' black feminist classroom theory and best practices outlined in the Wallace Foundation's comprehensive report (2011), an afterschool arts program at Freedom Preparatory Academy is evaluated through participatory research. Race, class, gender and sexuality all come into play in the cultivation of black feminist classroom theory and effective arts' programming; according to these, it is crucial to acknowledge and accept every individual, and to value our diversity. Likewise, each student artist must be respected and held to high standards, as to reinforce their self-esteem and create a culture of mutual respect among teachers and students. This case study offers a new, hybridized ideological framework for afterschool programming pedagogy, specifically afterschool arts programming in urban schools.

#7 *Adolescent Pregnancy and Prevention: Where Does Family Fit In?*

Chasity Scott

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

In the U.S., one of the most frequently used interventions to prevent adolescent pregnancy is sex educational classes taught throughout high school. Some advocate the practice of abstinence. In urban areas that experience high rates of infant mortality and adolescent pregnancy, the population is usually in poverty. The family dynamic in these communities usually consist of a single parent or guardian with children. In my research of the prevention methods and the family dynamic of those that experience these issues most, I have questioned the family aspect as it seems to be less profound in these methods of prevention, especially when family has numerous benefits to contribute. My

study includes interviews with organizations that work to prevent adolescent pregnancy, asking questions about the mission and motives of these organization, as well as their understanding of the mind sets, aspirations, and goals of the adolescents they work with. My analysis will focus on adolescents desire to attain a family and marriage, as well as the barriers and obstacles that prevent adolescents from reaching their aspirations. My research will bring an awareness to the issues that adolescents face and the importance of family to help and prevent some of these issues.

#8 Sex Education Policy Translation in Shelby County Schools

Leah Wisniewski

Faculty Sponsor: Peter Hossler, Department of Urban Studies

This project investigates sex education policy translation in Shelby County, Tennessee. Data will be taken primarily from semi-structured interviews with those in charge of sex education implementation: school district officials, school administrators, and teachers of sex education. Sex education is a community health intervention that aims to decrease the risk of sexual health diseases and negative conditions that spread within the community. Recent research evaluates the content and effectiveness of sex ed programs and current teen health statistics, but little scholarship investigates differences between policy and what is taught in classrooms. In recent years, the structure of school districts within Shelby County have changed dramatically—Shelby County Schools merged with Memphis City Schools, followed by a demerger of suburban city districts from greater Shelby County Schools. Along with the change in structure came a change of administrators and policies for schools in Memphis, TN. District restructuring, coupled with high rates of adolescent pregnancy and sexually transmitted infections, make Shelby County an instructive case study for exploring issues related to sex education policy translation. Investigating the translation of policy within sex education classrooms has the potential to indicate areas of improvement for an intervention aimed to secure community health.

#9 Reproductive Injustice: Reproductive Health Care Services within the Criminal Justice System

Rheanna Henson

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Today, females are the fastest growing demographic of the prison and jail population, yet compared to males they do not have the same level of access to resources or receive adequate care that cater to their specific needs. Specifically, women have a difficult time receiving comprehensive, high-quality, and affordable reproductive health care while incarcerated. This is a relatively unheard from population that suffers from health disparities disproportionately compared to other groups due to a combination of minority identities, such as class, gender, and race. Semi-structured, open-ended interviews and narratives will be collected from formerly incarcerated females, corrections administrators and medical employees, and case managers at nonprofit organizations who work with this community to explore qualitatively the effects of incarceration on reproductive health for women. The effects of incarceration to women's reproductive health will be addressed, along with barriers and possible solutions to positively change this dynamic. This information can have an influence on criminal justice reform, public health policies, and increased health outcomes for women with a criminal history.

#10 Examining the Process of Collaboration Across Sectors Through the Shelby County Healthy Homes Partnership

Allison Bowen

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Currently within the public health realm there is a shift towards preventative medicine and a holistic approach to healthcare. This move towards more preventative and holistic approaches in healthcare is connected to the promotion of collaboration across sectors. Due to the recency of this shift there is a lack of research grounding this promotion of collaboration and proving its effectiveness in public health programs. This limited research concerns the definitions of collaboration, barriers to successful collaboration, and assessments of collaboration. The purpose of this research is to gain insight about the process of collaboration across sectors. The Shelby County Healthy Homes Partnership (HHP) is utilized in this research as a case study to provide information on the collaborative process. HHP consists of various levels of collaboration including leadership in Le Bonheur, Memphis Children's Health Law Services, and Habitat for Humanity of Greater Memphis. This research uses triangulation and three different qualitative techniques: surveys, interviews, and participant observation. The results of this case study can hopefully be utilized to help strengthen the knowledge concerning collaboration as it moves forward as well as future interventions and further emphasize the role of collaboration in improving health outcomes.

#11 Investigation of How the Church Health Center Navigates Conflicting Narratives Put Forth by Health Justice Advocates and Consumer Driven Healthcare Advocates

Madeline Plaster

Faculty Sponsor: Peter Hossler, Department of Urban Studies

The language healthcare providers use to frame the causes of illness contributes to the effectiveness, unity, and cohesiveness of a healthcare organization. That language also affects medical outcomes and the lives of patients. This study aims to understand how The Church Health Center, a faith-based community healthcare provider that works with underserved populations, navigates two conflicting narratives of illness causality. The structural determinants of health framework highlighted by Health Justice Advocates suggests that the ultimate cause of illness often lies in social structures beyond the control of individuals. This can be contrasted with the framework suggested by consumer driven healthcare advocates, which emphasize personal responsibility. Through semi-structured interviews, participant observation, and analysis of publications distributed by the organization, this study will attempt to understand how these narratives of illness causality come together or fail to come together in the Church Health Center.

Thursday, April 28th, 5 pm.

URBAN STUDIES

Buckman 103

Moderator: Ellery Ammons and Sarah Baumann

#1 Mental Health Organizations' Impressions of the Memphis Police Department

Casey Renka

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Over 10 times as many people with mental illnesses are in prisons than in mental institutions in the United States today. This is not because mental illness causes violent or immoral acts. In fact, having a mental illness is one of the weakest predictors for committing a violent crime. Yet 20% of the prison population has a mental disorder. This has serious implications for urban public health and policy, and the Memphis Police Department has created a special unit to combat it, the Crisis Intervention Team. The Team is comprised of volunteer officers who are trained in knowledge about mental illnesses, de-escalation techniques, and information about local mental health centers to take people for help rather than a criminal record. The team has been praised for its fewer officer and civilian injuries, more knowledgeable officers, lower costs for imprisonment, and faster response times. However, little is known about the benefits for people with mental illnesses or the mental health organizations that treat them. Using interviews, this research seeks to supplement this narrative with the voices of local mental health professionals who can give insight into how the Crisis Intervention Team has impacted mental health care access.

#2 The Effects of the Fiscal Crisis on the Memphis Fire Department and Its Firefighters

Pauline Dinh

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Emergency Medical Services (EMS) can be defined as a system of coordinated services by a number of players including medical emergency dispatchers, fire and rescue, first responders, emergency medical technicians, and paramedics, to provide rescue, stabilization, transportation and pre-hospital treatments in medical and traumatic emergencies. The Memphis Fire Department Emergency Medical Service system, one of the first fire-based EMS systems in the United States, is considered one of the most progressive EMS systems in the U.S. (Emergency Medical Services, 2015). However, these successes have been threatened in recent years by the government fiscal crisis created after decades of low-tax rates and devolution of social service responsibility to the urban scale. Although researchers have extensively studied the results on these changes for school teachers, law enforcement and hospital-based services, the effects of these changes on EMS are largely unknown. The purpose of this research is to identify and examine the ways in which the fiscal crisis has or has not affected Memphis firefighters and the EMS system, whether through pension plans, staffing, response times, etc. Qualitative data will be collected from Memphis Fire employees using one-on-one semi-structured interviews and quantitative data from Memphis Fire Union and Memphis Fire Human Resources. Hopefully, this research will insert EMS into the greater social and academic conversations as a proponent in healthcare services, community stakeholder, and organization affected by the current fiscal crisis.

#3 Infectious Disease Prevention and Outbreak Control in Pediatric Populations in Memphis, TN

Michelle Chiles

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Many infectious diseases are highly transmissible, especially among pediatric populations in urban areas. Vaccinations are the primary line of defense against diseases, but the 1990s saw a rise in anti-vaccine sentiment among parents because of a now discredited study linking vaccines to autism. While some cities have seen subsequent outbreaks of infectious disease, Memphis has not. Why is that? In this paper, I will discuss this and outline public health exemplars. In particular, I will outline the prevention and contingency plans of plans of a private Catholic high school in Memphis. The school has a very clear plan in place in the case of any sort of emergency that would require the school to shut down for any period of time, and also has a sports medicine department that works to ensure athletes are not catching or transmitting bacteria like *Staphylococcus aureus* and viruses like influenza. The emergency plans that this school has in place could be replicated in school throughout the

nation. In addition, this school requires that all students be vaccinated according to the Tennessee vaccination laws. Schools in urban areas require this level of control so that students can learn in a health environment.

#4 Maintaining the Backbone of the Foster Care System: Foster Family Recruitment and Support in Memphis, Tennessee

Kate Morris

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Over 250,000 children enter the foster care system in the United States each year, yet many people are deterred from becoming foster parents because they hold the perception that children in the foster care system are too difficult or damaged to care for. This belief stems from a narrative in the United States that social welfare has solved the problems of poverty, and children in the foster care system are all products of moral failings rather than economic hardship. In reality poverty continues to be a strong correlate with foster care. One of the biggest problems facing the foster care system today is a shortage of foster parents. In order to maintain an adequate number of foster families, they must be recruited and supported by social service agencies. This case study looks at the foster care system in Memphis, Tennessee using interview data from social workers, foster parents, and other stakeholders. It contributes to research on the foster care system by providing information and analysis regarding the strengths and weaknesses of recruiting strategies and supplemental support services that can aid social services workers by providing best practices in this urban context.

#5 Assessing Refugee Health Through a Trajectory-Based Narrative Framework

Annika Gage

Faculty Sponsor: Peter Hossler, Department of Urban Studies

Previous research on refugee health in the United States has highlighted significant barriers to maintaining good health after resettlement. However, very few studies have examined health problems as a syndemic/trajectory in refugee populations. Instead, research has been focused on specific events or circumstances that impact health (i.e. psychological trauma, lack of translation in healthcare). A syndemic/trajectory-based approach recognizes health as a process of correlating factors over time in order to understand how certain circumstances and events intersect to effect an individual over a lifetime, which offers a more descriptive and nuanced understanding of health outcomes. This study explores refugees' narratives about their health to understand how they perceive a change before and after their arrival in the U.S., as well as the factors that are responsible for that change. Data was collected through interviews with refugees currently living in Memphis, Tennessee, as well as key stakeholders for refugee health in the city. The goal of this study was to identify barriers to good health for refugees living in urban areas in order to highlight opportunities for improvement amongst professional and volunteer organizations that assist them in acclimating to life in the United States.

#6 The Formation of a Lost Generation: Exploring the Movement of Syrian Refugee Women and Children from a Rural to an Urban Context

Adriana Quiroga

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

What began as civil unrest in Syria in 2011 has resulted in a crisis of mass displacement producing an entire generation of 'lost' people around the world. This refugee crisis has become a widely debated political, economic and social issue moving into the backyards of the western world and demanding a response. The infrastructures of Syria's neighboring cities are crumbling under the weight of the daily influx of refugees fleeing desperate circumstances. Social scientists continue to delve into the complexities of the impact the civil war has had on the lives of Syrian people and on the residents of the neighboring host countries. This research project aims to extend the international conversation about a major global crisis by investigating Istanbul, Turkey as a case study. Specifically, through tracing the lives of the most vulnerable victims, women and children, as they migrate from rural areas of Syria to a highly urbanized context like Istanbul. Additionally, this research discusses the growing tension between residents and refugees by examining the language used to describe the crisis in local Turkish news sources. Finally, this research includes an evaluation of US-based humanitarian relief organizations and their efforts to contribute to the alleviation of the crisis.

#7 Crosstown Community Mapping Project: Exploring Place Attachment and Sense of Place Through Participatory GIS

Sydney Sepúlveda

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Place attachment is used to describe the emotional bond residents feel toward their neighborhood. It is often present in neighborhoods that foster a sense of place, characteristics that make a place unique and interesting. Place attachment and sense of place provide a greater understanding of how neighborhood spaces motivate residents to maintain and protect their communities and participate in planning processes. While literature on place attachment tends to concentrate on individual feelings and experiences, it overlooks the importance of emotional connections to place and how these connections can be understood and used by local planners. While more traditional approaches seek to understand place attachment through surveys and interviews, this paper explores a new approach, “Bottom-Up GIS,” in which GIS is used as a participatory planning method to understand the place attachments and perceptions of Crosstown residents in Memphis, Tennessee (Talen, 2000). This paper analyzes place attachment and sense of place through individual GIS maps made by participants who either work or live in the Crosstown neighborhood. This project will align with Crosstown Development’s goals to collaborate and engage with the Crosstown neighborhood, a goal that is especially important with Crosstown Concourse, a mixed-use, vertical urban village opening in 2017.

#8 Walking in Memphis: A Study on Walkability in the Crosstown Neighborhood

Jackson McNeil

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Walkability, the measure of how a surrounding environment promotes pedestrian use, is an important measurement in many areas of study including city planning, community health, real estate, economics, and psychology. Studies have shown that areas that are more walkable have lower health risks, develop stronger social ties, and have cleaner air (Speck, 2012). In many American cities, neighborhoods and their built environment have been developed around the automobile, and those that travel by foot have not been prioritized in the way communities are built and developed. This means that walkability is an important equity issue in our country because not everyone has the choice to drive. This paper examines walkability in the Crosstown neighborhood of Memphis, TN, where a massive redevelopment project is reshaping the community. It investigates the way that the built environment shapes pedestrian use in the neighborhood by triangulating data regarding land use, sidewalk observations, surveys, and community meetings with residents. This research was conducted in conjunction with the Memphis Walk initiative through the Design Center at the University of Memphis, in which policy recommendations will be presented to encourage walkability through design and policy.

#9 Utilizing Collaboration for Urban Health Improvements and Economic Development

Mariko Krause

Faculty Sponsor: Peter Hossler, Department of Urban Studies

The process of collaboration between stakeholders is frequently used as the world becomes more interconnected. By utilizing a certain degree of collaboration, projects can be better implemented to solve community issues concerning urban health and economic development. The purpose of this research is to gain a better understanding of what collaboration means upon the creation of an innovation district within an urban context as well as question the differentiation between collaboration and coordination. The research takes an in-depth analysis of how partnership is utilized at the expense of the public realm. The public realm is defined as any publicly owned streets, sidewalks, plazas, parks, or areas accessible to all. In addition to analyzing the partnership, the research completes a case study on a specific Medical District that is currently undergoing renovations and improvements to make the area more livable and to “uplift” the district. The case study explores the collaborative process between stakeholders of the project, community engagement, and how a consulting firm mitigates the various dimensions of partnership.

#10 Privatized Place: How the Public Spaces of Downtown Memphis are Responding to Trends of Privatization

Ellery Ammons

Faculty Sponsor: Elizabeth Thomas, Department of Urban Studies

Since the eighteenth century, the American public realm has been decreasing. Modern society has seen what Richard Sennett would call in 1977, “a decline of public culture and sociability, a deadening of public life and public space, a privatization of emotion” (Sennett 24). Increasing privatization does not only decrease public life and public space, but also diminishes the quality of the public good. The inefficiency, isolation, and exclusion involved in more private lifestyles harm citizens, while continuing to segment their cities (Champlin 599). Interested to see the effects of privatization in a more local sphere, I decided to execute a study of public life in Memphis, Tennessee specifically through an analysis of public spaces in downtown Memphis. Through a comparative study of downtown parks, plazas, and streets, using methodology from architect urban design consultant Jan Gehl, I studied the present state of public space in our city. Partnering this analysis of Memphis public space with a more historic transition

away from the public realm, I explore how trends of increased privatization have not only affected public space in Memphis, but also the resulting public life.

#11 She's the Boss: Urban, Female Entrepreneurs in Memphis, Tennessee

Sarah Baumann

Entrepreneurship has been shown to stimulate the economy, provide job growth, and create “a way out” for many Americans looking to climb the ladder, particularly in urban scenarios and entrepreneurial economies (such as Austin, Texas and San Francisco, California). Female entrepreneurs are an up-and-coming group, long left out of the conversation but quickly proving their merit and gaining access to the same resources and opportunities as men. Entrepreneurship has also recently been proving itself as a somewhat uniquely urban phenomenon; startup accelerators are rallying around groups of entrepreneurs in medium and large cities across America. In this study, I will be exploring the intersection of these two growing movements (female and urban entrepreneurship) as I interview 12 female entrepreneurs in Memphis about their relationship with this mid-size American city. Memphis is an up-and-coming city - many organizations have planted themselves within the city to promote startup growth, but face difficult odds; the city is under-researched and rife with poverty and race issues. I will be looking for trends in the strengths and challenges of entrepreneurship in Memphis, mentoring relationships within the community of female entrepreneurs, and self-perception of the women as business owners. I believe this study will fill many research gaps; that of female entrepreneurs and business owners, that of the city of Memphis, and that of the specifically urban phenomenon of startup growth.

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