Fungal Infections in Montipora from American Samoa

In recent years, coral reefs have been under attack by opportunistic diseases driven by environmental stressors. Currently, nineteen coral diseases have been identified. Fungal pathogens are also known to attack corals. One defense mechanism corals use involves encasing the fungal pathogen in purple sclerites (capsules) resulting in dark pigmented coral tissues. The stony coral Montipora sp from American Samoa exhibits this dark pigmentation response which, through a previous investigation, has verified a fungal infection. This project sought to characterize the transcriptional profile of tissues from coral colonies infected with the fungus via quantitative real-time PCR (qPCR) and bioinformatic analyses. This project identifies a suite of genes that are representative of
different stages of infection. The results suggest that the fungal infection acts on the extracellular matrix and the corals respond with programmed cell death. Results of this project can help resource managers identify coral colonies at risk of infection through transcriptional analysis. Early detection offers opportunity to develop and implement preventive measures to protect colonies and their ecosystem.

10:00 a.m. – 11:00 a.m. Session 1-A (Room 217, Krannert Center)

Moderator: Dr. Lara Whelan

Allison Moore Corseted Rebellion: Politics and Women's Fashion in the American Revolution
Mentor: Dr. Christy Snider

Historians of women have often debated the underrepresentation of women in historical events. One of the most commonly discussed events is the American Revolution. While women were active members of colonial society, most early historians of the period disregard any possible influence. Beginning in the 1970s, however, historians began to make use of different sources that allowed them to better integrate women's actions into the history of the period. Based on an analysis of these arguments, this paper develops an in-depth study of women's costume in late 18th century America and its importance to the historical events of the time. Utilizing studies of wartime purchasing trends and the personal letters of contemporary women, this paper illustrates the importance of dress history in understanding women's early political involvement. To accompany this, the student will present a set of reproduction garments she has constructed in conjunction with the research paper. By choosing to explore Revolutionary Era women's lives through clothing, a major cultural element that is often overlooked, this interdisciplinary approach to historical study will provide a unique analysis of women's history in the revolutionary period.

Cole McCreary Hard War and Sherman's March: How Sherman's March Represented a Drastic Shift in Union Military Policy
Mentor: Dr. Jonathan Atkins

Final Abstract: The paper I will be presenting discusses Sherman’s March to the Sea. It focuses on how the March represented a change in Union strategy and military policy towards the South during the Civil War. Mainly, I argue that the March grew out of frustrations resulting from the North’s seeming inability to “put away” the South, militarily speaking. In response, the Union adopted a strategy of “hard war” or “total war” which reached its fulfillment in Sherman’s March. To illustrate this point, I discuss how William Sherman and Ulysses Grant utilized the theory of hard war in Mississippi first. Their success in Mississippi caught the Union military’s attention, and Grant received several promotions, eventually becoming commander of all Union forces. Grant proceeded to give Sherman permission to wreak havoc on the South, which he did in various campaigns, most notably his March to the Sea. The paper then discusses specifics of his campaign and its immediate impact on the war. It concludes by discussing the March’s legacy in Georgia and how it affected the psyche of Georgians in the years after the Civil War.

Beth Anne DeKeizer Over the Top for Berry and Country: Berry and World War I
Mentor: Dr. Matthew Stanard

The United States of America recognizes the centennial anniversary of their entry into World War I in 2017 and will mark the centenary of the war’s end in 2018. With both these anniversaries coming up soon, it is important for Americans to look back at the war that drew America out of its isolationist shell and connected it to international issues for the first time in decades. World War I revolutionized how citizens back home became involved in the war even though the fighting was not taking place on their land. Involvement in a distant war helped to create the modern understanding of the home front. This paper explores these and related issues by examining the lives of the “Berry Boys” who fought and those who died on the Western Front. This paper also looks at how the conflict affected the lives of students attending the Berry Schools at the time. This local history of a global conflict is based on analysis of the secondary literature and original research in the Berry College archives.

Michael Shaw It’s Heritage and Hate: Semiotics and the Confederate Flag
Mentor: Mrs. Hope Willoughby

The Confederate battle flag entered back into heightened public scrutiny in 2015 after a South Carolina shooting. The debate that followed has shown that national conversation over the symbol is far from over. This paper is a semiotic analysis of the Confederate battle flag which uses the concept of denotative and connotative sign systems to trace societal interpretations of the Confederate flag over history. The paper discloses the use and understanding of the Confederate flag through its creation, the Civil Rights movement, and the present, analyzing its meanings as understood by a semiotic lens of sign systems. It examines how disparate meanings can exist within a symbol for different groups and how symbolic reconstruction causes these rifts. The paper ends with a solution to the controversy over the Confederate flag and divisive symbols in general.

Session 1-B (Room 324, Krannert Center)

Moderator: Dr. Shawn Hilbert

Alexandria Skinner Band Structure Formation for Atomic Orbital Analogy
Mentor: Dr. Shawn Hilbert

This presentation focuses on a theoretical and experimental exploration of the analogy between the band gap formation of the energy levels in an atom, and the band gap formation of the resonant frequencies of a system of coupled oscillator pairs. In this demonstration, we analyze the resonances of a system of connected mass pairs on springs. One pair of masses connected by a spring
will have particular resonant frequencies associated with it and these frequencies will "split" as more mass pairs are introduced to the system. This effectively demonstrates resonance splitting in the mechanical system that is analogous to the level splitting in the quantum system. Through the introduction of more oscillators to this system, this analogy can be extended to the formation of allowed energy bands. This system of coupled mass pairs is modeled computationally to determine the theoretical behavior of the system and how it is analogous to the behavior of an atom. The behavior of the system is also analyzed experimentally and compared to the computationally observed behavior.

Wiliam Newman

An Acoustic Analog to Avoided Crossing of Energy Levels

Mentor: Dr. Shawn Hilbert

Avoided crossings are traditionally associated with quantum mechanical systems but have been known to occur in other classical systems. In this project, the emergence of an avoided crossing in an acoustic system was explored. The acoustic system is constructed with two PVC tube sections, one of fixed length and another of variable length. The tubes are separated by an aluminum diaphragm with a variable reflectivity of sound controlling how the two sections interact. This acoustic system is meant to mimic a quantum mechanical system that has two sections with one section at a fixed length and the other with a variable length and a barrier in between. We compare the values of the energy observed in the quantum system to the resonant frequencies of the acoustic system with respect to a change in length of one section of the system. With this we demonstrate that the two have similar avoided crossing behavior.

Kelli Little

Dirac Delta Wells as a Model of Disorder within a Periodic Quantum System

Mentor: Dr. Todd Timberlake

An infinite square well represents the potential energy of a particle bouncing between two hard walls, while a Dirac delta well is a narrow downwards spike in potential energy at a specified location with a designated strength. I examine the quantum eigenvalues and eigenstates in a system consisting of an infinite square well with multiple Dirac delta wells. By introducing variations in the strength or spacing of the Dirac delta wells I can examine the effects of disorder in a periodic quantum system which is that of equal strength delta wells spaced evenly apart. I will present computational results illustrating the formation of band structure in the eigenvalue spectrum as well as changes in the eigenvalue spectrum and eigenstate wave functions that result from disorder.

Joey Ellwanger

Occurrence of Batrachochytrium dendrobatidis in Northern Georgia Amphibians

Mentors: Dr. Michael Morgan and Dr. Chris Mowry

Batrachochytrium dendrobatidis (Bd) is a fungal pathogen that affects over 200 amphibian species worldwide. The effects of an infection vary depending on local climates, and in some cases there are no observable effects. 96 amphibians in Floyd and Walker Counties were swabbed to test for the presence of Bd on the skin. In preliminary screenings, three amphibians swabbed had fungal DNA presence on the skin, although none showed signs of active infection. Two sets of primers were then used to confirm and possibly expand the results. After further screening, only one sample tested positive using both primer sets. While Bd can be detected in NW Georgia, its prevalence in these two locations is minimal.

Mekayla D. Mekara

Synthesis of compounds to inhibit TcREL1

Mentors: Dr. Chris Hall, Dr. Heidi Dahlmann, and Dr. Dominic Qualley

Chagas’ disease caused by Trypanosoma cruzi is becoming a global problem now that immigration from South America is more common due to political and economic factors; this includes emergence in the United States. RNA editing ligase 1 (REL1) has been identified as a new drug target due to its unique mitochondrial RNA editing process within Trypanosomatids. Certain compounds can inhibit the ATP-binding site of REL-1, rendering it inactive and thus killing the parasite, but there is not much understanding of why some compounds work better than others. Eight naphthalene-based compounds were synthesized in order to study the impact of different functional groups on T. cruzi cytotoxicity. These compounds were diluted in DMSO and were tested on T.cruzi parasites at varying concentrations. Based on cell counts, compounds MM1-4, MM1-7, and MM1-8 were successful at killing the parasite, with MM1-4 being the strongest. Affinity for the ATP binding site was determined using computational modeling, which verified that specific sulfonate and hydroxyl groups are important for hydrogen bonding and orienting the molecule for pi-stacking with a PHE 209 within the active site. Overall compound shape also plays an important role for orientation within the active site.

Mary Shoup

In vitro T. cruzi Inhibition by Naphthalene-based Compounds Confirms in Silico Modeling

Mentor: Dr. Christopher Hall

When predicting binding affinities between pathogenic proteins and potentially therapeutic inhibitors, in silico modeling is often used to select those compounds with the greatest promise for further testing. Trypanosoma cruzi, the etiologic agent of Chagas disease, has therapeutic drugs that are only effective in the acute stage, and exert significant side effects. Based upon in silico modeling, naphthalene-based compounds (NBC) are predicted to inhibit the REL-1 subunit of the editosome, a RNA-editing complex unique and essential to kinetoplasts. Previous work has demonstrated that one such NBC, V4 was effective at clearing the BSF trypomastigote form from co-cultures of infected DH-82 canine macrophages. We chose to test V3, another closely related NBC, that has a lower predicted affinity for the REL-1 site, based upon in silico models. When compared to in vitro experiments like those with V4, V3, while still capable of reducing BSF’s, had reduced efficacy. The results also confirmed that mammalian DH-82 cell proliferation was not negatively affected by the presence of the NBC in the media.
Conclusively, V3 and V4 support the idea that in-silico studies can be useful to understand the inhibitory capacity of NBCs at the REL-1 complex, with a lack of toxicity on mammalian cells.

Session 1-D (Ballroom A, Krannert Center)
Moderator: Mrs. Jessica Hornbuckle

Matthew Robinson  Schism and Sexuality in Contemporary Anglicanism
Mentor: Dr. Dale McConkey
This presentation will examine the role of homosexuality in the recent schism of the Episcopal Church. Sociologists have long discussed the cultural divide caused by the issue of sexuality. There is a corresponding theological divide, one that prompted the fracturing of the Episcopal Church and the subsequent formation of the Anglican Church of North America. In this paper, I first outline the history of the debates regarding homosexuality within the Episcopal Church, specifically examining the growing theological divide within the church over the past several decades. I then contrast the leading voices from both the conservative and liberal factions, exploring the fundamentally different ways of thinking theologically about sexuality, tracing any changes in rhetoric by either side since the beginning of the discussion, and determining to what extent the theological divide over sexuality provided the conditions for a schism. Finally, I compare the Episcopal schism with the broader phenomenon of conservative-liberal polarization that has coincided with the intensification of the issue of homosexuality. In this final portion, I show how sociological factors have shaped contemporary Anglican theology of sexuality, and how the particularly Anglican response to homosexuality might inform and impact the larger religious and cultural polarization over the issue.

Reagan Pifer  Hell, Exclusivism, and the Morality of Children
Mentor: Dr. Matthew Lee
In this paper, I summarize and discuss the arguments of Kenneth Himma in regards to the morality of childbirth and how it affects our view of the Traditional Doctrine of Hell and Christian Exclusivism. I then discuss Shawn Bawulski’s objections to Himma’s arguments and conclude with Himma’s responses to those objections. After understanding the whole argument surrounding the topic, I propose my own argument that not only grants the morality of child birth but also grants Himma’s own key principle while avoiding all of Bawulski’s objections.

Nathan Thacker  Views of Heaven: C.S. Lewis on Saint Augustine's and Saint Thomas' Beatific Vision
Mentor: Dr. Matthew Lee
Throughout his writings, C.S. Lewis addressed the ideas of heaven and hell through the lens of fulfillment, a theology which can be traced back to St. Augustine and St. Thomas Aquinas. In this presentation of my senior thesis, I analyze the writings of Lewis, Augustine, and Aquinas which pertain specifically to the question “why is God necessary for ultimate fulfillment?” and explain what Lewis is able to contribute to the theology of heaven and hell.

Bekah Fortney  Natural Evil: Why Does It Exist? Where Did It Come From?
Mentor: Dr. Matthew Lee
Natural disasters are occurring every day around the world, leaving devastation, death, and depravity behind. It is important that we discuss how to reconcile that these things are happening around us. These things happen outside of human control with no apparent cause besides God. But why would a good God allow disaster and devastation to occur with seemingly no reason? C. S. Lewis argues natural evil is a consequence of rebellion. Lewis argues that the rebellion of man had implications on the creation that he was given dominion over. Lewis also argues that the rebellion of angels and demons has effects in our physical world because of their free-willed decisions of rebellion. Free will is a widely debated topic that provides interesting insight into why we see evil in the world as it is today.

11:10 a.m. – 12:10 p.m.  Session 2-A (Room 324, Krannert Center)
Moderator: Dr. Melissa Clark

Daniel Huetter and Emily McLandon  Utilizing Gaming for Pro-Social Change
Mentor: Dr. Julie Johnson-Pynn
In recent years, video and mobile games have become increasingly viable tools for social and political activism. Games like Evoke and World Without Oil have gamified social activism, mobilizing players to enact social change in their own communities. Many elements of game design tap into psychological constructs that can be used to further social goals, such as achievement motivation, self-efficacy, and collaborative problem-solving. In this presentation, we will describe how five student teams consider psychological concepts in designing five unique smartphone games that aim to promote the conservation of an endangered primate species, the Zanzibar Red Colobus. Teams will incorporate Gee’s concepts of semiotic domains, affinity groups, the identity principle, and the self-knowledge principle to encourage players to engage not only with the virtual environment of the game, but also with real-world environment of the monkeys. To be successful conservation tools, game designs must educate locals about monkeys’ behavior and habitat and change negative perceptions that locals have about monkeys from superstitious beliefs. Implications of combining anthropological information with biological data to produce creative technology-based conservation tools that are contemporary and culturally relevant will be discussed.
These attempts to explain some of the main reasons why those born in poverty are unlikely to escape their poverty, while those who are born into the best and the worst place to be poor, and contrast that with recent research that suggest the American dream, (of making a better life for oneself and one’s offspring through hard work) is not a possibility for large portions of society. Economic success in the twenty-first century and seeks to explain why those born into the highest reaches of society are far more likely to maintain their wealth, while those born in the bottom quartile are much less likely to reach the highest. It reviews the concept and role of meritocracy within the American market-based/capitalist system. It also examines the concept of American exceptionalism, the concept that America is simultaneously the best and the worst place to be poor, and contrast that with recent research that suggest the American dream, (of making a better life for oneself and one’s offspring through hard work) is not a possibility for large portions of society. Effectively, it attempts to explain some of the main reasons why those born into poverty are unlikely to escape their poverty, while those who are born to wealthy families are unlikely to lose their wealth and social standing.

Throughout the course of recorded history, political philosophers and other scholars have discussed the traits necessary to establish the perfect civilization or society. In particular, authors of utopias and ideal societies have attempted to answer the question, ‘What is justice?’ Each utopia and ideal society constructs a foundation of rules and requirements on which to build a just society. However, rather than serving as the definition for justice, these rules and requirements describe how a society could possibly achieve and maintain justice. By analyzing classical, modern, and contemporary utopian literature, this paper explores the essential components of justice in utopian and ideal societies in order to find similarities among the ideas presented by utopian authors. This paper seeks to unify the discovered commonalities into a possible definition of justice.

During a tribute to Joe Biden in which he bestowed him with the Presidential Medal of Freedom, President Obama remarked that “this gives the Internet one last chance to talk about our bromance.” Obama and Biden’s relationship has been the subject of Internet humor for years, and the fact that the president publicly addressed it demonstrates that these memes have become increasingly important to
how we conceive of politics in the modern age. In the aftermath of the 2016 presidential election, these memes took on a new role: instead of merely poking fun, they used Obama and Biden’s relationship to recontextualize the election of Donald Trump. These new memes create the narrative of a mischievous Biden who, reluctant to concede the White House quietly, plays pranks on Donald Trump. To understand the creation of these memes and the role they play in our construction of narratives, we can look to Don J. Waisanen’s article “A Citizen’s Guides to Democracy Inaction: Jon Stewart and Stephen Colbert’s Comic Rhetorical Criticism.” In this article Waisanen applies Kenneth Burke’s theory of the comic frame to the comedy shows The Daily Show and The Colbert Report in order to demonstrate how they reframe public discourses. After examining the article, this presentation will seek to apply the same theory to the creation and spread of Joe Biden memes in the wake of the presidential election.

Conrad MacNeil Sharpe  The Eternal Return and Culture
Mentors:  Dr. Michael Papazian and Dr. Peter Lawler
Nietzsche’s idea of the Eternal Return is linked to the consistent creation of values and, specifically, culture. Values, which are established through evaluating what an individual believes important, are the response to how fleeting life is to human beings and culture, which is the collective agreement on a certain set of values, works to guide a group of individuals to find purpose. By establishing, molding, or reestablishing what an individual or a particular group of individuals uphold in their lifetime then the eternal return can be a representation of the rise, fall, and renewing of values and, specifically, culture. The Eternal Return is linked to culture, as it represents a consistent test for any value or sets of values, culture, as the Eternal Return continually asks the following question to any value: “Do you have purpose and, if so, is that purpose worth upholding?”

Session 2-C (Room 217, Krannert Center)
Moderator:  Dr. Anna Filippo

Heather Pharis, Jack Padgett, Anna Katherine Drew, Stephanie Schwartz, Emory Frie, Lilly Gonzales, Hannah Avery, and Darian Kuxhouse
Playwriting: Exploring Structure through Workshopped Original Pieces
Mentor:  Dr. Anna Filippo
One of many often unsung heroes of the theatrical process is the playwright. The amount of time and work it takes for a playwright to get their ideas from inside their head onto paper and finally (if they’re lucky) on to a stage is immeasurable. With this presentation of selections from student written scenes, ten minute plays and one acts, we hope to highlight a crucial, yet sometimes looked over, part of a show’s process. We will each introduce our pieces with a short summary of our inspiration and process, and then perform a staged reading of selections from our pieces.

Session 2-D (Ballrooms C and D, Krannert Center)
Moderator:  Dr. Bill Davin

Michael Dunn  Calcium Sequestration in Understory Species
Mentor:  Dr. Cathy Borer
Flowering dogwood (Cornus florida) is known for maintaining a substantial amount of its foliar calcium in a water soluble form, which is vital for physiological processes, such as responses to environmental stresses and photosynthetic efficiency. This labile calcium is also important for cycling usable calcium in forest ecosystems, and making it available for uptake by other forest species. However, flowering dogwood is being threatened by the fungal disease, dogwood anthracnose (Discula destructiva), which is spreading through the range of dogwoods. The aim of this study is to evaluate whether other common understory species may similarly enhance calcium cycling in forests. We evaluated the chemical partitioning of calcium in the leaves of seven species (four native and three invasive) common on Berry College’s campus, including flowering dogwood, Eastern redbud (Cercis canadensis), American holly (Ilex opaca), Muscadine (Vitis rotundifolia), Chinese privet (Ligustrum sinense), Chinese holly (Ilex cornuta), and Mahonia (Mahonia japonica). We used water, acetic acid and hydrochloric acid in order to extract and evaluate three different foliar calcium pools from six individuals from each species. This project allows us to evaluate and predict ecosystem-level changes in calcium cycling that could result from declines in flowering dogwood

Michelle Carver  Conservation status of a relict tree species, Alnus maritima, in Northwest Georgia
Mentor:  Dr. Cathy Borer
The seaside alder (Alnus maritima) is a wetland tree species growing in three geographically isolated populations in the mid-Atlantic region, Oklahoma, and Georgia. These populations are thought to be remnants of a widespread species that once spanned North America. The three remaining populations have become isolated due to glaciation cycles and the conversion of wetland habitat to suit human activities. The three populations are genetically distinct and are considered to be separate sub-species. Two populations of the seaside alder exist in Drummond Swamp, a spring-fed swamp near the Etowah River in northwest Georgia. In order to learn more about this rare species, we evaluated the Drummond Swamp population to determine average diameter, height, and reproductive status of the seaside alder, and map its population distribution. Findings from this study could be used to inform educational programs to conserve this rare tree species as well as its threatened wetland habitat. Conservation of the essential habitat of the seaside alder may be aided by providing data from this study to landowners around the Drummond swamp about the importance of conserving this unique tree species.
Sydney Bardwell and Hannah Stanley
Survey of Tick-Borne Pathogens in Ticks Collected from the Campus of Berry College
Mentor: Dr. DeLacy Rhodes

Tick-borne diseases are a major threat to human health, and people who engage in outdoor activities are at risk. In order to understand the risk of contracting a tick-borne illness while utilizing outdoor spaces on the campus of Berry College, ticks were collected and tested for the presence of Rickettsia, Ehrlichia, and Borrelia species. Ticks were sampled by dragging multiple tracts of land in areas used for outdoor recreation between the months of May and October. The collected ticks were identified to species level and were found to belong to four different species, Dermacentor variabilis, Amblyomma maculatum, Amblyomma americanus, and Rhipicephalus sanguineus. DNA is being isolated from individual ticks and tested using sensitive nested PCR for the presence of pathogenic organisms. The purpose of this study is to help to expand the knowledge of tick populations, numbers, and the risk of tick-borne infections to outdoor recreation participants on Berry’s campus.

Ethan Hart
Analysis of Two Outer Surface Protein C Recombinant Proteins by BN-PAGE
Mentor: Dr. DeLacy Rhodes

Lyme disease is the most commonly reported tick-borne infection in the United States with an estimated 300,000 new cases occurring annually. This disease is caused by the bacterium Borrelia burgdorferi and is transmitted through the bite of the deer tick. The B. burgdorferi membrane protein Outer Surface Protein C (OspC) is upregulated during transmission of the bacteria to a host and has been shown to be crucial for mammalian infection, though the exact function of OspC remains unknown. This protein is naturally found on the cell surface as a dimer, consisting of two conjoined OspC monomers. Mutation of three key amino acids found on the highly variable ligand binding domain 2 (LBD2) of OspC has been shown to alter B. burgdorferi persistence in mice. In order to test whether these changes alter infection by affecting the ability of OspC to correctly dimerize, blue native-polyacrylamide gel electrophoresis (BN-PAGE) followed by protein staining was utilized.

12:20 – 1:50 p.m. Poster Session and Community Engagement Showcase (Cage Center Arena)
2:00 – 3:00 p.m. Session 3-A (Room 217, Krannert Center)
Moderator: Dr. Jennifer Hoyt

Hayley Westphal, Stephanie Schwartz, AnnaBeth Crittenden, Candace Shirley, and Jack Padgett
The Kennedy Center-American College Theater Festival: Performance and Presentation
Mentor: Dr. Anna Filippo

Throughout our theatre season, the Berry College Theatre Company invites adjudicators from the Kennedy Center American College Theatre Festival to come and see our productions. These adjudicators then choose certain student designers, performers and stage managers to compete in the regional festival for the chance to move on and present their work at the national festival in Washington D.C. This year we were privileged to send five nominees to the regional festival in Statesboro, and three of them will be presenting their work at the symposium. AnnaBeth Crittenden was nominated for her role as Sally Bowles in Cabaret and as a student director for A Charlie Brown Christmas; Candace Shirley was nominated for stage management for A Charlie Brown Christmas; and Hayley Westphal was nominated for her scenic design of A Charlie Brown Christmas. AnnaBeth will be presenting her acting package for the competition with her scene partner Stephanie Schwartz, as well as the scene she directed for the festival, which Stephanie and Jack Padgett will be performing in. Hayley will present her design concept for A Charlie Brown Christmas, and Candace will present her stage management prompt book for the same show.

Session 3-B (Room 250, Krannert Center)
Moderator: Dr. Peter Yoder

Nicolette Corley
How Feminism Influences Theology: A Study of Georgia Harkness
Mentor: Dr. Jonathan Parker

Georgia Harkness was a theologian who lived during a time of heightened political action particularly in the realm of women’s rights, and her theology reflects that. Harkness would probably not have identified herself as a feminist, since the term did not become prominent in pop culture until the middle of the twentieth century; however, feminist tones are embedded in the language that she uses to structure her theological arguments. This is particularly evident in her work, Understanding the Christian Faith, which will be the focus of this presentation. Harkness was the first women to hold a professorship in any American seminary, and like other leading feminists of her time, she used the written word to call attention to injustices. This paper surveys her work and life, and specifically considers the way her historical context—which saw the saw first-hand the formation of the feminist movement and the transformation of the women’s roles in society—directed and focused her understanding of God and the Christian church.

Jasmine Rangel
The First American Feminist?: Sor Juana Inés de la Cruz
Mentor: Dr. Jonathan Parker

The role of women throughout centuries of Christian Theology has been widely contested among scholars, church officials, and congregations across the world. The Feminist movement of the 20th century heavily criticized Christian institutions for their marginalization and oppression of women. However, exceptional examples within the history of Christianity remain. Sor Juana Inés de la Cruz, a 16th century Mexican nun, questioned the conceptions of a woman’s role in the church and actively advocated for expanding women’s educational opportunities. Her earnest passion for education, across a diverse range of academic and fine arts
Ryan Walker

Are Women in God’s Image? A Feminist Reading of Augustinian Conceptions of Gender

*Mentor: Dr. Jonathan Parker*

This paper discusses St. Augustine’s conceptions of male and female and evaluates these conceptions from the vantage point of Feminist concerns. Specifically, it discusses what Augustine believes it means for both males and females to be created in the “image of God” (Gen 1:27; 1 Cor 11:7) as influenced by the Platonic tradition and his reflections on his personal interactions with women. Following insights from previous work by Edmund Hill, this paper will demonstrate that while Augustine’s view includes some culturally-induced misogynistic tendencies, his view of the “feminine” remains different from his view of “women” (and indeed from Platonic assumptions about both), an important distinction sometimes lost in current Feminist readings and in historical readings of Augustine by defenders of patriarchy in the Church.

Austin Amandolia

Equal but Subordinate?

*Mentor: Dr. Jonathan Parker*

For some traditional Christian theologians, the Bible promotes the idea that only men may hold authority in the church and therefore women should not be allowed into leadership positions. This is often justified by mapping human relationships onto the relationships of the Trinity (Father, Son, and Holy Spirit). By doing so, they pair male with the Father and female with the Son. By correlation, they then use doctrines claiming that the Son is “subordinate [in role] but equal [in essence]” to the Father to say that women are similarly “subordinate but equal” to men. This paper first examines alternative conceptions of relations between Father and Son (i.e. by comparing egalitarian versus subordinationist versions of Social Trinitarianism). It also questions the mapping of human relations from Trinitarian doctrines, in general, and proposes that humility and mutuality in gender relations is a more Christian and properly Trinitarian view than human relations based on Social Trinitarianism, including “subordinate but equal.”

Valerie De Wandel

Ethics of In Vitro Fertilization

*Mentor: Dr. Peter Lawler*

The presentation will involve four student presenters who took a seminar/directed-study concerning bioethics and democracy. In the seminar, discussions have been held regarding various topics and differing perspectives. These topics include enhancement vs therapy, In-Vitro Fertilization (IVF), Brave New World, kidney transplants, amongst a variety of others. Valerie will be discussing the ethics of IVF in her presentation with a narrative ethics approach alongside scholarly/religious research, Mac will be discussing the ethics of kidney transplantation in terms of donation and market involvement, Chris will be discussing the ethics of abortion and enhancement, and Meg will be presenting on the politics and legal implementation concerning bioethical questions. The hope is that each presenter will present their topics for 10 min each, and allow the rest of the time for questions from the audience to the panel. The presentation topics derive from the research papers that the students have been working on in the class in accordance with the materials that were provided to them.

Meg Ligon

Analyzing the Politics of Bioethics

*Mentor: Dr. Peter Lawler*

Chris Cole

Ethics on Abortion and Early Enhancement

*Mentor: Dr. Peter Lawler*

Mac Stovall

Ethics Concerning Kidney Transplantation and Donation

*Mentor: Dr. Peter Lawler*

Lottie Sinkula

Comparison of Water Quality of Ponds Impacted by Livestock versus Wildlife

*Mentor: Dr. DeLacy Rhodes*

Nonpoint source pollution of waters is considered to be one of the leading threats to water quality. Because this pollution occurs with increasing prevalence, the importance of researching these impacted areas to determine levels of contamination becomes paramount. Much nonpoint pollution has been found to affect ground water by leeching into aquifers and impacting human drinking water. Studies assessing wildlife and livestock access to water sources have also shown that water contamination from all warm-blooded animals poses a concern for water quality. In terms of assessing water quality, studies have determined that total coliforms serve as a better indicator of quality than turbidity and suspended sediment. Understanding the effect of animals on water sources allows scientists to determine the quality of the waters tested and identify potential threats to nearby waterways and human health. Because of these factors, we sought to compare bacterial numbers in campus water sources based on animal access. Findings from these studies...
McKenzie Weisser  
**A Field Evaluation of Milorganite® as a Repellent for Non-Venomous Rat Snakes**  
*Mentor: Dr. George Gallagher*

The objective of this study was to evaluate Milorganite® as a repellent for rat snakes. During three, 7-day release periods, 5-6 rat snakes were placed within a 0.1ha plastic fence enclosure. Snakes were fitted with an externally attached radio transmitter with location determined 3x/day by radio telemetry and visual confirmation. During the first two, 7-day periods, with no Milorganite® treatment, snakes were contained within the enclosure for a similar (p>.05) duration of 9.1±1.8h and 9.4±1.8h respectively, before escaping. Prior to release of snakes in period 3, a total of 907.2g of Milorganite® was applied in a 20cm width strip along the interior perimeter of the enclosure. During period 3, total time snakes (n=6) were maintained in the enclosure was higher (p<0.005) during the Milorganite® treatment (164.0±1.4h) compared to period 1 (64.0±1.8h) or period 2 (66.0±9.0h). All snakes remained throughout the 7-day treatment period. One snake died on day 6 from unknown causes. Results of this study suggest Milorganite® was effective as a repellent for the rat snake under these conditions.

Rachel Botta and Katrina Prewett  
**Milk-Let Down: Strategies to Prevent Inconsistencies and Increase Efficiency**  
*Mentor: Dr. Sunday Peters*

Efficiency in the milking parlor is of great concern to the industry. Previous studies have shown that consistency and timing of udder preparation directly relates to the efficiency of milk let-down. The objective of this study is to identify factors responsible for variation in efficiency at the Berry College Dairy. When subjected to statistical analysis, milking data captured by AfiMilk showed significant difference in the effect of individual employees on the percent of milk let down in the first two minutes (% Milk 2 Min) and the flow rate in the first fifteen seconds of milking unit attachment (Flow Rate 0-15s). These results suggest that the present of variation among employees is one of the factors affecting milking parlor efficiency at the Berry College Dairy. These results will be used to attempt to improve the overall milking efficiency by minimizing variation in employee performance.

Jason Hatfield  
**Understanding Disease Resistance, Disease Tolerance, and Research Implications**  
*Mentor: Dr. Sunday Peters*

Disease resistance and disease tolerance are two different terminologies often used wrongly or used interchangeably to mean the same thing in the scientific community. The misunderstanding of these two unique and distinct terms has caused many problems with the development of better treatments for common diseases, as well as hindering optimal selection options in livestock genetics due to having significantly different mechanisms of actions. A general understanding of the differences between these terminologies and how they are studied in livestock genetics will be the first step in designing studies to find a genetic solution to resistant pathogens. This presentation discusses the importance of differentiating between these two terms and provides examples of their impact, as they are distinctly different, yet unfortunately are frequently misused.

Connor Wright  
**Solving the Structure of the 3,4-Dichlorophenol and Tetramethylammonium Crystal**  
*Mentor: Dr. Ken Martin*

The crystal structure of the 3,4-dichlorophenol/3,4-dichlorophenolate and tetramethylammonium system was solved. The determination of the structure of this crystal is another step in the much larger investigation of the alpha effect which governs the reaction kinetics of nucleophiles. In an effort to remove the phenolic hydrogen and to promote crystallization, tetramethylammonium hydroxide was chosen due to its classification as a strong base. Crystals were synthesized by mixing aqueous tetramethylammonium hydroxide and 3,4-dichlorophenolate dissolved in ethanol in a 1:1 molar ratio and allowing the solvent to very slowly evaporate. The identity of the crystal was confirmed using 1H-NMR spectroscopy. The x-ray data was then collected at the Emory University X-ray Crystallography Center. The structure was solved and was found to include a system of two distinct 3,4-dichlorophenol molecules (one of which is highly disordered), one distinct 3,4-dichlorophenolate molecule, and one distinct tetramethylammonium molecule. The two dichlorophenol donor each of their phenolic hydrogens to the phenolate, creating a strong hydrogen-bonding network. Due to the presence of a phenolate, the crystal can (in the future) be subjected to an electron density study which will then provide insight into the alpha effect as mentioned previously.

Danielle Penk  
**Asymmetric Synthesis of Chiral Aza-Heterocycles from Propargylamines**  
*Mentor: Dr. Mark Turlington*

Chiral aza-heterocycles are important building blocks in drug discovery and are found in alkaloid natural products. An example of a chiral aza-heterocycle is a 2015 FDA approved drug called Cotellic which is used to treat melanoma. While many methods for aza-heterocycle synthesis have been developed, propargylamines have been underutilized in the context of enantioselective aza-heterocycle synthesis. We report the stereoselective preparation of halogen-containing propargylamines in moderate to high diastereoselectivity via nucleophilic addition of halogenated alkynes to Ellman imines. We also describe the substrate scope and limitations of reduction and cyclization of these halogen-containing propargylamines to prepare chiral aza-heterocycles.
Nathan Robinson  
Reduction and Cyclization of Propargylamines for the Synthesis of Aza-Heterocycles  
Mentor: Dr. Mark Turlington

2-substituted 1,2,5,6-tetrahydropyridine and piperidine aza-heterocycles are present in a multitude of natural products and drug compounds such as Cotellic, which is a drug used in the treatment of melanoma, or the sedum alkaloid family of natural products, which have memory enhancing properties. As such, the development of new synthetic methods for these compounds expands the synthetic options available to medicinal chemists, leading to more efficient drug synthesis. We report studies on the preparation of propargylamines from the addition of alkynes to imines, and reduction and cyclization of these propargylamines to prepare 1,2,5,6-tetrahydropyridines and piperidines. The synthesis can be accomplished with up to 87% yield over three steps and is compatible with a large number of substituents including alkyl, aromatic, and heteroatom containing substituents.

3:10-4:20 Session 4-A (Ballroom A, Krannert Center)  
Moderator: Ms. Rebecca Logan

Maddie Ludvik  
Indian Aesthetics and its Effects on Performing Arts  
Mentor: Dr. Jeffrey Lidke

Ludvik explores how the facial expressions, gestures, movements, colors, and other elements of performance in Hindu dance reveal a complex religious aesthetic on the nature of emotion. A dancer’s purpose is to reflect the thoughts and emotions of a character through a carefully woven web of words translated into gestures. Classic Hindu performances are a gift for the gods, but they are also a form of meditation for the dancers who have spent most of their lives perfecting their skills as performers. The purpose of any art form is to unite all humans on the most basic level, and this ideal can be seen in the way Indian aesthetics are conveyed through Hindu dance.

Kirstan Catoe  
Neuroscience and Meditation  
Mentor: Dr. Jeffrey Lidke

My research was focused on how meditation affects the brain in light of the world’s three major religions: Buddhism, Hinduism, and Christianity. My presentation begins with explaining how meditation is embedded within these traditions and how, to some extent, they all can use meditation to achieve similar spiritual effects. From here, I discuss the mindfulness process as whole and then move into how practicing meditation effects specific parts of the brain such as the parietal-frontal circuit, anterior cingulate, amygdala, hippocampus, and pre-frontal cortex. After discussing how it affects the brain specifically, the presentation will move into how meditation affects a person’s overall demeanor, both positively and negatively.

Jordan Callahan  
Diet and Alchemy in Asia  
Mentor: Dr. Jeffrey Lidke

I will be discussing how diet is involved with alchemy. I will first look at the goal of alchemy, and also what heating up is and why it is important. I will discuss foods that physically heat up and cool down the body. I will then discuss how one must have a balance of Yin and Yang foods in order to heat up the sexual energies in the body. I will then mention how not only Taoists believe this, but almost all Asians live by the “hot” and “cold” food rule, whereas westerners do not.

John Edgar  
Mantras (Sound) in Religion  
Mentor: Dr. Jeffrey Lidke

My presentation will examine how influential sound is as a sensory perception to religion, and how it is capable of uniting humanity, and in turn uniting different religions. Sound is a fundamental part of our composition as humans and a key component in our world. It affects us at a molecular level and shapes our identity and beliefs. It is also the basis for our communication, which makes it essential for how we understand ourselves and the world around us. This includes how our beliefs develop and how we approach our faith. The goal of this presentation is to provide a knowledge of the impact of sound on our world, especially at the spiritual level, and in doing that provide a way for all religious voices to be united in one accord.

Brent Dotson  
The Superhero Faith: Religious Lessons in Superman, Batman, and Spider-Man  
Mentor: Dr. Jeffrey Lidke

I will take a look at the different characters and stories of Superman, Batman, and Spider-Man, and how they present various religious teachings within them. Superheroes have become the new mythology, and so help to show the human condition in super-human characters. For example, Batman represents the idea of suffering as well as serving as an example of dualism. Each character represents different traits, and comes back to the idea that humans tell stories to make sense of the world around them.

Emily Gates  
Burning and Madness: Exploring Sylvia Plath’s Construction of Identity  
Mentor: Dr. Sandra Meek

This paper is an analysis of how Sylvia Plath’s poetry and prose use images of burning/fire, madness, and confinement to subvert Western ideas about female identity. These three images are prominent themes in Episode IV of The Aeneid, where Dido, Queen of Carthage commits suicide because the patriarchy deems the hero’s mission more important than Dido’s love. Sylvia Plath’s poetry and prose utilize the same images that document the decline of Dido into madness to openly communicate her own struggles with madness and to construct an identity that demands and audience. Plath’s use of these images has established her as a central poet to the
Confessional movement and has transformed her into a feminist icon to whom many struggling women relate. In contemporary academia, there remains a debate about whether we should read Plath’s work biographically. This study concludes by making a case for why we should continue to read Plath’s work biographically, as it is abundantly clear that Plath’s poetry and only novel, *The Bell Jar*, reference events that Plath recounts in her journals. There is no separation between Plath the woman, and Plath the writer and we should respect Plath by reading her as she lived.

Julia Dawn Elkins

**Ode to a Hometown**

*Mentor: Dr. Sandra Meek*

Julia Dawn Elkins will be reading a series of original poems exploring the intersection between Eco poetry and the Southern identity.

Rachel Schrauben Yeates

**The Zine Scene: Queer Femme DIY Communities**

*Mentor: Dr. Jim Watkins*

Feminist and queer communities can trace their family trees to Riot Grrrl zines and other ephemeral texts. Not a magazine, not a book, but something in between – zines are small press at its smallest, but they play a large role in uniting marginalized communities.

Zachary Woodworth

**Rethinking Women’s Roles in Literature: A Study in Chretien de Troyes’ Lancelot**

*Mentor: Dr. Mark Taylor*

“If you shine a spotlight into dark cutting rooms the world over, you’ll find a lot of them.” This was what The Hollywood Reporter said of female film editors in an article highlighting their role in the history of cinema. The article reveals that female editors shaped many of the most important films ever made, from The Wizard of Oz to Star Wars to Pulp Fiction. But this trend, women playing critical yet unsung roles in the creation of art, is not a modern invention. In the opening to his epic poem The Knight of the Cart, Chrétien de Troyes credits the Countess Marie de Champagne with “furnishing” him with the material for his tale. She, effectively, prompted the creation of some of the most important and influential Arthurian legends. And the role of women as crucial behind-the-scenes operators continues in Knight of the Cart itself, where Lancelot is aided in his quest by several female companions, many unnamed and almost all forgotten by the story’s end. This paper seeks to demonstrate the importance that women, from an enemy’s daughter to Lady Guinevere herself, have in Chrétien’s story and shine the spotlight onto the dark world of women in literature.

Mallory Vaughn

**Queer Transnational Identities in Literature from the U.S.-Mexico Border**

*Mentor: Dr. Jim Watkins*

This paper focuses on the issue of transnational identity as well as queer identity and how these identifications function within the space of the border, as well as issues of increased violence on the border and how this contributes to the representation of individual identity. Presently, the issue of Latino immigration through United States borders is a complex and highly-charged topic. A great deal of sociological and literary research has been dedicated to the people who exist within these border spaces and those who have crossed national borders. This issue of militarization and cultural identity is very widespread and permeates a significant portion of the literature from border spaces and from Latino authors. It is an important topic to analyze in depth because so many of the issues represented in the literature also express themselves in the sociological and political climate of the present day.

Session 4-C (Room 324, Krannert Center)

*Moderator: Dr. Virginia Troy*

Julia Zharichenko

**A Fine Line**

*Mentor: Mr. Brad Adams*

The pecha kucha is about how there is a fine line between violent and non-violent protests and how it is hard for police to distinguish between whom is participating in which. This pecha kucha is fairly simple and does not have many speaking parts. It starts with calm music and friendly protests and progressively becomes more violent as the presentation goes on.

Suleima Jacob

**Eugène Chevreul and Color Theory**

*Mentor: Dr. Virginia Troy*

Michel Eugène Chevreul (1786-1889) was a French chemist whose research helped explain the chemical composition of animal fats. In addition to isolating th organic acids composing fat, Chevreul developed the law of simultaneous contrast. This color theory, which explains why juxtaposed colors appear as different as possible in optical composition and intensity of their color, influenced the techniques of French painters in the Impressionist and Neoimpressionist period. According to Chevreul, his law could also be applied to differences in the degrees of lightness as well as hues. However, scholars criticize Chevreul for confusing the mixture of lights with the mixture of pigments. Thus, this presentation will not only focus on presenting how Chevreul’s color theory influenced specific artists but will also discuss the criticism that the law of simultaneous contrasts faced by the end of the 19th century and faces with modern scholars.

Wendy Bristow

**Crafting a Character**

*Mentor: Mr. Brad Adams*

This work delves into the process of character design and illustration. Specifically, this Pecha Kucha presentation will primarily have to do with this process, displaying a breakdown of various stages of progress behind designing and then illustrating a character. Each
This body of work focuses on creating multiple digital portraits of five celebrities who died in 2016. These actors and singers were ones who meant something to me. The portraits explore what exactly it is that makes celebrities the same as the rest of us. Through the passage of time, they age and die like everyone else. While their roles (characters) and reputations can change with time, they ultimately remain the same person, as do we. This Pecha Kucha will display screenshots of one or two digital portraits created using Adobe Photoshop. The screenshots will focus on technical development of the portrait, showing each individual piece as it progresses from a simple digital sketch based on a reference image to a complete digital piece with colors, highlights, shadows, and a patterned background.

Robert M. Trieber

Development of a Digital Portrait: From Concept to Completion

Mentor: Mr. Brad Adams

Jess Bozeman

Moral Licensing and the Its Effect on Current American Politics

Mentors: Mr. Matt Delzer and Mrs. Hope Willoughby

Floyd Against Drugs (FAD) approached a public relations cases and campaigns class and requested assistance with campaign planning aimed at discouraging underage drinking. FAD received a grant from the White House Office of National Drug Policy requiring them to research, develop, implement and sustain a positive social norms media campaign with the collaboration of local partnerships. The class designed three traditional posters with positive social norms messages (e.g. 92% of you have fun without alcohol) but included #WhatIDidInstead, an interactive, social media campaign component. A focus group consisting of six local teens, ages ranging from 13 years to 18 years old, concluded that students believed the social norm statistics were being overused and the group of students who enjoy drinking appear as the majority (reversing the social norm). There was a positive response to #WhatIDidInstead, with the students agreeing that social media interaction is the best way to reach teenagers. Following the focus group, the class recommended listening to the voices of the local teenagers by creating a programmatic campaign utilizing a social media platform that can measure engagement by recording the number of views, posts, likes, comments, shares and retweets. Local teens used data from the focus group and campaign outline to develop a social media campaign called #ItsNotJustAFAD.

AnnaBeth Crittenden

Power of the Algorithm: Analysis of Facebook’s Censorship of Napalm Girl Photo

Mentor: Mrs. Hope Willoughby

On September 9, 2016, Espen Ehil Hanson, the news editor of the Norwegian newspaper Afterposten, received an email from Facebook requesting his removal of a pornographic photo from his newsfeed. However, the problem photo was not pornography, but rather Nick Ut’s Pulitzer Prize winning photo of a nine-year-old girl running naked from the Napalm attacks in the Vietnam War. Facebook’s censorship of an important photo from history sparked a debate across the world about Facebook’s control in our lives. The Facebook algorithm has been criticized for tailoring a person’s newsfeed based on interests and past preferences, and with the Napalm Girl censorship, Facebook’s control over what we see and how we see it has also begun altering public recollection of
historical events. Using a cultural studies approach, this paper analyzes how Facebook’s use of memorializing and filtering of the Napalm Girl photo provides Facebook with unconscious power in shaping our public memory and present reality.

Jason Hatfield

Ignorance is Bliss…Sometimes

Mentors: Mr. Matt Delzer and Mrs. Hope Willoughby

Heart attacks are a serious issue in America, as most heart attacks can turn fatal quickly, and they are the leading cause of death in America. There are many ignorances surrounding heart attacks, ranging from who they happen to, to where they can happen. Through the use of humorous rhetoric and scientific fact, this speech aims to educate and inform the general public on the very serious matter of the many dangers of heart attacks, specifically when they happen in our youth, and also provide ways to educate and to better prepare people in what to do should a heart attack happen around them.

4:30 – 5:30 p.m.

Closing Plenary (Spruill Ballroom, Krannert Center)

Moderator: Dr. Susan Conradsen

Presentations by Berry Scholars

Michaela Rowland, Synovus Scholar

Examining the Assimilation of Refugees vs. Economic Immigrants in the U.S.

Mentor: Dr. Jamie Sharpe

One of the main concerns policy makers have regarding refugees is how successfully refugees are able to assimilate in the area they settle. To examine refugee assimilation, we compare refugee U.S. Census data to economic immigrant U.S. Census data from 1980, 1990, and 2000. The United Nations Commission on Human Rights defines a refugee as “someone who has been forced to flee his or her country because of persecution, war, or violence”. An economic immigrant is someone who migrates to a new country in search of a new job or economic security (Cortes 2004). We examine assimilation in terms of wages, house ownership, and unemployment. By comparing the refugees to economic immigrants we expect to find that refugees start off at lower levels of economic standing because they were not as prepared to immigrate as economic migrants. However, as refugees are typically more dedicated to thriving in the areas they are placed, we expect to see them catch up to economic immigrant assimilation levels and eventually surpass.

Andrew Lockhart, Synovus Scholar

Anharmonic Frequency Generation

Mentor: Dr. Shawn Hilbert

A resonance frequency is a natural frequency of a system that is easier to excite than a non-resonance. When a driving frequency is introduced into a system it excites that frequency and all integer multiples of that frequency within the system. These frequencies are called harmonics. An anharmonic resonance is a frequency that is produced within the system that is not an integer multiple of the driving frequency. In our experiment we use a system composed of two PVC sections that are attached together with a metal disc in between to couple the two sections. We start by finding resonance frequency pairs, which are two resonance frequencies with small frequency differences. We drive the system with the higher resonant frequency and the difference between the resonances of the pair, which experimentally shows generation of anharmonics.

Joelle Smith, George Scholar

Athlete, Musician, or Linguist? What’s Working Memory Got to Do with It?

Mentor: Dr. Casey Dexter

The present study explored the relationship between “fluency” and working memory. Specifically, we examined the question of whether extensive training in athletics, music, or multiple languages conferred a particular advantage when it comes to working memory abilities. To answer this question, we recruited four separate groups of college students: musicians, athletes, multilinguals, and college students that did not have an expertise in any of these areas. 104 college students at a small, liberal arts college participated in tasks measuring intelligence and working memory span. To test intelligence, participants completed a computerized assessment. Working memory span was measured using computerized tasks created by Randall Engle at Georgia Tech. Specifically, we used two shortened complex span tasks, the operation task, and the reading task. Results revealed musicians to have the best working memory ability with significantly better working memory compared to athletes in particular. An additional analysis was run with fluency type dichotomized with musicians in one group and all other participants in the other group. A significant difference was found with musicians as a group demonstrating superior verbal working memory ability. This research adds to the literature by comparing these separate, but commonly practiced activities purported to improve working memory.

Samantha Marshall, George Scholar

An Integrative Model of Identity Development in Emerging Adulthood

Mentor: Dr. Alan Hughes

Current research in emerging adulthood explains how work and relationships independently affect identity but fails to provide an integrative model of identity development during this period. Our goal was to provide a working integrative model of identity development within emerging adulthood, highlighting the importance of personality in facilitating ethnic identity development and work motivation. We expected that ethnic identity development would correlate with emerging adulthood exploration; we also predicted that certain personality traits would positively correlate with ethnic identity development and intrinsic work motivation. Furthermore, we predicted that both whites and ethnic minorities would experience ethnic identity development due to changing demographics. Lastly, we predicted that self-determined work motivation would manifest during emerging adulthood. Twenty-eight participants (18 to 28) completed questionnaires about emerging adulthood, ethnic identity, personality, and work motivation. Emerging adulthood exploration negatively correlated with ethnic identity suggesting that ethnic identity may not be a facet that
develops during emerging adulthood. Ethnic identity exploration and development significantly differed for whites versus non-whites, suggesting that exploration is a process of ethnic identity development that ethnic minorities experience more than whites. Work motivation moderately correlated with higher scores in agreeableness. Finally, self-determined work motivation positively correlated with emerging adulthood experience.

Merrill Jane Wood, George Scholar  
Empathy in Adults with Intellectual Disability  
**Mentor: Dr. Michelle Haney**

The goal of the current study was to further understand affective empathy in individuals with Intellectual Disability (ID). The study addresses the historical lack of research on empathy and prosocial behavior in people with ID, noting the influence of the eugenics movement. In order to assess affective empathy, a modified version of the MET was administered to adults with ID (n=12) and to a control group (n=15). Completion of the MET involved viewing emotion eliciting photo stimuli from the International Affective Photo System (IAPS) and using a 9 point Self Assessment Manikin (SAM) to rate how much participants felt for each scene (i.e. explicit emotional empathy, or valence) and the perceived intensity of each scene (i.e. implicit emotional empathy, or arousal).

When compared with national averages, results indicated that individuals with an ID do not differ from controls in strongly functioning explicit emotional empathy. In contrast, implicit emotional empathy responses were qualitatively different from college students and national standards. Implications of these findings are discussed in comparison to emotional empathy of individuals with Autism Spectrum Disorder and Adam Smith’s Empathy Imbalance Hypothesis. Results support understanding that people with ID experience complex emotions, having a foundation for prosocial skills.

Kellie Sauer, Kirbo Scholar  
Prevalence of *Trypanosoma cruzi* in Rodent Populations on Berry College Campus  
**Mentor: Dr. Chris Hall**

An estimated 8 million people are infected with Trypanosoma cruzi, the causative agent of Chagas disease. Although largely associated with Latin America, *T. cruzi* is enzootic throughout the southern tier of North America. Unfortunately little is known of this pathogens distribution in natural mammalian reservoir populations in the southeastern United States. As part of a larger survey, rodents were trapped on the Berry College campus. DNA was extracted from spleen tissue and subjected to PCR analysis using the *T. cruzi* specific S35-36 primers. The results showed that 75 of 102 (73.5%) Cotton mice (*Peromyscus gossypinus*) and 28 of 64 (43.8%) of Cotton rats (*Sigmodon hispidus*) tested positive for the presence of *T. cruzi* DNA. In addition, 2 of 9 (22.2%) shrews tested positive, as did the single specimen of chipmunk (*Tamias striatus*) and a flying squirrel (*Glaucomys volans*). This resulted in an overall prevalence of 60.8% among those specimens tested. DNA from 177 rodents was subjected to PCR using the D71-72 primers to determine the strain type *T. cruzi*. These results showed that all those tested harbored the Type-1 strain of *T. cruzi*, the one most associated with human infections in the U.S. This highlights the broad distribution of *T. cruzi* among rodent populations in the southeastern United States.

Sarah Carroll, Kirbo Scholar  
How Does the City of Savannah Reconcile its Conflicted Past?  
**Mentor: Dr. Curt Hersey**

This presentation provides context for a 30-minute documentary that explores how Savannah as a touristic city remembers (and forgets) its very conflicted past, including how and even whether to commemorate its participation in the trans-Atlantic slave economy. With so many competing narratives vying for tourists’ attention, which voices are never heard? The documentary uses historic markers and monuments as a geography that exposes the various economic, political, and cultural factors that reveal Savannah’s past as complex, even dangerous, as well as how competing versions of that past are portrayed to the public. Organizing themes of the documentary are dichotomous notions about “black history” and “white history.” How are the two sanctioned, and who is authorized to shape and share those histories? What role does or should “moral obligation” play in telling these histories? What does or should progress look like for Savannah in telling its story? Savannah Mayor and Berry alum Eddie DeLoach, Queen Quet, the self-described Chiefess of the Gullah/Geechee People, Stan Deaton, senior historian at the Georgia Historical Society, and others discuss these issues.

Closing Remarks- Dr. Jennifer Hoyt

5:00 p.m.  Music Department Honors Recital, Ford Auditorium
**Animal Science**

**Hannah Rivers**

**Natural Antibody Profiles During Early to Mid-Lactation in Jersey Dairy Cows**

*Mentor: Dr. Laura Flatow*

At the onset of lactation, dairy cattle are at greater risk for developing diseases such as mastitis. Diseases resulting from this immunosuppression can lead to decreased milk production and economic losses. Determining which component of the immune system is responsible for this suppression could help in addressing the issue. Natural antibodies are an important component of the innate immune system, which is the body’s first line of defense against disease and high somatic cell counts. The purpose of this study is to measure natural antibody concentrations in the serum of Jersey dairy cattle to determine if there are changes over time. This could help us pinpoint a time during lactation that cows are most susceptible to disease. Producers could then use this information to reduce economic losses. Our study showed that IgG and IgM natural antibody concentrations decreased at the onset of lactation and then increased and plateaued by week ten of lactation.

**Isabella Kukor**

**Elnady Technique: Animal Tissue Preservation**

*Mentor: Dr. Jay Daniel*

The Elnady Technique was developed as a new method of tissue preservation. The Elnady Technique consists of soaking the specimens in each of the appropriate solution resulting in a plasticized specimen free of harsh chemicals and odors. This preservation can then be used for easily storing a multitude of different types of samples for the broad array of topics covered by the Animal Science Department. The technique was developed at the University of Cairo as an innovation in the field of tissue preservation. The resulting specimens are said to be durable, realistic, flexible, and inexpensive. The purpose of this project is to test the method on animal tissue to preserve dissected tracts and organs for teaching purposes in the animal science classroom. A goat reproductive tract is currently being used to test the new technique of preservation by using acetone, glycerin, and cornstarch instead of formalin.

**Danielle Creamer, McKenzie Weisser, and Daryon Smith**

**Anatomy of a Fence to Prevent Escape of Non-Venomous Rat Snakes (Elaphe obsolete)**

*Mentor: Dr. George Gallagher*

We constructed a fence enclosure for rat snakes (Elaphe obsolete) as part of a repellent study in an unimproved pasture. Wood and steel T-posts were secured in a 30m x 30m square (0.1ha) at an average height of 128.5cm±0.5 with an inward slope of 17.1°±0.5. Plastic sheeting (3.04m x 30.4m x 4mm) was suspended over support wires between posts and secured within a 25cm trench. A 17-gage electric fence wire and electric polytape were attached by duct tape to the top of the plastic fence. An additional strand of polyfence was attached by tape 20cm above the ground. A loop of polytape was attached between the top and bottom electric fence material in each corner of the enclosure. Electric polytape and wire were energized by a solar powered charger with an output >5000v. During two releases of 5 mature rat snakes (n=10; 136.7cm±6.4), containment within the enclosure was similar (p>0.05), and limited to 9.1h±1.8 and 9.4h±1.8 respectively. Video analysis indicated snakes were climbing the electric charged polyfence tape and escaping over the fence. This fence design was not sufficient to maintain mature rat snakes.

**Olivia Iobst**

**Handedness in Fruit Bats (Pteropus spp)**

*Mentor: Dr. Sunday Peters*

Fruit Bats are classified, as Megabats and they are extremely similar to humans with respect to arm, hand, and digits orientation. The objective of this research is to investigate if Fruit Bats, like humans, would show dominance in their left or right hand (wing) when presented with both simple and difficult tasks. A population, consisting of four different species of Fruit Bats, was subjected to a controlled testing. The Fruit Bat species are presented with a simple or difficult task and then observing which wing was used to grab the object. The counted data from each observation of which wing was used during simple and difficult tasks were analyzed using paired t-test after logarithmic transformation of the data. Sex and species effects on hand dominance and interaction between these factors were also analyzed using univariate analysis of variance. Results showed multiple Fruit Bat species showed a preference (P<0.05) to using their left wing over their right. We did not find sex and species effect (P> 0.05) on hand dominance in the population of Fruit Bats used in this study. Although we did find a higher percentage of handedness in difficult tasks compared to simple tasks. These results suggest the existence of hand dominance in Fruit Bats.

**Daryon Smith, McKenzie Weisser, and Danielle Creamer**

**A Field Evaluation of Two External Attachment Locations of Radio Transmitters on Non-Venomous Rat Snakes (Elaphe obsolete)**

*Mentor: Dr. George Gallagher*

The objective of this study was to determine the effectiveness of external attachment of radio transmitters at one of two locations on mature rat snakes (Elaphe obsolete). Transmitters were attached to mature snakes (n=10; 136.7cm ± 6.4) on either the ventral surface (n=5) or dorsal-lateral surface of the rib cage (n=5), approximately 25cm cranially to the cloaca. Transmitters (18mm x8mmx2mm) were fastened to the adherent side of duct tape (20cm x 30mm), and then secured in the appropriate location by a second layer of tape (20cm x 40mm) wrapped around the snake’s body. Snakes were placed in a 0.1ha plastic fence enclosure, and located 3x/day by radio telemetry. Snakes (n=4) shed their skin and the transmitter, within 6-17d post-attachment (11.7d ±2.4). Transmitter reception distance
was typically <50m and often problematic. Snakes (n=4) escaping the enclosure and not located, ranged from 1-21d post-attachment (12.3d± 4.7). Results of this study suggest that the location of external attachment of transmitters had no influence on duration of effectiveness. However, shedding and limited telemetry range under these conditions should be considered to determine if the methodology is appropriate for the desired objectives.

Rachel Botta
Economic Viability of On-Farm Milk Culturing
Mentor: Dr. Rebecca Dixon
Clinical and subclinical mastitis have devastating financial effects on the dairy industry. The objective of this study was to test the economic viability of a culture-based selective treatment program in a small farm setting (28 lactating Jerseys) as well as to gather information on the common mastitis pathogens present within the Berry College dairy herd. Over the course of five months, a total of 17 cows were sampled based on a positive California Mastitis Test (CMT), a test-day somatic cell count (SCC) of over 250,000/ml, and/or visible symptoms of infection. Plates were evaluated after 24 hours of incubation for gram-positive, gram-negative, or no-growth patterns. Treatment decisions were then made based on pathogen identity, cow history, and estimated cost-efficacy. The costs associated with each case were then calculated and compared to other treatment plans. Prior to this study, cows were treated non-selectively and immediately following a positive CMT, high test day SCC, or visible flakes or chunks, which created concerns of overtreatment and appeared to be unreliable in curing chronic cases. This research yields economic and herd health value which warrants the continuation of the program at this facility as well as potential implementation by other small herds.

Kristianna Saelens
Amino Acid Analysis in Plasma from Yearling Horses Through One Year of Growth
Mentors: Dr. Judith Wilson and Dr. Dominic Qualley
In the study of animal nutrition, it has been long understood that animals have varying nutritional requirements in different physiological stages of life. This study is investigating the changes, if any, in amino acid profiles of yearling horses over a year’s period of growth. Yearlings experience large spurts of growth that require optimal nutrition in the form of quality energy and protein in order to support the increase in muscle mass. Blood plasma samples were taken from the same five horses over a years’ time. Concentrations of eight specific amino acids were analyzed from the plasma. Amino acid analysis was performed by high-performance liquid chromatography (HPLC) to obtain the data. Amino acid standards were used to identify specific amino acids peaks in the data. Research in this area has been done before, but not in this specific age group of horses. Knowledge of exact amino acid requirements and usage in the body during growth can help horse owners and scientists in their goal to provide and meet nutritional requirements of adolescent equines.

Erin Valek
Species Identification of Plant Roots in Caves in the SE U.S. using DNA Analysis
Mentor: Dr. Cathy Borer
Plants are vital in almost all ecosystems, and roots growing into caves provide an ideal opportunity to study plant roots with minimal physical or physiological disruption. An essential first step for this work is to identify the species of plant roots growing into caves. Because it would be difficult to identify plant species based on root morphology, we used molecular analysis to identify plant species. We visited local caves to collect root samples from which we extracted and amplified their DNA. We used UV spectroscopy and gel electrophoresis to analyze the samples before we had the DNA sequenced. Using DNA sequence data, we expect to accurately identify the plant species by comparing the results with online genetic databases. We also compared root identifications with species growing on the surface above the caves to verify the species identification we made via molecular tools. This species identification will allow future work to address a range of physiological and ecological questions.

Nick Wessel
Seed and Seedling Characteristics of Hybrid Chestnuts (Castanea spp.) Derived from a Backcross Blight-Resistance Breeding Program in Georgia
Mentor: Dr. Martin Cipollini
The Georgia Chapter of The American Chestnut Foundation (GA-TACF) has been breeding backcross hybrid chestnuts since 2005. The goal has been to introduce blight resistance from Chinese chestnut while recovering traits of pure American chestnut via a series of successive backcrosses. This study focuses on the degree to which American chestnut-type traits can be found among seeds and seedlings derived from the first backcross trees selected for blight resistance in Georgia. Seeds were collected from selected hybrid, Chinese chestnut, and American chestnut trees in September 2015. Measurements of seed mass, volume, and sugar content were made on seeds from each line. Duplicate seed batches were planted in pots and early seedling traits were measured in April 2016. Chinese chestnut lines tended to differ significantly from American chestnut/backcross lines in seed mass and volume, and seedling leaf number, basal area, height, and volume, whereas American chestnuts and backcross lines overlapped broadly in these traits. Seed sugar content, and seedling leaf area and leaf length/width ratio showed non-significant trends for differences between Chinese chestnut and American chestnut/backcross lines. These results suggest that seed and seedling characteristics of backcross hybrid chestnuts do not differ significantly from those of pure American chestnuts.

Robbie Ellwanger and Robert Stilz
The Atlanta Coyote Project
Mentor: Dr. Chris Mowry
The Atlanta Coyote Project (www.atlantacoyote.project) was formed following a 2014 survey of nearly 2,000 Georgia residents asking for their attitudes towards, experiences with, and perceptions of coyotes. Many respondents perceived an increase in coyote activity near their home over the previous three years. Concern for the safety of pets and children was high among respondents, but so
was the desire for further information and recommendations on peaceful coexistence with coyotes. The project now serves as 1) a valuable source of coyote information for the general public, 2) a centralized place to report and track coyote sightings and incidents in Georgia, and 3) a framework for conducting scientific research on coyotes. Innovative technologies using infrared-triggered cameras and field audio recordings have become increasingly valuable and effective tools for wildlife researchers, and we are using them to study the presence and size of coyote populations across the metro Atlanta region as well as to encourage “citizen-scientists” to join in our efforts. We are using the 26,000 acre Berry College Outdoor Laboratory as an ideal location to experiment with and refine camera- trapping and vocalization elicitation techniques on coyotes, and to then apply what we learn in other (urban) settings across metro Atlanta.

Savannah McKenzie
Survey of Environmental Enterococcus spp. Isolates for Antibiotic Resistance
Mentor: Dr. DeLacy Rhodes

Previous research has identified Swan Lake on the Berry College campus to have comparatively high levels of the bacteria Enterococcus. Members of this bacterial genus are common intestinal organisms that are. Enterococcus is known for its ability to acquire antibiotic resistance, and become a health threat when resistance to cell wall inhibitors like ampicillin, penicillin, and vancomycin. The presences of drug resistant Enterococcus species in Swan Lake could have implications for affecting human health because the use of Swan Lake by many migratory waterfowl, especially large flocks of Canadian geese, could be spread over a potentially large area. Enterococcus isolates will be acquired from Swan Lake, and isolated through the use of selective and differential media. A broth will be cultured from the isolates and plated with various antibiotics on different plates to determine if any antibiotic resistant bacteria are present.

Serena Kargbo and Jared Blake
Self-mulching in Temperate-zone Trees: A Hypothesis
Mentor: Dr. John Graham

Abstract: Mulching protects a tree’s root zone from frost damage. Consequently, it may be advantageous for a tree to drop its leaves directly over the root zone. We are investigating the evolutionary connections between leaf shape and possible self-mulching. Self-mulching occurs when leaves are aerodynamically inclined to fall straight down, or almost straight down, so that they cover the tree’s root zone, protecting the tree from frost. We are observing leaf fall of various temperate region trees. We drop the leaves from a height of 73.1 centimeters, and measure how far each leaf has drifted horizontally from the drop point. Moreover, we studied patterns of leaf fall over 2-hour increments of 24-hour periods. We predicted that leaf fall might occur more frequently in the early morning, when wind is minimal. Leaf fall, however, is influenced more by windy conditions than time of day.

Ashley Woodard and Austin Fowler
Investigation of Invasive Avian Species in Propogation of Salmonella and E.coli in a Dairy Setting
Mentor: Dr. DeLacy Rhodes

The transmission of disease from wildlife to commercial animals is becoming an increasingly prevalent epidemiological problem. In Georgia, house sparrows (Passer domesticus) and European starlings (Sturnus vulgaris) are considered to be invasive avian species that frequently nest around feedyards and other agricultural facilities due to the year-round supply of food and water. Both house sparrows and European starlings have been found to carry and transmit Salmonella and E. coli to dairy cattle through fecal oral transmission. The infection of cattle with Salmonella and E. coli can lead to decreased overall milk production for dairies and therefore decreased profit margins. Cloacal swabs from house sparrows and European starlings as well as fecal samples from Jersey cows (Bos taurus) were taken at Rollin’s Ruminant Research Center at Berry College. These samples were tested for E. coli as well as Salmonella spp. using general culture methods and molecular detection methods. Investigation into the types of bacteria our local avian species possess as well as which of these bacteria are spread to commercial livestock is important for both the health of the livestock as well as the health of the dairy workers who are exposed to the cattle on a daily basis.

Chemistry

Brooklyn Walsh
The Cloning, Expression, and Purification of The Dead-Box RNA Helicase DDX56
Mentor: Dr. Dominic Qualley

Previous studies have indicated that the interaction between the West Nile virus (WNV) capsid (C) protein and the DEAD-Box RNA helicase DDX56 is an important step for viral assembly, a critical process that occurs prior to viral exit from an infected cell. Understanding this interaction is important because it is a potential target for drug development against many viruses in the Flaviviridae family. Most flaviviruses are vector-borne illnesses, making them a significant epidemiological concern since their most common vectors, ticks and mosquitoes, are both widespread and persistent. In addition to being easily spread, flaviviruses such as WNV, Dengue virus (DENV), and Zika virus (ZIKV) are known to cause severe illnesses such as encephalitis and hemorrhagic fever. In this study, we began by amplifying DDX56 DNA by PCR followed by directional cloning into an expression plasmid. Next, the plasmid was inserted into bacterial cells, which were utilized to express DDX56. After a number of attempts using different purification techniques, we have succeeded in purifying the DDX56 protein. We aim to continue this project by removing the added histidine tag and studying the binding of DDX56 with the WNV C protein, with the eventual goal of developing inhibitors to block this interaction.

Drew Chambers
Synthesis of 2-(Dimethylamino)biphenyl-2-carboxaldehydes Derivatives
Mentor: Dr. Lindsey Davis

Chemists seek to understand observations of the natural world on a molecular level. Reactions between two molecules can typically be described as those between an electrophile (electron-loving) and a nucleophile (nucleus-loving). Our group is particularly interested in the intramolecular interactions between the nucleophilic nitrogen atom and the electrophilic carbonyl carbon atom in 2-(dimethylamino)biphenyl-2'-carboxaldehydes. The synthesis of 2-(dimethylamino)biphenyl-2'-carboxaldehyde and several
derivatives with para-substituents will be reported. Substituents include electron-donating groups (−OCH3 and −CH3) and electron-withdrawing groups (−NO2 and −Cl). Interatomic distances between the nitrogen atom and carbon atom have been determined using X-ray crystallography. This information provides a better understanding of how these groups react with each other.

Grace Sarabia  
Detection of Antioxidants in Black and Green Teas  
Mentor: Dr. Alice Suroviec

Recent studies have found potential anti-oxidant health benefits of teas. This made us interested in finding which molecules are the active ingredients in tea. We were also curious if they could be quantitatively detected. The use of cyclic voltammetry has been suggested in past studies as a quick, less expensive method of detecting the anti-oxidant ingredients in tea. For this reason we employed it in our study. Our goal was to see which molecules were present in a variety of teas using cyclic voltammetry. We then confirmed these results using High Performance Liquid Chromatography.

Harrison Hill  
Synthesis of tetrahydropyridines and piperidines from chloro-propargylamines  
Mentor: Dr. Mark Turlington

A new chemistry methodology for the synthesis of functionalized, nitrogen-containing 5-membered and 6-membered ring systems for use in synthetic organic chemistry and medicinal chemistry is reported. Our method utilizes the addition of 4-chloro-1-butyne to Ellman sulfonamides to produce chiral chloro-containing propargylamines. Partial alkyne reduction to form the alkene and base-initiated cyclization leads to 6-membered nitrogen-containing rings that contain a carbon-carbon double bond present in the ring, allowing for potential further functionalization. This methodology can also be applied to prepare fully saturated 6-membered nitrogen-containing rings.

Matthew Shapiro  
Comparison of a Non-Substituted and a Chloro- Substituted Biphenyl System  
Mentor: Dr. Ken Martin

Often when looking at the structures of compounds, there are more interactions occurring than what appears to the eye. When comparing the structures of a non-substituted biphenyl ring system and a chloro-substituted biphenyl ring system, our group determined that one can observe an interaction between the nitrogen group and the carbon found in the aldehyde due to the addition of a chlorine to the biphenyl ring system. To observe this interaction, the crystal systems of the two compounds were analyzed and compared to note any differences in their structures. It was found that there was a substantial change in the mean deviation of the planarity of the aldehyde when a chlorine was added to the ring system, and this supports the idea that the aldehyde group is changing shape to interact with the lone pairs found on the nitrogen. The interaction was further supported by determining that the torsion angles for the non-substituted biphenyl ring system decreased from 58.47° to 54.98° after a chlorine was added, thereby showing that the amine group’s nitrogen and the aldehydes carbon are getting closer and interacting with one another in the chloro-substituted system.

Nathan Thacker and Anderson  
Synthesis and Evaluation of VX-809 Analogs for in situ Click Chemistry with CFTR  
Mentor: Dr. Mark Turlington

Cystic fibrosis (CF) is caused by mutations to the cystic fibrosis transmembrane conductance regulator (CFTR) ion channel. Deletion of phenylalanine 508 (delF508) is the most prominent mutation and causes impaired protein folding that results in low delF508-CFTR expression and compromised chloride transport. Small molecule delF508-CFTR modulators represent a promising strategy for CF therapy. VX-809 (Lumacaftor) is a recently FDA-approved small molecule modulator that partially corrects the impaired protein folding of delF508-CFTR; however, VX-809 only affords modest gains in lung function for CF patients. To discover novel delF508-CFTR modulators we are pursuing an in situ click chemistry (isCC) approach. In isCC the biological target directs the synthesis of its own modulators by selectively co-localizing reactive azide and alkyne fragments that interact strongly with the target. We report the synthesis and biological evaluation of triazole-containing VX-809 analogs that will serve as positive control compounds for isCC studies. Additionally, we report the problem and solution of a tetrazole intermediate.

Sarah Cooper, Synovus Scholar  
Structural Implications of Gag-Mediated Assembly during Bovine Leukemia Virus Replication  
Mentor: Dr. Dominic Qualley

Bovine leukemia virus (BLV) is a retrovirus that can infect domestic cattle. Additionally, BLV has been proposed as an animal model for human T-cell leukemia virus type 1 (HTLV-1), so treatments for BLV could potentially be translated into human medical therapies. Like most retroviruses, including human immunodeficiency virus type 1 (HIV-1), BLV utilizes the structural polypeptide Gag in its replication process. Gag is composed of three different domains: the matrix domain (MA), the capsid domain (CA), and the nucleocapsid domain (NC). After viral budding, Gag is cleaved into three new proteins (MA, CA, and NC) that serve different functions in the viral life cycle. However, the role of full-length Gag in viral assembly is not clear. We used solution X-ray scattering, computational modeling, and functional assays to study the interaction of Gag with viral RNA. Our results indicate that unlike HIV-1 Gag, BLV Gag adopts a rigid conformation with little flexibility. Similar to HIV-1 Gag, however, the MA domain is important for membrane binding while the NC domain is responsible for RNA binding and packaging.
DriveLite is a prototype designed to solve the problem of a lack of efficiency/economy information in automobiles. The prototype addresses the problem of conveying vehicle economy information in a way that requires very little active thinking from the driver. The poster will be a summary of the development process. The poster will also describe the expected result which is drivers being able to understand their driving efficiency better while remaining undistracted from the act of driving. The results will be found by prototyping and user testing.

Alan Young  From Gamers to Game Developers: Teaching Programming with Game Design  
Mentor: Mr. Zane Cochran

This project explores a different approach to teaching programming and game design principles, by developing a system to teach these concepts by interacting with the system. A person should be able to use this system to gain a basic knowledge about programming to take with them as they begin the process of learning to be a programmer or game designer. The poster will include a demonstration of the prototype that guests can interact with, and an analysis of early user testing feedback. The poster will also include potential extensions for the project.

Chris Whitmire  Interactive Smart Garden  
Mentor: Mr. Zane Cochran

Many gardeners struggle to maintain a completely healthy garden. The Interactive Smart Garden System helps people to take better care of their garden and builds the relationship between people and plant life, giving them more incentive to care for their plants. It does this by monitoring the status of the garden and presenting relevant information to the gardeners in an easy to understand way. This allows the gardener to better understand their garden’s health and to better know how to care for it. It also provides feedback so that the gardener does not underwater or overwater his/her plants. This garden system even utilizes green technology, such as solar panels to power the electronics. This presentation will include a description of the development process of the smart garden, a working prototype, and a description of how user testing is being conducted.

John Aschenbach  Vehicle Maintenance: The Road to Repair  
Mentor: Dr. Zane Cochran

This project explores the decisions and solutions behind repairing and maintaining cars. Due to a variety of maintenance technicalities and extensive repair content, vehicle repair can take a substantial amount of time, money, and expertise. As a result, vehicle users often take their cars to auto mechanics for a majority of basic repairs and maintenance. This project tackles specific areas within vehicle maintenance such as accessing repair content, logging maintenance, and performing preventative upkeep. By compiling and centralizing key repair resources for the maintenance process, vehicle users can save substantial time and money and keep their vehicles on the road and in optimal condition. This project explores the use of an augmented reality system so that vehicle users can understand the basic components and systems of a vehicle. The goal of this is project is to evaluate a user's vehicle system recognition while utilizing the augmented reality system.

Meghan Dooling  Where's Fido?: Notifying Owner when Pets Wonder Off  
Mentor: Mr. Zane Cochran

This project explores the problem of dog owners being away from their dog for long periods of time and dogs wandering off and becoming lost. The first twelve hours after a dog is lost are critical in finding the dog. This project defines a solution to which owners could monitor their dog(s) remotely. The device attached to the dog's collar will communicate with a "home base" station and allows the dog owner to be notified when their dog is no longer in range of the "home base." This will allow the dog owner to react immediately, instead of hours later when they get home from work and realize their beloved dog is lost. This presentation will be of the working prototype and user testing results.

Olivia Mund  Improved TV Interfaces for Children with Disabilities  
Mentor: Mr. Zane Cochran

This work details the development of a TV interface device for children with extreme physical and mental disabilities that allows them to watch movies and TV shows and gives them the ability to select and change the video playing on their own. The prototype for this device is currently set to be a touch screen monitor with a program on it that displays six movie selections in the form of DVDs, which the user can tap to select. My poster will illustrate the research and prototyping progress I have made and will outline user feedback on the effectiveness of the design.

Environmental Science
Chelsea Anderson  Holocene Vegetation and Fire History from Clear Pond, South Carolina  
Mentor: Dr. Zachary Taylor

To understand fire dynamics and climate in Clear Pond, South Carolina I performed a macroscopic charcoal analysis on a 2.5-meter sediment core. Macroscopic charcoal is a useful tool for recreating past fire events because it is deposited into lakes and becomes part of the sediment within 2-3 years. In this region, fire is essential in maintaining a healthy ecosystem and understanding fire behavior in relation to climate will advance researchers knowledge of climate effects on fire dynamics. The charcoal analysis and radio carbonates...
showed evidence of two significant fire events. The largest fire event occurred at 1,222 BP signified by a peak in total charcoal concentration of 1,859 pieces. The second fire occurrence happened at 1,841 BP with a peak in total charcoal concentration of 1,606 pieces. This charcoal record will help refine the understanding of fire and climate during the past 6,000 years in the Southeast, and provide invaluable information to land managers tasked with preserving this vital ecosystem.

Karli Riley and Rhett Allen
Late-Holocene Paleofire Records from Three Lakes in Western Colorado
Mentor: Dr. Zachary Taylor
Lake sediments are an important source of information about past environments. In this research, we use macroscopic charcoal analysis and sediment geochemistry to reconstruct fire behavior and climate from three high-elevation lakes in western Colorado. At Nicholson Lake, we found relatively high fire activity from 3500 to 3000 years before present, BP, (1950), and a second, shorter active period around 300 cal yr BP. Emerald Lake showed a period of consistent fire activity from 2700 to 600 BP. Lake Irwin, a shorter record with a higher sedimentation rate, shows three major peaks at 800, 620 and 320. Of the three lakes, Emerald Lake has the highest bulk density, likely because of its location in a narrow, steep valley prone to avalanches and debris flows. Elevation seems to be the primary control over organic content, with the highest elevation lake (Emerald) having the lowest organic content and the lowest elevation lake (Nicholson) with the highest. While each lake shows evidence of local variation, there appears to be several regional trends. Nicholson and Emerald Lakes both indicate elevated fire activity at 2750 and 2280 BP. Nicholson and Irwin both a peak in charcoal around 300 BP.

Meghan Albritton, Synovus Scholar
A 7,000 Year Record of Fire-Dynamics from Meridian Lake, Colorado
Mentor: Dr. Zachary Taylor
Fires are integral to montane ecosystems of western Colorado, but the controls on fire dynamics are complex and vary in time and space. We performed high-resolution macroscopic charcoal and geochemical analysis on a 2.2 meter sediment core from Meridian Lake, Colorado to reconstruct fire behavior and paleoenvironmental conditions. Meridian Lake sits in a narrow, closed basin between two glacial moraines at 2,940 meters above sea level. The core was recovered near the northwest end of the lake and dates back to 7,600 before present (BP). Charcoal analysis identifies a peak in in fire activity from 1200 to 830 BP. After this peak, fire activity is reduced except for a brief increase from 420 to 278 BP. Bulk density is relatively high throughout the core, though it gradually declines after 500 BP. Organic content varies with bulk density from 1,200 to 500 BP, when they become decoupled. Meridian Lake is surrounded by steep slopes and, given its narrow shape, it seems likely that organic content and bulk density are largely controlled by mineral material washing into the lake. Given that charcoal counts, especially of larger, presumably locally-sourced fragments, also decrease around 500 BP, it is possible that fire may contribute to increased erosion within the watershed.

Geology
Justyn Patterson
Restoring the Coastal Prairie: A Soil Study of the Texas Prairie Preserve
Mentor: Dr. Tamie Jovanelly
An important aspect of plant physiology and biodiversity is the concentration and presence of certain minerals and nutrients found in the soil substrate. Restoration projects in disturbed ecosystems containing invasive plant species require the evaluation of soil composition to establish an action based remediation plan. Situated in Texas City, TX, 42.5 miles from Houston, is the Texas City Prairie Preserve (TCPP), a large 2,220-acre coastal grassland restoration property is managed by The Nature Conservancy. Due to agriculture, range improvements, and urbanization since the Settlement Era (1821-1834) 99% of coastal prairie has been lost, resulting in a highly fragmented range under constant threat of exotic invasive species and the growing urban sprawl. Composite soil testing of several plots within the TCPP was initiated in an effort to determine effective coastal restoration practices. In this project four representative survey plots (5.3 acres total) were established to evaluate as potential candidates for coastal vegetation restoration—particularly for the native growth of big bluestem grass (Andropogon gerardii). The soil data collected from this study illustrate the diversity in macronutrients, textural composition, and organic material from four plots within the TCPP. It was determined that restoration of big bluestem is possible, although some added nutrients may enhance the productivity and project efficiency.

Mallory Paulk
Updating the Georgia Fossil Record (Cambrian through Oligocene)
Mentor: Dr. Tamie Jovanelly
The state of Georgia contains a rich fossil record from the Cambrian Period to present day; however, a book on the complete paleontology of the state has not been published. The 1954 Contributions to the Paleontology of Northwest Georgia by A.T. Allen and J.G. Lester lists fossils from the Cambrian to the Pennsylvanian, while the 1969 Illustrated Fossils of the Georgia Coastal Plain by Horace G. Richards covers invertebrate fossils from the Cretaceous to the Pleistocene. A 360-piece collection of Georgia fossils donated to the Tellus Museum is being catalogued and includes fossils from the following formations: Shady Dolomite, Conasauga Shale, Floyd Shale, Fort Payne Chert, Red Mountain, Rockcastle Sandstone, Ripley, and Bridgeboro Limestone. I will be presenting a poster on how this fossil collection provides new information on paleo Georgia from the Cambrian Period to the Oligocene Epoch, in hopes of expanding both publications of Georgia paleontology.

Maddie Bess, Synovus Scholar
Education and Outreach: Introduction to Fracking and its Impacts in Northwest GA
Mentor: Dr. Tamie Jovanelly
Using the resources provided by the Synovus Scholarship at Berry College, Maddie Bess started an Education and Outreach project that offered a free public lecture to communities in Northwest Georgia. These areas are being approached by oil and gas excavators to explore natural gas contained within the Conasauga shale formation and Valley and Ridge shale formation. These units have been
projected to contain 625 trillion cubic feet of natural gas. To date, natural gas has not yet been mass extracted in Northwest Georgia. As a result, rural communities may have limited knowledge of the fracturing process, procedures, and long term effects to the environment and land-value once mineral rights are sold. The purpose of my presentation was to present non-biased information in an understandable format citing peer-reviewed, scientific data. The goal of the circuit was to start conversations about fracking and to educate these communities on the geology of the area so they could make informed decisions about the issue’s impact for landowners and the local environment. In the fall of 2016, Maddie spoke at nine venues, including seven Northwest Georgia libraries within the shale units and four organizations. For the venue held in Rome, Maddie invited a panel of individuals well-versed in the environmental, legal, and economic aspects of fracking. Attendance at the presentations fluctuated between 10 and 100 people.

**Government**

Seth G Read

*An Analysis of European Popularity and the Rise of Euroscepticism*

**Mentor:** Dr. John Hickman

In my paper, I will examine the correlation between the popularity of the European Union, measured by the percentage of a Member State’s population that answered positively to the question “Do you support measures to further unify western Europe?” in Eurobarometer public opinion surveys, and the percentage of seats won by Eurosceptic political groups in the European Parliament. As the popularity of the European Union expressed in Eurobarometer surveys changes, the percentage of Eurosceptic seats will change inversely. The conclusions found by examining the elections of 1979, 1984, 1989, and 1994 may bring a new perspective and new ideas to the modern-day rise of Euroscepticism in ways that could help influence European Union policy and ensure the survival of the Union.

**Kinesiology**

Grant Simonds, Silas Stocks, and Molly Horton

*Weight and BP Measurements, in SHR Rats during The Pathogenesis of Hypertension*

**Mentor:** Dr. Anna Leal

The purpose of this study is to prove a math model of arterial damage due to hypertension developed by Dr. Wilstein and her students. Over the past year, our lab has bred and studied spontaneously hypertensive rats (SHR; n=31) in order to assess arterial damage during the pathogenesis of hypertension. Starting when rats are four weeks old, we measured mass, systolic blood pressure, and diastolic blood pressure using a tail-cuff system three times a week. At specific ages, the rats were euthanized and common carotid and iliac arteries were excised to test for cell apoptosis. At week four, systolic/diastolic pressures were 97 ± 36.7/75 ± 43.6 mmHg and mass was 76.4 ± 10.9 g. At week eight, systolic/diastolic pressures were 123 ± 19.3/93 ± 17.8 mmHg and mass was 124.5 ± 5.5 g. At ten weeks, systolic/diastolic pressures were 144 ± 18.6/102 ± 16.1 mmHg and mass was 160.8 ± 16.8 g. Finally, at week 12, systolic/diastolic pressures were 164 ± 35.4/137 ± 39.6 mmHg and mass was 207.6 ± 20.3 g. This mathematical model of hypertension could provide insight into the development of arterial remodeling and suggest possible interventions in the cellular pathways that contribute to the disease.

**Management**

Andrew Brady and Austin Brooks

*Case Study: Nike FIT Brand Analysis*

**Mentor:** Dr. Paula Englis

This case study presents the overall history, current financial setting, and future innovation as well as multiple issues and solutions to several fields found within Nike and its Nike FIT brand. We outline certain problems such as Nike FIT mainly targeting youth and not having an extensive female product line. This case study also offers many consumer pros and cons to Nike FIT and describes why companies such as Adidas, Under Armour and Reebok are main competitors of Nike FIT. We will present our findings using SWOT Analysis and Porter’s Five Forces models. We conclude this case study by offering some recommendations to Nike on how they can improve their already popular Nike FIT brand.

Andy Eddington and Landon Pierce

*Forge IT*

**Mentor:** Dr. Paula Englis

Forge Information technology is a student-led business that provides reliable and affordable tech repair services to Berry College and its affiliated people. Since 2014, Forge strives to be the go-to tech repair business for Berry by providing high quality service with prices that are lower than the competition due to our considerably smaller overhead. As students, we are closer than other brick-and-mortar stores, and we have the ability to come to our customers instead of the other way around. We also have flexible schedules that allow us to work and meet clients at hours that other businesses would not be open. Our research focuses on expanding into Amazon Services, a referral service for IT professionals to help consumers and small businesses. By using Amazon Services, we hope to retain our student workers beyond graduation and extend the Forge IT brand beyond the Berry Bubble.

Christopher Whitmire and Joshua Cutter

*Ambedo: A Startup that Makes 3D Printable Prosthetic Hands Assessable*

**Mentor:** Dr. Paula Englis

Many gardeners struggle to maintain a completely healthy garden. The Interactive Smart Garden System helps people to take better care of their garden and builds the relationship between people and plant life, giving them more incentive to care for their plants. It does this by monitoring the status of the garden and presenting relevant information to the gardeners in an easy to understand way. This allows the gardener to better understand their garden’s health and to better know how to care for it. It also provides feedback so that the gardener does not underwater or overwater his/her plants. This garden system even utilizes green technology, such as solar
panels to power the electronics. This presentation will include a description of the development process of the smart garden, a working prototype, and a description of how user testing is being conducted.

Tedric Palmer and Tyler Wiseman  
**Ambedo: A Startup that Makes 3D Printable Prosthetic Hands Assessable**  
**Mentor: Dr. Paula Englis**

For this paper, we are conducting research on the future of retail. First we conduct a broad retail industry analysis, using Porter’s Five Forces and focusing on the forces of technology, the internet of things, consumer demand, and integration of mobile payment in the retail environment. Companies like Amazon, Google, and Facebook began a culture of new-wave innovation within the retail industry, making online shopping popular, putting the entirety of the internet at the fingertips of the consumer, and changing the way ads are sold. In this research we focus on two of Amazon’s recent innovations. The Amazon Dash program bringing instant shopping into the home, coming one step closer to the theoretical smart home of the 21st century. The Amazon Go program is still in beta testing, but promises to be one of the more revolutionary ideas in the history of shopping. We examined these two programs, the pros and cons, and the impact these innovations will have on other retailers. We also closely examine the infrastructure and integration across devices, payment, and barriers to adoption. We conclude by predicting what impact this will have on the traditional brick-and-mortar retailers and provide recommendations on what these retailers and competitors should do in response.

Caroline Lee  
**Trust and Charitable Behavior**  
**Mentor: Dr. Anna Vredeveld**

The purpose of this research is to understand how consumer-based trust influences charitable behaviors and donation intentions. Individuals can either develop cognitive-based trust in which they trust an individual or entity based on their rational thoughts and assessments, or they can develop trust affectively through emotional bonds and investments. In this research, we attempt to discover how the use of empathy and public disclosure (i.e., disclosure of donation amount used for the charitable cause) in advertising appeals affect an individual’s cognitive and affect based trust and how such trust, in turn, affects donation behavior and attitudes towards the charity’s cause and reputation. Overall, we expect public disclosure advertising appeals to affect an individual’s cognition-based trust and empathy based appeals to affect an individual’s affect-based trust in the charitable organization.

Lauren Garner and Preston Stewart  
**Strategic Launch of Social Media Marketing Initiative for Alliance@work**  
**Mentor: Dr. Paula Englis**

We present our research and plan for Alliance@Work, a subsidiary of the Alliance Theatre in Atlanta, GA. Their goal is to help business people in their personal development and communication. Alliance@Work’s main product is performance based training that is designed to give their clients a competitive advantage. They execute this by implementing four pillars: Strategic Storytelling, Customer and Experience Design, Executive Coaching, and Emotional Intelligence Training. The main problem currently is that Alliance@Work is not well known. We are researching and developing a social media marketing campaign to help them reach their goal of improving their visibility. In this poster we present our research on the industry, their competitors, and trends in corporate communication. We also present the plan we developed for Alliance@Work by emphasizing their four pillars. By developing a social media content marketing plan, we hope to help them reach their goal of substantially increasing their web presence through social media in an effort to reach a wider range of customers.

Miles Flora  
**No Flaw In You (Marketing and Social Media Development)**  
**Mentor: Dr. Paula Englis**

No Flaw In You is a lifestyle calligraphy business started by Shenandoah Phillips. The purpose of her business is to help promote the values of self-worth and self-love in women. Her business started by selling in person at local fair opportunities and has since developed an online presence on the entrepreneurial website, Etsy.com. This poster will show the research I conducted on the industry dynamics and the top competitors. In order to grow the business, I developed a marketing and social media plan which includes; social media development, researching wholesale opportunities and website and blog development. By implementing my action plan, No Flaw In You should see increased online sales revenue, higher traffic on all participating social media accounts, website and blog as well as greater interest by outsider wholesale vendors.

Emilee Burroughs and Rob Himmelwright  
**Anointed Magazine**  
**Mentor: Dr. Paula Englis**

We will examine the initial launch of Anointed Magazine on January 1, 2016 by Emilee Burroughs. In August 2016, Emilee Burroughs and Rob Himmelwright became business partners after meeting in MGT 340, Intro to Entrepreneurship. Anointed Magazine is a Christian fashion magazine targeted to a teenage Christian audience. Our motto is “Christian Centered, Fashion Forward.” The magazine has been in publication for over a year and is available on both print and digital platforms. We will show our research on the publishing industry, a competitor analysis, our business model, social media marketing plan, financial projections, and a growth plan for expansion throughout the Southeast in connection to each of these components listed above.

Mitchell Blanchard  
**Innovate Medical Start-Ups in the Netherlands**  
**Mentor: Dr. Paula Englis**

This research presentation focuses on the market for Diagnostic Medical Testing. After working this semester with the firm C.C. Diagnostics located in the Netherlands, I have conducted research within the market for in-vitro diagnostics, DNA-based hypermethylation PCR testing, and medical testing laboratories within the United States. The product designed by C.C. Diagnostics seeks to
reduce the risk of uncertainty of wrongly diagnosed cervical cancer tests in women. The launch of this product will change the testing process for cervical cancer around the world and will save many women from going through the process of a colposcopy. My research will show the depth and analysis of a mature global market that needs innovation.

**Mathematics**

Abigail Maiwald  
Developing a Project Based Learning Curriculum Integrating Math and Literature  
*Mentor: Dr. Jill Cochran*

Project Based Learning is an educational approach in which students work for an extended period of time to respond to a real-world and multi-faceted challenge or question. For this Honors Thesis Project, an original curriculum was created that integrates mathematics and literature using the Project Based Learning method. The curriculum consisted of four math units: addition, measurement, time, and money. Each unit makes interdisciplinary connections to either science or social studies in addition to mathematics and literature connections. Each unit is based upon an authentic piece of children’s literature which serves as the foundation for the mathematics concepts and hands-on project used in the following lessons. The curriculum was piloted in a Kindergarten classroom. The goal of the curriculum is for students to develop their abilities to recognize and identify mathematics in real-world contexts.

Kayla Davis and Savannah Lane  
Benefits and Challenges of Using Online Discussion Blogs with Education Majors  
*Mentor: Dr. Anne Marie S. Marshall*

When early childhood education (ECE) majors are learning to teach mathematics to children, the range of educational experiences should go beyond learning through classroom discussion and individualized homework. Teacher preparation programs can expand the views of ECE majors on the methods for learning this content area by encouraging collaborative problem solving that involves exchanging ideas through online discussion blog assignments. During our poster presentation, we will report on research findings uncovered during the exploration of ten ECEs’ views addressing the benefits and challenges shared when online discussion blog assignments accompanied the traditional classroom setting. These findings include: (a) increasing the sharing of the ECEs’ perspectives, (b) promoting follow-up conversations, (c) increasing collaboration, and (d) providing time-driven benefits.

**Music**

Daniel Lyman Hinson Jr.  
Florence Beatrice Price: A Vocal Journey  
*Mentor: Dr. Paul Neal*

Florence Price (1887-1953) was the first African-American woman to have a composition played by a major symphony orchestra. Her choral and vocal music is virtually unknown to most classical musicians. During a recent trip to the Special Collections Library at the University of Arkansas, several of her compositions were collected and studied, including several that were just recently discovered in an attic in Chicago. After three days and reviewing almost 100 manuscripts and scores, around 20 have been collected and are being edited and prepared for future performance. This poster session will discuss the ongoing research process and present several compositions for viewing.

**Nursing**

Abigail Beasley, Brooke Brogdon, Lindsey Cargle, and Jake Dyer  
The Impact of a Standardized Hand-off on Patient Outcomes in Hospitals  
*Mentor: Dr. Pam Dunagan*

Patient handoff, the process of passing patient information to another nurse, is currently not standardized in hospitals which results in negative patient outcomes. The purpose of this research review was to compile evidence that answers the question: What improvements can be made with patient handoffs to improve patient outcomes, satisfaction, and medication administration? Peer-reviewed articles from nursing databases such as CINAHL and PubMed were analyzed to find evidence related to the current patient handoff problem. A total of 12 articles were reviewed, and of those articles, five were found to be of the strongest levels of scientific evidence and quality. The articles were scored according to reliability, sample size, and other aspects common to nursing research. Results reflected how standardized handoff tools affected patient outcomes and satisfaction. Additionally, implementation of a standardized handoff tool significantly improves patient outcomes and satisfaction, as well as nurse efficiency. Handoff tools included protocols such as SBAR, SOAP, HENDIT, Bedside, and IT. When nurse time management is disrupted due to unorganized patient handoffs, patient safety is compromised. Consistent evidence supporting the use of a standardized handoff tool reflects better patient outcomes, however more research needs to be conducted to implement practice change.

Alondra Guzman, Angelica Miller, Elizabeth Pratt, Lillian Staley, and Emily Walls  
The Effect of Nurse Understaffing on Patient Outcomes  
*Mentor: Dr. Vanice Roberts*

Nurse understaffing impacts the effectiveness of nurses meeting patient care responsibilities. When the nurse-patient workload ratio and patient acuity is increased, there are more negative patient outcomes documented. The practice question guiding the synthesis is: How does nurse understaffing affect patient outcomes on adult hospital floors? The results of five articles were synthesized and consistently indicated that nurse understaffing is significantly correlated with poor patient outcomes. The outcomes included surgical site infections, urinary tract infections, exclusion of essential nursing care tasks, higher prevalence of falls and pressure ulcers, and higher mortality rates in intensive care units. The five articles reviewed reported a correlation between nurse understaffing and negative patient outcomes. Further investigation on the nurse understaffing should be continued. For additional exploration, a standardized metric to measure patient outcomes would lead to stronger evidence. The preliminary synthesis of the research should
raise the awareness of the practicing nurse to the impact of understaffing on positive patient outcomes. Additional investigations are needed to support the implication and impact of understaffing on patient outcomes.

Amanda Hawkins, Amelia Parker, Jennifer Keenan, and Rachel Flatt  
Mentor: Ms. Carrie Barr
Patient satisfaction is considered an important indicator of quality care and is a determining factor in hospital accreditation and reimbursement. As hospitals seek to improve quality care, it is necessary to evaluate aspects of care that contribute to increased patient satisfaction. Allowing family members to participate as active contributors to the patient care team increases patient satisfaction and results in improved quality standards. Many current policies enforce restrictions on visitation hours in the Intensive Care Unit, leading to the question: Is patient satisfaction increased or decreased with open visitation hours? Of twelve articles retrieved from CINAHL, a nursing research database, the four studies selected to answer this question were all quantitative, non-experimental articles. The overall synthesis of findings from the studies found that open visitation hours increased patient and family satisfaction, especially when family members were allowed to visit at their convenience. The evidence supports the need for further investigation and a pilot study. We recommend that more hospitals in the United States conduct higher quality studies to assess for an overall increase in quality care for patients and their families with open visitation hours.

George Edwards, Lindsey Cagle, Ashlyn Clay, and Cassidy Bornhorst  
Mentor: Dr. Cindy Johnson
Preoperative fasting is defined as the time period before a surgical procedure when patients are instructed not to eat solids or drink liquids. Traditionally, patients have been instructed to fast preoperatively for up to 12 hours prior to receiving anesthesia. The purpose of this presentation is to answer the question: What are the effects of variations in fasting times on elective surgical patients’ overall satisfaction and outcomes? While the risk of aspiration has consistently been the priority concern for preoperative patients, recent research suggests prolonged fasting provides no reduction in this risk. The American Society of Anesthesiologists (2011) published best practice guidelines recommending fasting from the ingestion of clear fluids should be limited to two hours prior to a surgical procedure. For this project, a review of fifteen articles published in the last five years from CINAHL and PubMed databases was completed. Seven articles were chosen: Three were randomized controlled trials; two were a meta-analysis; and two were non-experimental articles. Synthesis of findings supported reduced fasting times correlated with fewer complications and improved patient satisfaction. Recommendations include educating healthcare providers to promote evidence-based practice and adoption of current practice guidelines.

Mary Cerny, Sarah Moore, Dustin Rogers, Regina Segletes, and Jessie Vaughn  
Mentor: Ms. Katie Morales
Nurses work multiple consecutive 12 hour shifts. No federal regulations restrict the number of consecutive shifts or hours a nurse can work. However, three states (Oregon, Maine, and California) have adopted such regulations. The ability to provide safe patient care may be compromised by nurse fatigue. This presentation explores the effects of nurse overtime and consecutive shifts worked on nurse/patient outcomes. The literature search included PubMed, CINAHL, and ProQuest databases. Twenty-two articles published in the last five years were reviewed and four articles were selected based on the evidence appraisal. The literature revealed a negative association between nurse work hours and nurse/patient outcomes and a positive association between nurse fatigue and patient complaints. Nurses working overtime are more likely to report higher levels of fatigue and instances of workplace incivility, which may lead to decreased job satisfaction and increased compassion fatigue. Increased overtime may lead to negative patient outcomes such as patient falls, medication errors, and patient identification errors. Compassion fatigue may lead to increased patient complaints, which may directly impact financial reimbursement to the hospital. Based on this synthesis, further research is required to determine the number of work hours and consecutive shifts to provide optimal nurse/patient outcomes.

Shelby Bailey, Lori Blosz, Jasmine Dallas, and Michelle Ivey  
Mentor: Dr. Pam Dunagan
Current practice on Medical-Surgical units is the use of open-system intravenous catheters, which has been shown to increase the risk of needle sticks, blood transmission, and phlebitis rates in patients. The purpose of this research synthesis was to answer the evidence-based question: Is the use of the closed system intravenous catheter safer for medical-surgical nurses and patients than the traditionally used open-system intravenous catheter? The closed intravenous catheter system is a non-vented, peripheral intravenous catheter, with integrated extension tubing and a passively activated needle shielding safety mechanism. Four large institutional studies classified as randomized, controlled trials were used to answer this question. The articles were found using CINAHL and GALILEO databases. Findings suggested the closed system intravenous catheter was superior in regard to clinical acceptability, performance, incidence of blood exposure, and safety. Due to decreased awareness of product and lack of education in utilization, a substantial deficit in current knowledge surrounding the use of closed-system intravenous catheters in hospitals was identified. The research provided consistent results comprised of strong and compelling evidence, which provides a solid indication for practice change. The best way to translate this evidence into practice is to present clinicians with evidence and education for catheter insertion.

Physics and Astronomy
Kelli Little  
Mentor: Dr. Truong Le
Quasi-Static Plasma Flow Along the Poles of a Neutron Star
A neutron star is an astronomical object formed by the gravitational collapse of a massive star after a supernova. It is believed that a neutron star of a solar mass has a radius of about 10-16 km. The surrounding matter (plasma) ranges in temperature from $10^5$ to $10^6$ K, therefore possessing high electric conductivity while also attaining powerful magnetic fields with surface strengths ranging from $10^4$ to $10^5$ G. Consequently, the necessary consideration of both the gravitational and magnetic fields eliminates a solely hydrodynamic description of the accretion of matter towards the surface of a neutron star. This research investigates the accretion of matter as it flows from the space surrounding a neutron star to its surface along the magnetic poles using magnetohydrodynamics (MHD), utilizing both hydrodynamics equations and Maxwell's equations, through zero-order approximation. The results of the particles dynamics will be present on this poster.

Michael LaRosa and Nathan Gaby

**Solar Energy for a Brighter Future**

*Mentor: Dr. Truong Le*

Solar Energy is one of the major renewable energy sources being developed for the future and the technology of a solar tracker can be used to increase productivity by tracking the sun across the sky. In the first phase of the project, a solar panel tracker, energy storage, and data mining system were constructed with the following requirements: (1) collect and store solar energy to two 6-volt batteries, (2) collect and store data to a laptop for analysis, (3) use the collected energy to run the systems, (4) track the sun from East to West, and (5) shut down the system at sun down. The readiness of the system will be presented and demonstrated at the meeting.

William Newman

**An Accoustic Analog to Avoided Crossing of Energy Levels**

*Mentor: Dr. Shawn Hilbert*

Avoided crossings are traditionally associated with quantum mechanical systems but have been known to occur in other classical systems. In this project, the emergence of an avoided crossing in an acoustic system was explored. The acoustic system is constructed with two PVC tube sections, one of fixed length and another of variable length. The tubes are separated by an aluminum diaphragm with a variable reflectivity of sound controlling how the two sections interact. This acoustic system is meant to mimic a quantum mechanical system that has two sections with one section at a fixed length and the other with a variable length and a barrier in between. We compare the values of the energy observed in the quantum system to the resonant frequencies of the acoustic system with respect to a change in length of one section of the system. With this demonstration that the two have similar avoided crossing behavior.

Rachel Bibbey

**Slowing the Speed of Sound**

*Mentor: Dr. Shawn Hilbert*

This project mimics slow light using sound. It is possible to slow light down from 300,000,000 meters per second down to about five meters per second by using a phenomena called dispersion. In our project we use dispersion to slow down sound. The experiment uses sound waves inside a PVC tube with aluminum end caps. A frequency sweep in the tube demonstrates a phase shift over each resonance in the tube. These phase shifts are caused by the dispersion of sound waves.

Andrew Lockhart

**A Classical Analog to an Avoided Crossing**

*Mentor: Dr. Shawn Hilbert*

Cecilia Ratke

**The Hubble Constant and its Effect on the Measured GRBs Redshift Distribution**

*Mentor: Dr. Truong Le*

Gamma-ray bursts (GRBs) are extremely energetic bursts that can last from milliseconds to hours. They are divided into two categories based on their duration: short and long GRBs. Long GRBs generally result from the death of massive stars, implying that GRB activity should be correlated with star formation rate. Le & Mehta (2017) show that such a relationship is possible, and their analysis also indicates that an excess of LGRBs exist below a redshift of 2 in the Swift redshift distribution. As a first step toward understanding the origin of this excess, the effect of the observed Hubble constant on the outcome of the calculated distribution is explored.

Erin Bassett

**Anharmonic Resonance Generation**

*Mentor: Dr. Shawn Hilbert*

A resonance frequency is a natural frequency of a system that is easier to excite than a non-resonance. When a driving frequency is introduced into a system it excites that frequency and all integer multiples of that frequency within the system. These frequencies are called harmonics. An anharmonic resonance is a frequency that is produced within the system that is not an integer multiple of the driving frequency. In our experiment, we use a system composed of two PVC sections that are attached together with a metal disc in between to couple the two sections. We start by finding resonance frequency pairs, which are two resonance frequencies with small frequency differences. We drive the system with the higher resonant frequency and the difference between the resonances of the pair, which experimentally shows generation of anharmonics.

Tadan Cobb

**Band Structure in Coupled Oscillators**

*Mentor: Dr. Shawn Hilbert*

Band structure, a concept in quantum mechanics, is formed when resonant frequencies overlap to form bands separated by regions of forbidden frequencies known as band gaps. We are aiming to demonstrate band structure in our research by using a classical spring-mass system where we have multiple masses oscillating back and forth on an air track. A motion sensor was used to obtain the position versus time graphs which describe the oscillation of the carts on the track. The Fourier Transform of the position versus time
graph showed us the frequencies of the systems oscillations. In the future when these frequencies begin to overlap we will see the formation of band structure. Then, we will look at how we can modify the structure of the band through changing the spring constants and the mass of the carts.

**Psychology**

Alexandra Ketterman and Garrett Bennett  
*Mentor: Dr. Victor Bissonnette*

We investigated the “dark triad” (DT) personality traits: narcissism, Machiavellianism, and psychopathy. Narcissism involves a grandiose self-image and a need for admiration. Machiavellianism involves a tendency to manipulate others. Psychopathy involves a lack of empathy, and a tendency toward impulsive, anti-social behaviors. This investigation explores how those with DT traits experience guilt and shame when facing embarrassing situations. Those with DT traits engage in moral disengagement when justifying their antisocial behaviors. In this study, we predicted that those with DT traits would experience less guilt and shame, and that moral disengagement will mediate this relationship. Undergraduate students (n=98) responded to a computer-administered survey which included a) the Short DT measure, b) the Guilt & Shame Proneness scales, and c) the Mechanisms of Moral Disengagement Scale. The results revealed that all three DT traits were negatively correlated with the experience of guilt. Only psychopathy was negatively correlated with the experience of shame. Moral disengagement did not mediate the relationship between the DT traits and guilt/shame. Those with the DT traits tend to exhibit less guilt/shame when faced with embarrassing social situations. This effect is relatively independent of the use of moral disengagement. Future research will explore how those with the DT traits regulate morally-relevant behavioral decisions.

Morgan Andrews and Ally Claytor  
*Mentor: Dr. Casey Dexter*

The present study explored the relationship between “fluency” and working memory. Specifically, we examined the question of whether extensive training in athletics, music, or multiple languages conferred a particular advantage when it comes to working memory abilities. To answer this question, we recruited four separate groups of college students: musicians, athletes, multilinguals, and college students that did not have an expertise in any of these areas. 104 college students at a small, liberal arts college participated in tasks measuring intelligence and working memory span. To test intelligence, participants completed a computerized assessment. Working memory span was measured using computerized tasks created by Randall Engle at Georgia Tech. Specifically, we used two shortened complex span tasks, the operation task, and the reading task. Results revealed musicians to have the best working memory ability with significantly better working memory compared to athletes in particular. An additional analysis was run with fluency type dichotomized with musicians in one group and all other participants in the other group. A significant difference was found with musicians as a group demonstrating superior verbal working memory ability. This research adds to the literature by comparing these separate, but commonly practiced activities purported to improve working memory.

**Teacher Education**

Anna Rose Garrett and Anne Patton  
*Mentor: Dr. Eliana Hirano*

Pen pal exchanges have been used for years to promote cross-cultural communication. In educational settings, these exchanges have been used for additional purposes, including language learning and practice. This study investigates the benefits of e-pal exchanges for both pre-service teachers, Berry College students in the Introduction to Applied Linguistics class, and students learning English as a foreign language at a language school in Brazil. The poster presents the patterns identified in the email exchanges as well as the recurrent themes found in the reflections written by the preservice teachers following the e-pal project. The poster will then discuss how e-pal exchanges provide authentic language practice for English language learners abroad and how participating in such exchanges can give pre-service teachers an opportunity to interact with English language learners before entering the teaching field.

Alex Perry, Cassie Helsel, Alexandra, Trahan, and Crystal Linsenbigler  
*Mentors: Dr. Carolyn Stufft and Dr. Julie Pynn*

To promote the conservation and protection of an endangered monkey species, we will create a video game platform in which users are able to interact with the species and collect valuable information. Research shows that our generation gains awareness of new concepts through participation and actively experiencing content. Gee’s affinity group principle, which is described as a group bonding through common goals, would be the primary focus to highlight the social aspects of both the monkey and the game player (Gee, 2007). In order to raise awareness of the conservation of this species, we will incorporate prosocial gaming elements such as information about the environment, geography, and natural resources of this area. It is the player’s job to gather information and befriend a member of the species to take care of throughout the game. By playing minigames and collecting data, the player attempts to accrue as many points as possible compared to other “researchers/players” in order to gain a higher rank in the affinity group. Our goal in developing this app is to promote environmental education and conservation.

Anthony Batey, Alex Byerly, Brandon Park, Samantha Ramsey, Savannah Sweet, and Anna Walker  
*Mentors: Dr. Carolyn Stufft and Dr. Julie Pynn*

Mobile device games are increasingly being used for educational and social purposes, but they have not been utilized in environmental conservation. This project combines citizen science and video gaming technologies to modernize conservation of an endangered...
flagship primate species, the Zanzibar colobus monkey. We designed a game that is an educational tool for local youth to understand how monkeys interact with local communities who also depend on natural resources of the forest for survival. Youth players explore using the “multiple routes principle” (Gee, 2007) so they learn systems-levels thinking that is paramount to solving complex problems. The game empowers and engages youth to solve real-world problems because it incorporates monkey field research with game challenges in a virtual world, what Gee (2007) refers to as “situated learning.” In our game design, it will be possible for players to earn “care badges” of compassion as they learn about optimal habitat conditions for the monkeys and share their findings with local stakeholders. The predicted outcome of playing this conservation game will be the community understanding the financial and ecological value of conserving this endangered monkey as Zanzibar’s flagship species, which epitomizes Gee’s (2007) “achievement principle.”

Hannah Barnes, Alexi Bell, Marcus Ghee, Casey Johnston, and Tool Madeleine Schoone

Mentors: Dr. Carolyn Stufft and Dr. Julie Pynn

Science has shown that when citizens have hands-on interaction with their natural environment, they feel a more intense connection to it and are more likely to work to preserve it. We will design a mobile phone app that allows African youth to interact with an endangered monkey population, while also collecting data from the monkey that will aid scientists in the conservation of this species. Our game-based app blends virtual reality with field research on monkeys' behavior and habitat. Gee’s Principle of Manipulation (2007) in our game design will prompt youth to develop an attachment to the monkeys. Elements in our game that demonstrate this include: 1) taking monkeys’ perspective as they interact with other monkeys and residents; 2) building a supportive community as monkeys explore together; and 3) advancing to new levels of survival as monkeys meet challenges of attaining food and safety. Game playing will incorporate data collection from field research, such as noting monkeys’ travel and behavioral patterns, population changes from births and deaths, and human-monkey conflicts over competition for natural resources. Our predicted outcome is that data will not only be useful for scientists, but also for engendering community support to conserve this endangered monkey.

Matthew Davis, Abbey Hardman, Andrew Elgin, Coleman Ellingsworth, Sloane Smith, and Violet Keys

Mentors: Dr. Carolyn Stufft and Dr. Julie Pynn

Inspired by McGonigal (2011) and Gee (2007), we seek to create a prosocial gaming application design focused on preserving an endangered African monkey. Our design is based on 3 of Gee’s Learning Principles. The Affinity Group Principle will be used to prompt players to form a community centered on the conservation goal because players will engage in environmental protection activities together. The Subset Principle will be used to keep players engaged as they learn new field research skills and develop knowledge of the species and its habitat. The Dispersed Principle illustrates how players will share their monkey knowledge with the community. Through the formation of community bonds, the spreading of facts about the monkey species, and the inspiration to continue playing, we believe our game could save this species from extinction.

Campbell Harrison, Landry Hutto, Brittany McGehee, Caroline Russell, and Sara Roach

Mentors: Dr. Carolyn Stufft and Dr. Julie Pynn

Successful conservation efforts cross disciplinary boundaries and utilize multi-faceted models that develop environmental knowledge, encourage compassion, and prompt action (The Jane Goodall Institute, 2016). Our project seeks to incorporate the use of video game and mobile phone app technologies with real-world data to engage youth in the conservation of a critically endangered African monkey. Reminiscent of the popular mobile app Pokémon Go, we describe a game that utilizes data (cell phone pictures and geotagging) collected by local youth in field research. App users will be able to learn about threats to monkeys and their habitat by video capture and analysis of pictures of the endangered monkeys in real time. Progression in the game is based on knowledge gained, such as earning points for correctly identifying individual monkeys and types of plants they consume. Players will develop compassion and a personal connection to the monkeys in the field by taking care of monkey avatars in the virtual world of the game. This will encourage action on the part of youth to rally stakeholders and inspire local communities to support conservation efforts and sustainable ecotourism initiatives that benefit monkeys and humans alike.
The Berry Scholars Program

Outstanding student scholars who wish to work one-on-one with Berry faculty members by participating in research or other scholarly activities are supported by Berry College in a number of ways. One such way is through the Berry Scholars Program. The program is made up of named grants that can be applied for during the course of your time here at Berry. Descriptions of the Berry Scholar Program awards are listed below.

**The Richards Scholars Program** is named for Mrs. Alice Richards and her family and is designed for Berry students in their sophomore, junior and senior years. The goal of the program is to help students move beyond the excellent work characteristic of many Berry students to a superlative level through a one-on-one working relationship with a faculty mentor. This program awards $5,000 to Berry College students for a two-year project and $1,000 to a faculty mentor.

The **Synovus Sophomore Scholars Program** makes awards to rising sophomores to support the student’s exploration of academic, research, growth experiences (such as practicums, research, internships, entrepreneurial service or work projects), or artistic endeavors. The program offers awards of up to $2,000 to Berry College students and $500 for faculty or staff mentor.

**The Kirbo Scholars Program** is a grant funded by the Thomas M. and Irene B. Kirbo Charitable Trust. Kirbo Scholars are students who have completed at least 24 credit hours at Berry College. This annual award funds up to $1,250 to Berry College students to support projects related to the student’s academic research or growth experiences such as study abroad, internships, or artistic endeavors.

**Richards Undergraduate Research Grant** is also named for Mrs. Alice Richards and her family and is designed for Berry students in their sophomore, junior, or senior years. The goal of the program is to help students complete their scholarly activity where they are the project lead. This program awards up to $1500.

**Student Research and Development Fund** is intended to enable students to take part in the important professional activity of conference presentation. Funding is intended to cover expenses such as conference travel, registration fees, hotel costs, and meals. The program awards up to $500.

For more information about the Berry Scholars Program, please contact
The Council on Student Scholarship
Office of Research and Sponsored Programs
McAllister Hall 219
css@berry.edu.