2018 Symposium on Student Scholarship
April 10, 2018

8:30 a.m. – 9:45 a.m. **Opening Plenary (Spruill Ballroom, Krannert Center)**[CE Credit]

Welcome to the Symposium – Dr. Stephen Briggs, President

Introduction of Speakers – Dr. Lindsey Davis, *Chair Council on Student Scholarship*

Presentations by Berry Scholars

Jared Brumbelow, Kirbo Scholar — One-Health Biosurveillance for Blood Feeding Phlebotomine Flies in Northwest GA
Mentor: Dr. David Bruce Conn

As part of a major emphasis on One Health approaches to infectious disease epidemiology, we have initiated several studies of blood-feeding arthropods that may serve as potential vectors of infectious pathogens to humans, wildlife, or domestic animals. Among the most important are the phlebotomine sand flies (Diptera: Psychodidae: Phlebotominae) that belong to the genus Lutzomyia. Several Lutzomyia species are known or suspected as potential vectors of important emerging infectious diseases of animals and humans in the United States, including zoonotic leishmaniasis, caused by a parasitic flagellate protist. From late August through November 2017, we conducted a preliminary survey for phlebotomine flies at diverse locations across Berry College's 107-square-kilometer outdoor laboratory. Flies were prepared in the laboratory and identified to genus using a light microscopy. All of the Lutzomyia were from traps set in woodland/field border areas with substantial active use by humans, dogs, cats, and diverse wildlife. This is the first report of phlebotomine flies in this area of Northwest Georgia. We conclude that there is some potential for disease transmission by these flies among wildlife, domestic animals, and/or humans. Additional studies are underway to gather further details about their distribution, seasonality, and other characteristics of potential epidemiological importance.

Abby Newman, George Scholar — Intrinsic and Extrinsic Goal Framing in Spanish Speakers Learning English
Mentor: Dr. Kristen Diliberto-Macaluso

This study examines effects of intrinsic and extrinsic goal framing in classroom performance in native Spanish speakers learning English. This research is driven by Self-Determination Theory (SDT), which distinguishes between intrinsic and extrinsic goals and is used to identify the effectiveness of these mindsets in the classroom through framing paradigms (Ryan & Deci, 2000). Literature shows that intrinsic framing improves all aspects of students' performance on an assignment while extrinsic framing compromises learning through distraction. Intrinsic motivation is also an important factor in second language learning; however, theorists argue that motivation of a majority group learning a minority language may be different from that of a minority group learning a majority language. In our study, we tested 38 native Spanish-speaking adults learning English who were assigned to intrinsic or extrinsic goal-framing instruction conditions in Spanish. Participants read paragraphs in English, answered comprehension and vocabulary questions, and took a memory test. Based on STD, we predicted that participants receiving intrinsic instructions perform better on all measures compared to participants receiving extrinsic instructions. Surprisingly, performance was higher in the extrinsic condition than with the intrinsic condition. Future research will investigate motivational differences between language learning for personal enrichment or as a necessity.

Parker Roberts, Synovus Scholar — Spring-mass systems: An analogy for quantum behavior
Mentor: Dr. Shawn Hilbert

Quantum mechanics, the subfield of physics that deals with interactions on very small scales, is often counterintuitive and difficult upon first learning the subject. This project aims to develop a visual analogy for a quantum process called band formation through the exploration of a similar, macroscopic phenomenon. With use of theoretical models and a physical apparatus, an analogy was found and tested with coupled harmonic oscillator systems, which are arrays of masses connected by springs. We found that the resonance spectra of such systems behave similarly to the electron energy levels due to the lattice structure of atoms in solids. This analogy computationally and experimentally fits a qualitative framework that provides insight into the nature of the quantum system.

Hannah Stanley, Kirbo Scholar — Pathogen Prevalence in Ticks from Companion Animals in Gainesville, Georgia
Mentors: Dr. DeLacy Rhodes

Tick-borne diseases are a major threat to human and animal health. People contract these pathogens from tick vectors through outdoor activities and close contact with animals harboring these ticks. It is important to evaluate the prevalence of pathogens carried by ticks on companion animals in order to gain insight into human risk for diseases transmitted by ticks. In this study, we obtained ticks removed from companion animals by a veterinary practice in Gainesville, Georgia, and screened them for the presence of Rickettsia, Ehrlichia, Anaplasma, and Borrelia spp. Two hundred and five ticks belonging to 4 different species were collected. Total DNA was then isolated, and PCR was used to test for the tick-borne pathogens. Ehrlichia, Anaplasma, and Borrelia spp. were not detected, but Rickettsia spp. were found. Molecular sequencing was used to determine the species of the Rickettsia. Fifty-four of the 91 Rickettsia samples were *R. parkeri*, 33 were *R. montana*, 1 was *R. cooleyi*, 1 was *R. felis*, and 1 was *R. philipii* str 364D. By assessing the prevalence of pathogens harbored by these ticks, we gain insight into the risk companion animals pose to their owners in transmitting these diseases.

10:00a.m. – 11:00 a.m. **Session 1-A (Ballroom A, Krannert Center)** CE Credit
Moderator: Dr. Kim Field-Springer

Avery James — Frankenstein's Monster Reborn: A Rhetorical Criticism of "The Destroyer"
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

Since their debut on the New Year of 1818, Frankenstein and his monster have become integral figures in the literary world and a hallmark of exploring the human condition. In 2017, Frankenstein's monster was reanimated yet again in the form of a twelve year-old Black boy recently gunned down by Chicago police officer in Víctor LaValle's graphic novel The Destroyer. This adaptation of Frankenstein acts as a manifestation of cultural tension through a blend of horror and political discourse. Which prompts the question: how does the reformation of Frankenstein through the lens of victims impacted by police brutality shape our understanding of contemporary racial discourse? The article, "The Moore's Ford Lynching Reenactment: Affective Memory and Race trauma by A. Susan Own and Peter Ehrenhaus will be used as a lens in order to unpack how The Destroyer recounts moments of cultural trauma and constructs public memory as shaped by its victims. So after examining the significance of The Moore's Ford Lynching Reenactment's use for healing from race trauma, then analyzing how The Destroyer utilizes that rhetorical device to further its message, and finally discussing the critical implications, we can better understand how Victor LaValle's rendition of Frankenstein reflects and contests current racial tensions.

Hunter Berry — How Do Russian Twitterbots Affect Public Opinion?
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

In recent months, the use of Russian twitterbots has increased dramatically. By using a variety of popular hashtags, ranging from "#guncontrol" to "#MotivationalMonday," the Russian twitterbots are spreading their influence at an alarming rate, even playing a part in the aftermath of the recent shooting in Parkland, Florida. With the twitterbots involvement in the 2016 presidential election, as well as the recent tragedy in Parkland, it is important to ask ourselves how these Russian twitterbots influence our perception of current events. This paper turns to Seung-A Jin and Joe Phua's 2014 article that breaks down how Twitter opinion leaders can influence the perception of their followers through the strategies of bridging and bonding. This paper applies their Jin and Phua's model to the Russian twitterbots to show how they use bridging and bonding to build social capital, before finally discusses some implications.

Shelby Newland — Lost Home: A Poetry Program
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

There are currently tens of thousands of displaced persons, and ct discourse often directs attention more toward where these people are going than from where they have come. The stories of individuals are oftenovershadowed by the magnitude of the collective. Lee and Gura argue that through oral interpretation anaudience can "understand a work of literary art in its intellectual, emotional and aesthetic entirety." This performance seeks to recontextualize the stories of refugees from that of a faceless number to a that of complex human being with a story worthy of empathy.

Benjamin Allee — Fly Already: An Oral Interpretation Examining Human Grief
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

The grieving process is a phenomena that applies to nearly all people throughout the course of their lives – and as it is such a fundamental part of the human condition, it has received no shortage of study in academic fields. However, it is universal only in its variability, as it is just as unique as the individuals who endure it. Empirical study, therefore, is limited in its examination of grief and the emotional, spiritual, and psychological experiences associated with it. By instead observing grief in its aesthetic entirety through performance, we will better understand the nature of a process with such an integral and enigmatic impact on the lives of so many. Etgar Keret, in his short story, "Fly Already," presents an individual who exemplifies the complex and tangled mechanisms of recovery, grief, and trauma, as he attempts to rebuild a life from a broken past. This presentation will consist of a performance of the short story through oral interpretation, connecting with its audience and illuminating concepts that are too abstract and vital to be limited to empirical examination.

Session 1-B (Ballroom C and D, Krannert Center) CE Credit
Moderator: Dr. Bill Davin

John Patten Moss, Natalie Bailey, Nick Wessel, Shadae Williams, Emily Humphreys, and Mary-Grace Gaskin — The Berry College Central Grove Longleaf Pine Seed Orchard
Mentor: Dr. Martin Cipollini

Montane longleaf pine (*Pinus palustris*) forests of NE Alabama and NW Georgia are critically reduced from their historic range. Berry College is a partner in range-wide efforts to restore these regional forests. Currently, seeds used to generate seedlings for mountain longleaf restoration come from a single Talladega National Forest (TNF) site. Efforts to capture greater genetic diversity include two existing orchards at Berry College totaling ~7 acres and ~600 trees. To expand this effort, a 10-acre orchard containing

1560 seedlings derived from 46 mother trees was planted in January/February 2018 at Berry College. Cones were collected in October 2016 at several sites including Berry College, Paulding/Sheffield WMA, Shoal Creek (TNF), and the Mountain Longleaf Pine National Wildlife Refuge. Following extraction from cones, seeds were oven dried and stored frozen. After planting seeds in 6 in deep containerized trays (April 2017), seedlings were watered as needed and kept from freezing. Site preparation in a recently logged forest included herbicide application (July 2017), prescribed burning (November 2017), and staking positions with ID tags prior to planting. Seedlings were randomly planted on a 15 X 20 ft spacing. Long-term plans will include culling inferior individuals while maintaining genetic diversity prior to cone harvesting.

Shadae Williams, Natalie Bailey, John Patten Moss, Nicholas Wessel and Mary-Grace Gaskin

Is there a sexual dimorphism in *Lindera benzoin* prior to fruit production?
Mentor: Dr. Martin Cijpollini

Spicebush (*Lindera benzoin*) is dioecious (has separate female and male plants). This spawns the potential for sexual dimorphism (morphological or physiological differences between the sexes). Prior studies of wild populations show that females grow more slowly than males. Such differences are hypothesized to result from differential "costs of reproduction", in that females invest more resources to flowering and fruiting than do males to flowering alone. Thus, dimorphism should not arise until significant fruit production commences. To test this, we are growing >500 plants from seeds collected in 2013 from 15 individuals in a Maryland site. Annually, the basal diameters and heights of all dormant stems have been measured. Flowering (and thus sex determination) began in spring 2016 and continued in spring 2017 and 2018. Few fruits have yet been produced, so the period being assessed is prior to the bearing of substantial fruit production costs. Statistical analyses will compare relative growth of females and males in: 1) height and volume (as determined from basal diameter and height) of the largest stem, 2) total stem volume, and 3) total stem number. Our hypothesis is that no differences will be observed in any parameter at this point in the life cycle.

Alexa Adams

Evaluating vertebrate use of gopher tortoise burrows on St. Catherines Island
Mentor: Dr. Laura Flatow

Gopher tortoises (*Gopherus polyphemus*) are classified as "threatened" and play a critical role as a keystone species of the long leaf pine ecosystem. Recently, a new subpopulation of burrows was discovered on St. Catherines Island isolated from the original pasture release site and in a less desirable habitat on sand dunes with new pine forest growth. This study aimed to evaluate vertebrate commensal activity at gopher tortoise burrows. The objective was to determine whether tortoise and commensal activity differs between the pasture and the dune habitats. Wildlife cameras were placed at active gopher tortoise burrows in both habitats to capture images and videos of vertebrates using or visiting the burrows over a three month period. Preliminary results indicated that both the type and frequency of tortoise and commensal activity varied based on habitat. Differences in commensal classification and overall vertebrate species diversity were also observed. Evidence of armadillo (*Dasypus novemcinctus*) activity around dune burrows became a cause of concern. Further research is needed to determine if armadillos displaced the tortoises from the dune habitat by taking over their burrows. These findings provide a significant measure of the negative impact of invasive species on native wildlife.

Alexander Dhom

Determining the optimal phase of lactation to administer a vaccine against *M. bovis*
Mentor: Dr. Laura Flatow

Dairy cattle undergo a period of immunosuppression during the end of pregnancy and beginning of milk production. During this time, they are at greater risk for contracting infectious diseases. Vaccination is a reliable measure that can be taken to reduce this risk at an affordable cost for producers. This study was designed to see if the phase of lactation had an effect on the effectiveness of vaccinations. Using 24 healthy Jersey cows in various stages of lactation, serum and lacrimal secretions were collected to measure levels of two types of antibodies produced against a vaccine for the bacteria *M. bovis*. ELISAs were used to quantify the antibody levels for each cow pre-vaccination, one-week post vaccination, and two weeks post vaccination. The data analysis showed that there was no significant difference between cows in different phases of lactation. This indicated that phase of lactation may not need to be considered when determining vaccination protocols for dairy cows.

Session 1-C (Room 217, Krannert Center) CE Credit
Moderator: Dr. Todd Timberlake

Tadan M. Cobb

A Classical Analogy to Defects in Quantum Band Formation
Mentor: Dr. Shawn Hilbert

Atoms have distinct energy levels at which electrons can be found. When atoms join together in a lattice structure to form a solid, these energy levels split and form regions, or bands, of allowed energy levels, separated by forbidden regions in which no electron energy levels are available. When a defect is introduced into a solid, the defect changes the energy levels of the electrons within the solid and can form a miniature band of energy levels within the formerly forbidden region. This band structure effects the conductivity of solids. We developed an experimental analogy to this phenomena using an array of coupled harmonic oscillators, carts attached to each other with springs on an airtrack. Analogies of this type are easily accessible and allow for an increased intuition into how these phenomena behave. Previous work with this system has demonstrated band structure. Here we will extend it to demonstrate the effects of defects on the band structure.

Nathan Gaby and Michael LaRosa — 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. In order to analyze the efficiency of solar energy, three solar panels with various movement capabilities were constructed to test energy collection, and cost efficiency. Additionally, the solar panels meet the requirements to: (1) collect and store solar energy to two 6-volt batteries, (2) use the collected energy to run the systems, (3) continuously adjust the panels to point at the brightest points in the sky, and (4) shut down the system at sun down. Preliminary results show that a dual-axis panel collects the most energy, but struggles with cost efficiency.

William Newman — Jet Launching Radius in Black Hole Accretion Disk
Mentor: Dr. Truong Le

Using our theory for the production of relativistic outflows for supermassive black holes with accretion disk (e.g., Le & Becker 2005), we estimate the astrophysical jet launching radius and the inferred mass accretion rate based on the observed jet powers for 52 low-power radio-loud active galactic nuclei (AGNs) containing supper massive black holes. Our analysis indicates that (1) a significant fraction of the accreted energy from the disk is required to convert the accreted mass to relativistic energy particles towards the production of the jets near the event horizon, (2) the jets launching radius moves radially toward the horizon as the mass accretion rate or jets power increases, and (3) jet/outflow formation cuts off beyond 44 gravitational radii.

Session 1-D (Room 324, Krannert Center)
Moderator: Dr. Anna Filippo

Nikkie Gilmer and Bryce Wiseman — Eugene O'Niell and The Hairy Ape
Mentor: Dr. Anna Filippo

Our presentation discuss the life of Eugene O'Neill and his dramatic work The Hairy Ape. O'Neill was one of America's first successful playwrights and his work is still influential today.

Kayley Rapp and Meg Yukishige — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process-Tennessee Williams
Mentor: Dr. Anna Filippo

Tennesse Williams is remembered for well-known and celebrated plays such as Cat on a Hot Tin Roof. Countless theatre companies continue to perform his work, and theatre students study his plays everyday. How did such sickly and quiet child grow up into one of American's greatest playwrights? (Part of a larger Symposium Piece).

Jay Rogers and Faith Stout — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process-Henrik Ibsen
Mentor: Dr. Anna Filippo

Henrik Ibsen was an 19th century Norwegian playwright known as the Father of Realism due to his plays Pillars of Society and A Doll's House. A Doll's House is a notable work of his due to its social commentary on marriage and the role of women in society. (Part of a larger Symposium Piece).

Lilly Conzales and Jordan Potter — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process-Anton Chekhov
Mentor: Dr. Anna Filippo

Anton Chekhov is one of the most prominent playwrights of the late 1800s, with his works being widely produced not only in his home country of Russia, but also in different countries across the seas. The Cherry Orchard is one of him most well-known works, and demonstrates his value of realism in a time where many plays were intentionally melodramatic. (Part of a larger Symposium Piece).

Tyler Hooper and Harley Weiss — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process-Arthur Miller
Mentor: Dr. Anna Filippo

Arthur Miller is known through theatre history as the playwright who was not afraid to embrace the darkness of suffering and the power it has to drive humans out of their normal actions to handle it. Death of a Salesman takes the life of Willy Loman who is suffering through his physical and emotional world caving in around him showing the way that it not only affects himself, but his family; underlining how suffering, although can be destructive, it can also bring actions into one's life that one could never expect. (Part of a larger Symposium Piece).

Sara Arms and Jack Padgett — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process-Sam Shepard
Mentor: Dr. Anna Filippo

True West is a play by Sam Shepard which examines the relationship between two brothers that explore themes of the unhealthy ideal of the American Dream, writing as an ideal versus for emotional fulfillment and the juxtaposition of "old west" and "new west". Sam Shepard is a highly accomplished American Playwright who grew up in a small town, worked in ranches and was an alcoholic. (Part of a larger Symposium Piece).

Monty Wilson and Parker Trau — Modern and Contemporary Drama: Dramaturgy and Reader's Theatre as Process
Mentor: Dr. Anna Filippo

Harold Pinter was the a 20th century British playwright, whose focus on where the real truth of theatre lies in the world of the play, revolutionized the modern approach to how theatre is performed. His work, The Birthday Party, gives us insight to the human mind when dealing with maliciousness.

11:15 a.m. – 12:15 p.m. — **Session 2-A (Room 217, Krannert Center)**[CE Credit]
Moderator: Dr. Jen Hoyt

Cam Mallett — Executive Women: The Limits and Liberation of Gender in Corporate Leadership
Mentor: Dr. Christy Snider

Following the second-wave feminist movement of the 1960s, more women began to enter executive leadership positions in American corporations. Despite this new legal acceptance, however, the world of executive management continued to underrepresent women. Even today, women make up 47% of the U.S. labor force but occupy only 6% of the nation's corner offices. By reviewing the history of women in corporate leadership from 1960 to 1990, this presentation analyzes why this trend of exclusion has persisted. The study identifies major trends which affected women's upward mobility during the late 20th century, including systematic policies, relational barriers, sexual harassment, and family obligations. At the same time, some corporations fostered company cultures which liberated women from these barriers. This analysis will demonstrate that positive and inclusive attitudes towards women and their workplace capabilities was the single greatest factor in allowing them to succeed in the 20th century.

Charles Hollub — Silence on the Field: A Rhetorical Criticism of the 2017 NFL Protest
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

Colin Kaepernick sparked a flame of controversy by protesting the National Anthem during the 2016 NFL season, but the 2017 NFL season ignited a firestorm. Although the protests originally aimed to call attention to police brutality against the African American community, the focus shifted in September 2017 when President Trump called for all protesting NFL players to be fired. Following Trump's comments, more than 100 NFL players joined the protest by kneeling or refusing to take the field during the National Anthem. In using their bodies, which typically defines them and their career paths, as a form of protest, these professional athletes demanded attention. To analyze the ways in which the body functions as protest, this paper looks to Michelle Flood's article "The Wiz Live! And Body Rhetoric: The Complexity of Increasing Diversity in a Whitewashed Entertainment Industry." This paper uses Flood's idea of the racialized body as a vehicle for protest to better understand the rhetorical tactics employed by the NFL players and discusses the implications of these tactics on protest and the social perception of black bodies in white spaces.

Leigh Hadaway — Fill the Jails: Student Sit-In Movement in Rome, Georgia
Mentor: Dr. Christy Snider

Student activists were a driving factor in the Civil Rights Movement. They bolstered the movement with direct action protest tactics to create a multi-generational force that accelerated the movement's success. Adapting non-violent tactics from established Civil Rights leaders, students captured national attention with sit-in protests at resturants and lunch counters that directly challenged Jim Crow legislation. The Greensboro sit-in of 1960 sparked a region-wide grassroots movement across the South and led to subsequent student organization and local protest efforts. This presentation will focus on how student activists in Atlanta inspired the sit-in movement of African American highschool students in Rome, Georgia, which will provide a micro-level perspective to a nation-wide phenomenon. Using primary sources such as newspapers and student essays, this paper demonstrates how Rome student protestors assumed many of the attitudes, motives, and actions of regional student activists and played a significant role in the integration of downtown facilities.

Anna Claire Tucker — The Hero, The Wimp, and the Villan: How Trump uses Political Drama for Rhetorical Gain
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

After whisperings of possible diplomatic talks between North Korean leaders and the former U.S. Secretary of State Rex Tillerson, President Trump quickly demolished potential progress with a barrage of tweets on October 1, 2017. Most notably he quipped, "I told Rex Tillerson, our wonderful Secretary of State, that he is wasting his time trying to negotiate with Little Rocket Man". This statement led to an uproar from many in the public, media, and government who saw the tweet as a step backwards for diplomacy and a step closer towards warfare. The tweet was not simply a reckless remark, but part of President Trump's rhetorical strategy. This paper analyzes Trump's use of the rhetorical strategy of victimage, as identified by Michael Blain in the article "The Politics of Victimage".

Victimage refers to the offloading of guilt onto a scapegoat; in this case, the scapegoat is Tillerson. We found that the President's use of victimage in this tweet mirrors countless other incidents we have seen during his campaign and presidency. We therefore conclude that understanding how Trump uses strategies like victimage is important to protecting the future of American democracy.

Tasha Mwangi "Crazy they Call Me" by Zadie Smith
Mentors: Mrs. Hope Willoughby and Mr. Matt Delzer

This performance addresses the struggles of artists of color in the music industry by examining the life of one of the best jazz vocalists of all time, Billie Holiday. Despite the gravitas of the messages in her music and in her contributions to jazz, Ms. Holiday was constantly undermined and persecuted because of the color of her skin. Lee and Gura argue that through oral interpretation, performance not only deepens our understanding of literature, it changes us in the process. This performance seeks to engage the audience in the complex reality of Ms. Holiday's life to deepen our collective understanding of marginalized groups in all industries.

Session 2-B (Room 324, Krannert Center)[CE Credit]
Moderator: Dr. Sandy Meek

Courtney Lonsway War and Art: The Journey of the Ghent Altarpiece
Mentor: Dr. Virginia Troy

Despite the fame of DaVinci's Mona Lisa, the Ghent Altarpiece by Jan van Eyck could be the most sought-after work of art in the Western world. Since its creation in 1432, the survival of the Ghent Altarpiece has been threatened by the political turmoil of the Reformation, Napoleonic Wars, WWI and WWII. Coveted for centuries, this multi-panel oil painting on wood depicts a representation of Christian mysticism. Nazi leadership prized this polyptich and sought to acquire it by any means possible. In 1942, Hitler ordered its removal from Ghent, Belgium to an unknown location seven hundred miles away. The Ghent Altarpiece panels traveled across war-torn Europe to a salt mine in Altasusee, Austria. Salt miners suspicious of Nazi movements alerted Allied forces. In 1945, while saving works of art stolen from museums and personal collections, the Allied forces discovered the Ghent Altarpiece panels within the mine. The Monuments, Fine Arts, and Archive division, known as the Monuments Men, preserved the hoard of previously-looted European art. Despite its troubled past, the Ghent Altarpiece, survived restored to the Saint Bavo Cathedral behind bullet-proof glass. This presentation will examine the tumultuous history of van Eyck's masterpiece from creation to restoration.

Kathleen Minor Existential Dread and Pringles
Mentor: Dr. William Donnelly

I often attempt to define my life and my existence, but in so doing I begin to spiral into an existential dread because if I am indeed a cosmic speck, then my life may be relatively meaningless. To avoid losing sanity I will hone in on my place on this specific Earth, in this country, in this state, but even then the current reality of today, upon reflection, becomes just as impossible to cope with. My creative nonfiction essay examines one instance of this spiraling thought process, in the middle of which I stumbled upon a few quotes from the novelist Philip Roth, who, reflecting on his own eighty-four years of life, called himself "naïve" for ever believing his reality was "crazy." Every year, he said, our definition of "crazy" is outstripped and what once seemed preposterous becomes simple reality. In reading Roth's quotes I came to the conclusion that life may not be an existential dread, but the comfort of knowing I am in no way alone.

Katie Doremus Infinite Questions and Infinite Answers in Madeleine L'Engle's A Wrinkle in Time
Mentor: Dr. Jim Watkins

This essay examines the sociopolitical and theological implications of Madeleine L'Engle's A Wrinkle in Time, analyzing the connection of the fictional planet Camazotz to the United States during the Cold War as well as her critique of the church during the Red Scare. Although many publishers classify A Wrinkle in Time as a children's novel, the fact that many schools banned it as a dangerous book reveals the underlying levels of interpretation. L'Engle links her sociopolitical critique of a false American conformity with a theological critique of the closed-mindedness of American Christianity, encouraging her readers not only to think for themselves but also to be open to questions relating to science and Christianity. Instead of promoting religion as opposing science, as many of the religious leaders were doing at the time, she urges her readers to expand their worldviews, using the ideas of the Heisenberg Uncertainty Principle to portray science as opening up infinite questions about God that should not be dismissed with finite, easy answers. Ultimately, L'Engle critiques American society not out of spite but out of love, for A Wrinkle in Time culminates in the Christian value of love.

Session 2-C (Ballroom A, Krannert Center)[CE Credit]
Moderator: Dr. Jeff Lidke

Sarah Bryan "Looking Along": The Role of the Imagination According to C.S. Lewis
Mentors: Dr. Jeff Lidke and Dr. Matthew Lee

In this paper, I aim to explore the question, "What is the role of the imagination in the Christian life according to C.S. Lewis?" I will argue that the role of the imagination according to Lewis is to work in perfect harmony with reason to allow persons to experience God to the furthest extent that He has created them to do. I will establish my argument through consulting Lewis's apologetic work of

The Problem of Pain and his spiritual autobiography Surprised by Joy, as well as consulting his fiction works of Till We Have Faces and A Pilgrim's Regress. The intended goal of this research is to not only discuss Lewis's marriage of reason and imagination, but to discuss the implications of this argument in terms of the flourishing of the global church.

Ryan Walker — She Will Be Saved Through Childbearing: Sexuality in Early Christian Philosophy
Mentor: Dr. Jeff Lidke

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.

Payton Stone — Let's Make Prisons Beautiful: Theological Reflections on the Prison Environment
Mentor: Dr. Jonathan Parker

The American criminal justice system incarcerates millions of individuals in the various correctional institutions across the country. Much of the available Christian theological literature on the criminal justice system tend to focus on chaplaincy programs, liberation movements, or a Christian perspective of justice. In this essay, I provide a novel approach to the issue of mass-incarceration and criminal justice through theological reflections on the prison environment. I first articulate a theological foundation of the built environment from which I will build my analysis. I then discuss how the prison acts as a place of death and the antithesis of the home, the true human dwelling, by analyzing parallel features of the two. Following this assessment, I then offer a possible response focused on beautifying prisons. I examine a theological understanding of beauty, one specifically focused on its necessity for human flourishing. I also discuss the ways in which the arts have proven an effective means of rehabilitation and how the process of making art reflects theological truths about humanity's vocation, responsibility, and end of shalom (peace).

Bekah Fortney — Heaven's Gate: An investigation and explanation of the mysterious departure
Mentor: Dr. Jeff Lidke

This paper examines the theology, leadership, and departure of the New Religious Movement, Heaven's Gate. Heaven's Gate is one of several new religious movements that have ended in mass violence in the past 50 years. Heaven's Gate began in 1975 in California and ended in mass suicide in Sante Fe California in 1997. This has left many questions about the meaning behind the violence, the purpose theologically for the group as well as the implications left on earth after such events. Through the sociological framework of Clifford Geertz, Emile Durkheim and Max Weber, this paper seeks to explain the meaning behind mass suicide correlated to religion, specifically Heaven's Gate while also providing a framework in which we can view the religion to gain greater understanding of New Religious Movements as a whole.

John Anders — Reasonable Limits: A Pedogogical Comparison of Kierkegarrd's and Smith's Anthropologies of the Human Self
Mentors: Dr. Jeff Lidke and Dean Thomas Kennedy

I confront two natural preliminary inquiries concerning Søren Kierkegaard and his recent critics before entering into his life and philosophy: first, what, broadly speaking, is existentialism? and second, what is the nature of Schaeffer's critique of Kierkegaard? By answering these questions, I offer those suspicious of Kierkegaard's work an invitation to travel beyond their doubts. Then as my paper's central focus I argue that Kierkegaard's indirect style of communication through his pseudonymous method, and the content of Philosophical Fragments, reveal an anthropology of the human person plagued by self-deception and yet equipped with passionate reason. I then argue, through comparing this anthropology of the self with that of James K. A. Smith found in Desiring the Kingdom, that (1) Kierkegaard's and Smith's conceptions of the person are similar in that they responsibly avoid an overly cognitivist conception of the self, and (2) their conceptions are different in that the former is defined by paradox-driven thinking and the latter by practice-shaped desire.

Session 2-D (Ballrooms C and D, Krannert Center)[CE Credit]
Moderator: Dr. Mark Turlington

Victoria Liss — Era-Appropriate Music and Meals
Mentor: Dr. Katie Morales

Often, residents in long-term care facilities cannot focus long enough to eat adequate portions of their meals, leading to malnutrition. Currently, classical music is played during meals in the observation setting for this study. While research supports the use of calming music to reduce agitation in dementia patients, little research exists with the general population of long-term care facilities. This purpose of this study is to test the feasibility and acceptability of a music therapy intervention within a long-term care facility, using a mixed methods, observational quality improvement design. The research question for this study is: What is the effect of era-appropriate music instead of classical music on long term care facility residents' mentation and nutrition during mealtimes? Era appropriate music is defined as music that was popular in the residents' late teens and early twenties. Articles considered in preparing

this study ranged from quasi-experimental to descriptive in nature. While studies agree that music therapy is beneficial to older adults, a definitive statement cannot be made due to small sample sizes and lack of randomization. This study seeks to add to the body of evidence regarding music therapy among the general population of long-term care facility residents.

Jake Doiron, Richards Scholar — Synthesis of a triazole containing VX-770 analog and analysis as a bioisostere
Mentors: Dr. Mark Turlington and *Dr. Ken Martin*

Cystic fibrosis (CF) is a fatal genetic disease caused by a mutation to the cystic fibrosis transmembrane conductance regulator (CFTR) protein. The most common mutation is deletion of phenylalanine at the 508th position (the ΔF508 mutation) which affects 90% of CF patients. Recently the drug Orkambi has been approved by the FDA to treat the ΔF508 mutation, however Orkambi is only modestly effective in improving lung function. Orkambi is composed of two molecules, VX-770 and VX-809, both of which contain an amide functional group. The amide functional group is theorized to be less stable and consequently less effective in comparison to a triazole functional group. The synthesis of the triazole substituted VX-770 drug molecule and accompanying biological data of the new compound is reported. While the triazole analog does correct ΔF508-CFTR function, it was found to be less effective than VX-770.

Sarah Cooper, Richards Scholar — Structural role of Gag protein domains during assembly of bovine leukemia virus
Mentor: Dr. Dominic Qualley

Like most retroviruses, bovine leukemia virus (BLV) utilizes the structural protein 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). It is unknown which domains play an active role in facilitating assembly by packaging the genomic RNA of the virus during replication. Through homology modeling, small angle x-ray scattering, and molecular dynamics experiments, we have produced the first experimentally-validated molecular model of a retroviral Gag protein. Fluorometric annealing assays were used to provide insight on the BLV assembly process. Our results indicate that BLV Gag adopts a rigid conformation with little flexibility and that the MA domain plays a major role in RNA packaging. By better understanding this interaction, the domain responsible for genome packaging can potentially be inhibited in order to disrupt viral assembly and prevent BLV from replicating. Because BLV is an agriculturally significant pathogen that infects domestic cattle, a potential treatment would have an important impact on the agriculture industry. 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.

Katie Hambrick — Synthesis of click-on fluorophores for copper catalyzed cycloaddition reactions
Mentor: Dr. Mark Turlington

Fluorescent dyes that can participate in the copper-catalyzed azide-alkyne cycloaddition reaction serve as easily introduced fluorescent tags giving them broad applications in chemical biology. In particular, "click-on" dyes that exhibit a significant increase in fluorescence after the azide-alkyne cycloaddition labeling reaction are advantageous as these dyes do not exhibit significant background fluorescence. The synthesis of alkyne-containing benzothiazole and benzooxadiazole fragments and model copper-catalyzed click reactions of these substrates are reported. These click fragments will be evaluated for use as "click-on" fluorophores.

12:30 – 2:30 p.m. — **Poster Session and Community Engagement Showcase (Cage Center Arena)**

2:45 – 3:45 p.m. — **Session 3-A (Room 217, Krannert Center)**[CE Credit]
Moderator: Mrs. Hope Willoughby

Bailey Dingley — Rejecting and Regressing: Mapping the Rhetorical Limits of the Southern Baptist Covention's Identity
Mentor: Mrs. Hope Willoughby and Mr. Matt Delzer

The Southern Baptist Convention, the SBC, released the latest translation of the Christian Standard Bible in summer of 2017. The Atlantic, on June 11, 2017, argued that this latest translation uses gender-neutral terms, and other media outlets followed suit, praising the SBC for embracing progressive values. However, the SBC's members and pastors have made it clear that this was not the intention, arguing that gender-neutral terms are not an accurate translation. As society is becoming more gender inclusive, and the SBC is losing membership, the SBC is struggling to negotiate its identity and retain its relevance. This prompts us to ask, how has the Southern Baptist Convention's adoption of the latest Christian Standard Bible altered their collective identity? This paper applies Michael Bruner's methodology called limit work from his article "Rhetorical Criticism as Limit Work." Limit work looks at how what a group rejects can define what the group is. By conducting limit work, this paper unpacks the rhetoric of the SBC's rejection of the Atlantic's claims and discusses the implications on women and the church resulting from this rejection.

Beth Anne DeKeizer — The Forgotten Teachers
Mentor: Mrs. Hope Willoughby and Mr. Matt Delzer

There is a shortage of black teachers in the United States of America. According to a 2016 report from the US Department of Education, only 18% of public school teachers are black. And there is cause for concern. A March 2017, report by the Institute of Labor Economics shows that black students who had just one black teacher between third and fifth grade are 29% less likely to drop out. While it is easy to blame racism or discrimination for the lack of black teachers, this speech examines how the Brown v. Board of

Education of Topeka verdict in 1954 lead to the shortage of black teachers in the United States today. This connection between Brown v. Board and the lack of black teachers will be discussed through studying the Supreme court decision, then how it affected black teachers in the 1950s, before finally looking at the implications Brown v. Board has on black teachers today.

Avery James — Mental Illness: The Musical
Mentor: Mrs. Hope Willoughby and Mr. Matt Delzer

According to the National Alliance on Mental Illness, one in five American adults live with a mental illness. With the rise of social awareness concerning mental health in the last decade, comes our society's obligation to understand its consequences on our world and its implications. This oral interpretation examines society's simultaneous stigmatization and romanticization of mental illness. By using performance as a rhetorical device, the argument presented by the selected literature can be understood in its aesthetic, emotional, intellectual, and contextual entirety. Through the poetry Mental Illness the Musical, by Ben Wenzl, Audiobook by Neil Hilborn, Bob by Robert Rope, Doug Stanhope's scene on suicide from the Louie Show, and the article "If You Don't Have a Mental Illness, You're Just Not Cool" by Anne Gus, we can further our understanding of the human condition while advocating social awareness for mental health.

Beth Anne DeKeizer — Transmedia Storytelling: "The Lizzie Bennet Diaries" and Digital Authenticity
Mentor: Dr. Curt Hersey

The "Lizzie Bennet Diaries" is a transmedia modernized retelling of Jane Austen's "Pride and Prejudice." From April 2012 to March 2013, Lizzie Bennet vlogs about her life, and she shares personal details about her sisters, friends, and potential love interests. Vlogs are a way for someone to share their experiences and thoughts through a video format. All the characters from "Pride and Prejudice" are modernized, have their own active social media accounts, and they post in real time along with the vlogs. Lizzie opens up about her life to her viewers and through videos and Twitter she and others connect to the viewers. However, Lizzie and those in her life are not real, they are actors in a scripted series, yet they are presented in a manner that simulates real life. This paper analyses how "The Lizzie Bennet Diaries" uses techniques from new media as a mode of storytelling. As well as studying how "The Lizzie Bennet Diaries," through social media, uses false authenticity and a mimicking of participatory culture to create a sense of intimacy with the audience.

Session 3-B (Ballroom C and D, Krannert Center)[CE Credit]
Moderator: Dr. Mike Morgan

Grant Simonds, Synovus Scholar — Assessment of the Pathogenisis of Hypertension from Rodent Tissue Samples
Mentor: Dr. Christopher Hall

Vascular hypertension remains a major contributing factor to the frequency of heart attacks and strokes in the United States. This study was initiated to assess a mathematical model for arterial damage due to hypertension. We utilized a hypertensive rat model (SHR; n=31) in order to assess arterial damage, as measured by vascular epithelium apoptosis, during the pathogenesis induced by hypertension. At four weeks of age we recorded systolic, diastolic, and mean arterial pressure (MAP) using a tail cuff system (Harvard Apparatus) 3x a week until week 12. Rats were euthanized at specific blood pressures and time points. The left and right common carotid and iliac arteries were harvested and frozen at -80C. Tissues were then homogenized and subjected to two commercial assays to detect initiation (caspase 3) and completion (DNA fragmentation) of apoptosis. The assay is based on spectrophotometric detection of the chromophore p-nitro-aniline (p-NA). The p-NA light emission can be quantified using microtiter plate reader at 405 nm. Comparison of the absorbance of p-NA between groups allows determination of the fold increase in caspase 3 activity. Results show that there is some difference between the vascular epithelial apoptosis of the control and the apoptosis present in the hypertensive rats.

Jacob Ryan Williams, Richards Scholar — Sea Anemones and Crude Oil; Is there a reason for concern?
Mentor: Dr. Mike Morgan

As humans, we have the critical responsibility of sustaining our earth, and perhaps one small step towards learning how to steward our home is to better understand the immense impact we can have on the world around us. The focus of this project is to investigate the effects of crude oil components on sea anemones. Using quantitative real-time PCR, changes in gene transcription can be quantified in the sea anemone Exaiptasia pallida that was exposed to the simplest polyaromatic hydrocarbon known as naphthalene, which is commonly found in households as mothballs. Preliminary results show that there are significant effects on developmental processes and programed cell death. This investigation offers insight into the dangers these chemicals pose to organisms found in coral reefs.

Anna Claire Tucker — Biosurveillance for Mosquitoes as Potential Disease Vectors in northwest Georgia
Mentor: Dr. David Bruce Conn

Mosquito-borne diseases threaten both humans and animals in the southeastern United States, where favorable climate and aquatic habitats are well suited for mosquito breeding. Little is known about recent trends in mosquito occurrence in much of the state of Georgia. During early May and from late August through November 2017, we followed a One Health approach to survey for mosquitoes in diverse habitats across Berry College's 107-square-kilometer outdoor laboratory. Nineteen mosquito species were collected belonging to five genera: Aedes, Anopheles, Culex, Psorophora, and Uranotaenia. Collectively, in some regions the species we identified are known vectors of many pathogens including but not limited to: Zika, dengue, chikungunya, yellow fever, eastern

equine encephalitis, La Crosse encephalitis, St. Louis encephalitis, West Nile, and other viruses; *Dirofilaria immitis* (heartworm); *Plasmodium vivax* (malaria). Each of these pathogens is known either to occur presently, to have occurred historically, or to have potential for emergence or re-emergence in northwest Georgia. We conclude that there is potential for transmission of some of these pathogens to humans and/or animals by existing mosquito populations here. Thus, it is crucial that we continue surveillance of both vector and host populations in this region.

Ethan Hart — Analysis of OspC Down-regulation in Mutant Strains of Borrelia Burgdorferi
Mentor: Dr. DeLacy Rhodes

Lyme Disease is the most common vector-borne disease in North America. No human vaccine yet exists, highlighting the importance of studying the pathogenesis of this organism. Outer Surface Protein C (OspC) is a known virulence factor that is required for the ability of B. burgdorferi to establish an infection, though the exact mechanism is still unknown. To better understand the role of this protein in disease establishment, two OspC mutant strains of B. burgdorferi were created: one with an increased positive charge (B31::ospC(HNN)) and one with a slight negative charge (B31::ospC(NDE)). Infectivity was assessed and the B31::ospC(NDE) mutant was unable to persist. In this study, the control and mutant strains were cultured in conditions that mimicked the progression of the bacteria from the tick to a host using temperature shift to up and downregulate OspC in vitro. At days zero, seven, fourteen, and twenty-one post-temperature shift, bactericidal assays were performed to assess antibody-dependent killing. At all time points assayed, all mutant and control strains show antibody-dependent killing. Because OspC is a significant virulence factor for B. burgdorferi, studying this protein is important for further understanding Lyme Disease.

Session 3-C (Room 324, Krannert Center)[CE Credit]
Moderator: Dr. Julia Barnes

Alyssa Fowler — Las Mujeres y su Humanidad (Women of Quijote and Their Humanity)
Mentor: Dr. Jen Corry

Don Quijote is a vivacious satire that has been contesting problematic social norms for the last 400 years. Today's movement for gender equality can be seen in various outlets, as females are increasingly encouraged to disregard the oppressive social construct of femininity. However, Cervantes began this fight some 400 years ago, in an age where women were belittled and viewed in terms of male domination. He engages feminine characters in adventures, strength, and intelligent discourse, developing them beyond the traditional dichotomy of either pure chastity or malicious seduction. The very book that seems to epitomize masculinity and chivalry also boldly decries the treatment of women as a weaker gender, illustrating them instead as at least as capable of full life as men. Women in Don Quijote are more than placeholders that exist for the sake of a story. They are boldly real, setting a precedent for other women to defy norms and become utterly human.

Abby Newman — Generativity vs. Stagnation: An Eriksonian Perspective on Don Quixote
Mentor: Dr. Jen Corry

Don Quixote, from the famous novel Don Quixote of La Mancha by Miguel de Cervantes, is known as the most unique character in all Spanish literature. His absurd behavior and seemingly crazy antics with his squire Sancho Panza have entertained and delighted readers, while also provoking deep thought and discussion, since the seventeenth century. While many readers commonly dismiss Don Quixote as simply a senile old man, Erik Erikson's theory of psychosocial development provides a magnifying lens with which to examine the protagonist's behavior more profoundly, specifically using the stage generativity vs stagnation. This paper argues that Don Quixote's adventures are not the product of psychotic fantasies, but instead, manifestations of his desire to find significance in his life and to make a mark on the world.

Hannah Gurniewicz — Bridging the Gap: Nonprofit Organizations and the Latino Community in Rome, GA
Mentor: Dr. Julia Barnes

A major platform of nonprofit organizations is their outreach to their local community, especially those that are underrepresented or marginalized. In Rome, Georgia, however, this is not the case with the Latino community. There is a significant gap between the outreach performed by nonprofit organizations and service to the Latino community due to various reasons. While 95% of the nonprofits surveyed wanted to work more with the Latino community only 60% of the Latinos surveyed knew of only two or less of the 30+ nonprofit organizations in Rome. My conclusions are based on data from survey responses from the nonprofit organizations in Rome and from the Berry College ESL program as well as data from the US Census Bureau. Ways to address this gap are presented, including connecting nonprofits that are not working with the Latino community to organizations that already are working with the Latino community.

Olivia Leviton — El Sìndrome de la Nariz Blanca (White Nose Sindrome)
Mentor: Dr. Jen Corry

White Nose Syndrome is a fungal infection that uniquely afflicts North American bats. Responsible for up to one hundred percent die offs in some colonies, the fungus is massively destructive, as its scientific name implicates. Pseudogymnoascus destructans often covers bats' muzzles, impedes their respiratory tracts, and annihilates wing flaps by riddling them with holes and rendering the bat unable to fly. As people can spread the fungus to uninfected caves if they have been inside affected caves, some caves have a human

barrier such as a gate, and specific decontamination precautions are required for most caves. The blockade and sterilization methods have drastically curtailed the human-caused spread of the disease, and researchers are currently working with a bacteria/volatile organic compound (VOC) pairing that utilizes the bacterium R. rhodochrous VOC emissions to inhibit fungal growth. The VOC's emitted stop Pseudogymnoascus destructans in its tracks but do not reverse the damage inflicted by the fungus. Initially administered by keeping bats in a cooler filled with the VOC's for a day or two, scientists are now working on a nebulizer system that enables treatment without handling the bats.

Caroline Stiles — El sabio analfabeto: El papel de Sancho Panza en *Don Quijote de la Mancha*
Mentor: Dr. Jen Corry

This presentation will be given in Spanish. Perhaps one of Miguel de Cervantes' most remarkable accomplishments in Don Quixote de la Mancha is his skillful concealment of the scathing and revolutionary social commentary that pervades the work. In order to avoid censorship by the Spanish inquisitors of the time, Cervantes had to obscure his radical propositions that illuminated the hypocrisy and injustice of 15th century social hierarchies and the Catholic Church. With Cervantes' motivation to avoid the threat of censorship in mind, it is prudent to analyze Don Quixote's odyssey seeking irony in the mundane, comedy in the tragic, and, most importantly, wisdom in the unsophisticated. Uneducated and illiterate, Sancho Panza would appear at a shallow glance to be but a lowly foil to the cosmopolitan nobility of Quixote's time. However, through his discreet, perceptive observations and unexpectedly insightful behaviors, Sancho is the ideal emissary of Cervantes' subversive messages, which he delivers in refranes, or adages that appear to boast no more sophistication than a common man's proverb. This paper analyzes the role of Sancho Panza and his refranes as the ideal covert vehicles for Cervantes' veiled social criticism in Don Quixote de la Mancha.

4:00 – 5:15 p.m. — **Closing Plenary (Spruill Ballroom, Krannert Center)**
Moderator: Alexa Adams, Phi Kappa Phi

Presentations by Berry Scholars

Marnie Wall, George Scholar — Using Reflective Functioning and Self Efficacy to Better Understand Teacher Burnout
Mentor: Dr. Casey Dexter

Teacher Self Efficacy (TSE) is associated with student academic achievement and adjustment, teacher practices indicative of classroom quality, and psychological processes important to teacher functioning. Predictably, TSE is also predictive of teacher burnout. While much attention has been paid to TSE as an important predictor, little research has examined what might predict TSE. Borrowing from the parenting literature, we examined the potential contribution of reflective functioning (RF) to this conversation. RF refers to the ability to understand oneself and others in light of mental states. Previous research has shown RF to be useful in understanding mental processes underlying teachers' behavior in the classroom with students. We are most interested in whether this reflective capacity is predictive of TSE and in turn, teacher burnout. We hypothesize a mediated effect such that reflective functioning acts on teacher burnout through TSE. Ninety-six elementary teachers completed an online survey measuring teacher burnout, TSE, and Teacher RF. RF was a significant predictor of TSE and additional analyses suggest a significant indirect effect of RF on teacher burnout through TSE. This evidence for mediation has some interesting implications for how we conceptualize ways to effect psychological change in teacher TSE and in turn their burnout susceptibility.

Jennifer Wayman, Kirbo Scholar — Evaluation of Sex Ratio of Goat Embyos Produced by *in vitro* Fertilization
Mentor: Dr. Dawn Bresnahan

In most species, reproductive technologies including in vitro fertilization (IVF) have been developed to assist with preservation of valuable genetics and the selection of desirable traits. However, techniques for application in goat production are lacking, yet could be of value due to increased consumption of goat products in the US. In the bovine, IVF has been experimentally proven to produce a high male-to-female ratio of embryos. In this study, we hypothesize there will be an increase in the male-to-female ratio of goat embryos produced using IVF. Oocytes were collected from goat ovaries purchased from a local meat processing facility. In vitro embryo production was accomplished utilizing a complete media suited for goat embryogenesis according to manufacturer's instructions. Once the embryos reached the expanded blastocyst stage in development sex was determined using Polymerase Chain Reaction (PCR) and gel analysis. At this point, 20% of our samples were sexed resulting in approximately 1:1 ratio of male-to-female embryos. Preliminary results have shown no skew in male-to-female ratio, additional data are still being analyzed. Determining if IVF technology produces embryos with a skewed sex ratio could lead to future research analyzing components within IVF produces and determine if they alter the ratio.

Hannah Youngblood, Richards Scholar — Coral Response to Diuron Exposure
Mentor: Dr. Mike Morgan

Herbicides (i.e., weed killers) used on coastal golf courses and similar landscapes are unintentionally introduced into marine ecosystems through water run-off. Coral tissues contain symbiotic algal cells which are affected by herbicide exposure. Diuron is one such commonly used herbicide. Although algal cells are known to respond to Diuron, the response of their coral hosts to this herbicide has not been analyzed. This project sought to characterize the coral host tissue response to various doses of Diuron by using quantitative real-time PCR (qPCR). This project identifies a suite of twenty-one genes that are representative of the coral's response to

Diuron. These genes suggest the herbicide stimulates receptor-mediated responses. As a collaboration between Berry College, Clemson University, and the Bermuda Institute of Ocean Sciences, this project is international both in terms of its contributors and its implications for the use of herbicides throughout the world's coastal areas.

Mary Shoup, Kirbo Scholar — In vitro modeling confirms in silico predictions of REL-1 binding in *T. cruzi*
Mentor: Dr. Christopher Hall

Using in silico modeling to predict binding kinetics, is often beneficial for screening therapeutic compounds prior to in vitro studies. Based on such modeling approaches, certain naphthalene-based compounds (NBCs) were predicted to bind with high affinity to the ATP-binding site of the REL-1 subunit of the kinetoplast editosome complex within Trypanosoma cruzi. Previously, we demonstrated that NBCs V2, V3, and V4 had the ability to inhibit proliferation of T. cruzi, in vitro. We were able to test the final NBC analog, V1, and compare it to the previously tested NBCs. DH-82 canine macrophage cells and T. cruzi trypomastigotes were cultured in the presence of V1 at 0, 10, 50 and 100 μM concentrations. T. cruzi blood stream form trypomastigote proliferation was monitored through hemocytometer counts at 24, 48, and 72 hours. Results showed that V1 inhibited parasite proliferation in vitro in a manner consistent with in silico predictions of REL-1 binding affinity. The relative efficacy of each NBC in vitro was also in agreement with in silico predictions of REL-1 binding. Biochemical analysis also supports that three NBCs competitively inhibit ATP binding of REL-1. This supports further studies for the potential use of NBCs as therapeutic compounds against T. cruzi.

Payton Stone, George Scholar — The Influence of Religious Priming and Personality on Prosocial Behavior
Mentor: Dr. Kristen Diliberto-Macaluso

"Does religion or belief in God make people good?" is a fundamental question of religious belief, and in recent years, psychologists have begun to study prosocial behavior using religious priming methodologies. In light of this research, we examined the effects of two different forms of religious priming, religiosity, generativity, and guilt on prosocial behavior using two experiments. In the first, participants were primed with religious, selfish, or neutral words using a Lexical Decision Task, and in the second participants were primed using either religiously affiliated or neutral company logos. Participants were then given the opportunity to donate some, part, or all of their $8 compensation to one or more student projects, presented on a college crowdfunding website. As expected, positive relationships were found between measures of generativity and spirituality. Also, negative relationships were found between guilt and generativity. Findings from both types of religious priming tasks and measures of personality will be discussed with respect to the literature on religious priming and prosocial behavior.

Closing Remarks- Dr. Mary K. Boyd, Provost

5:30 p.m. Music Department Honors Recital, Ford Auditorium

Symposium on Student Scholarship Poster Session and Community Engagement Showcase
Cage Center Arena
April 10, 2018 at 12:30 p.m.

Animal Science

Elli Hayes — Comparison of powdered and fresh colostrum fed to dairy calves
Mentor: Dr. Laura Flatow — Poster Number: 2

In the first few hours of life, it is vital for dairy calves to receive a meal of high quality colostrum. This colostrum provides a food source as well as proteins such as maternal antibodies for the calf's first month of life. There are a variety of colostrum options for calves, and commercially available powdered colostrum and fresh colostrum from the dam that has been pasteurized. The purpose of this study was to determine if there is a difference in the absorption of antibodies in calves fed powdered or fresh colostrum. At calving, animals were assigned either powdered or fresh colostrum, and blood samples were collected before colostrum was fed and at 24 hours of age. Serum protein and antibody concentrations were measured. Calves fed fresh colostrum had significantly higher increases in serum protein concentrations compared to calves fed powdered colostrum. There were no differences in serum protein concentrations between male and female calves. This indicates that powdered colostrum may not contain proteins that are as readily absorbed as those found in maternal colostrum.

McKennon Trujillo — Modification of glucose utilization by *in vitro* produced goat embryos
Mentor: Dr. Dawn Bresnahan — Poster Number: 70

In the United States, consumption of goat meat is increasing; however, production is not adequate to supply the demand. Overall, understanding of in vitro fertilization (IVF) techniques for use in goats is lacking. Research in other species indicates that tolerance of glucose in culture media is greater in one sex. The purpose of this study is to determine a protocol for modification of glucose utilization by goat embryos. Three inhibitors of glucose uptake inhibition were tested to determine the best method to alter glucose uptake without decreasing embryo viability. Next, to test glucose utilization, embryos are assigned to one of four groups: 1) control (standard media), 2) GLU (added glucose), 3) GLU-I (glucose inhibitor), and 4) GLU + GLU-I. Glucose uptake is determined by measuring glucose remaining in media following embryo culture using an enzyme linked immunosorbent assay (ELISA) . Presently, inhibitors are still being tested. One inhibitor was toxic to the embryos and was eliminated. The remaining two inhibitors reduce embryo formation rates; therefore, various doses are being tested. Results of this study could provide an inexpensive method for skewing sex ratios and insight into metabolic changes in embryos due to glucose availability.

Anthropology and Sociology

Emmie Cornell — Agroecological Biodiversity Conservation at Berry College: Engaging the Public
Mentor: Dr. Brian Campbell — Poster Number: 44

Organic agriculture depends upon a thorough understanding of ecology. The Berry Agricultural Biodiversity Conservation project utilizes agroecological methods to grow vegetables organically, allowing the varieties to locally adapt and produce organic seeds to distribute to the community. My research attempts to answer the following two questions: How do these agroecological gardens mimic ecology and therefore confer sustainability? How do heirloom crop varieties adapt to local conditions? The installation of educational signage at the BCEMS Orchard and Dogwood gardens that summarizes agroecology and agrobiodiversity conservation will educate garden visitors and summarize the conclusions of this research. Signage that explains the species in the Orchard and Dogwood Gardens, the ecological patterns mimicked in the gardens, and the contributions to the local ecology and Berry community will be beneficial within the gardens, especially during less productive seasons when these patterns and contributions are less obviously demonstrated. At Dogwood, the addition of a small pond provides the garden with nutrient rich water to fertilize the garden, as well as a home for the ducks that help eliminate pests at Dogwood. It provides irrigation to additional fruit trees, attracting pollinators and providing food for the community and the animals that sustain Dogwood.

Victoria Farrelly — Berry College students' knowledge and attitudes about Sexually Transmitted Infections
Mentor: Dr. Timothy Knowlton — Poster Number: 50

In this presentation, I discuss my findings on Berry College students' knowledge and attitudes about Sexually Transmitted Infections (STI), specifically considering Hepatitis C. I argue that a variable such as the type of education an individual receives is associated with attitudes about persons who have contracted STIs and which STIs are most stigmatized. The concept of stigma originated from the ancient Greeks, who used signs burned onto individual's bodies to mark them as slaves, traitors, or criminals. Cross culturally stigma can be defined as an attribute that reduces a person from an entire whole human being down to an unwanted or tainted part. The social theorist Erving Goffman argued that stigma is not a naturally occurring characteristic of individuals. Rather it is produced in social interactions in which the stigmatized characteristic is deemed relevant to the individual's expectations of the other person. In conclusion, this research demonstrations the roles of peer interactions and institutions in the stigmatization of STIs.

Emma Wright 21st Century Community Building
Mentor: Dr. Timothy Knowlton Poster Number: 69

This study examines the general concept of community building within the context of a local, non-profit organization called One Community United (OCU). OCU exists as a space for community members to engage in dialogue about breaking down social barriers. The data on community building within OCU are both qualitative and quantitative. Qualitative data were gathered from one-on-one interviews with key informants knowledgeable about the history of OCU development, current communication, and membership relationship practices within the group. Quantitative data were gathered through an online survey, reaching out to the full members. The analyses examine themes in the qualitative narrative obtained through open coding procedures. These themes are discussed in relation to the theoretical lens of social theorist Erving Goffman's work on presentation of self and political scientist Benedict Anderson's theory of "imagined communities." These results highlight the means for meaning making and membership development in a community group where the options for modes of communication are diverse due to member proximity. The findings are discussed in the context of scholarship on community building for social justice social action purposes with an emphasis on the use of communication technologies for connection and promotion.

Bertha Nibigira Refugee Youth's Resettlement and Educational Experiences in the United States
Mentor: Dr. Timothy Knowlton Poster Number: 73

This study is a sociological approach to the educational experience of first-generation refugee youth. This study expands on the limited scholarship concerning the myriad factors that affect this vulnerable population's education attainment. Over half of the 22.5 million refugees in the world are minors and less than 50% of them attend primary and or secondary school. Less than 1% of the global refugee population acquire higher education. Estimates indicate that about 1.5 million refugees who have resettled to the United States are minors. This project summarizes the experiences of some of these minor refugees and elaborates on the main themes they describe as key impediments to the fulfilment of their educational goals, based on their initial refugee experience, their overall educational experience, and their continuous refugee experience. The findings from open ended interviews with 15 refugee youths, all of whom are 18 years or older, suggest lack of proper academic settings to accommodate refugees' special educational needs, acculturation problems, and psychological needs from the internalization of traumatic war experiences affect refugee youth educational attainment. The study proposes recommendations for future research that may contribute to a greater comprehension of the refugee experience as it relates to educational experiences and attainment.

Biology

Austin Fowler GIS Mapping of Tick Species and Associated Pathogens on Berry College Campus
Mentor: Dr. DeLacy Rhodes Poster Number: 5

Tick-borne diseases threaten human health, and people can become infected through outdoor activities. Evaluating the prevalence of ticks and the pathogens they carry is therefore important to better understand the human risk for these diseases. Additionally, using geographical information to identify where ticks and pathogens can be found is critical for understanding which areas present a higher risk for disease contraction. In this study, we collected ticks from the Berry College campus while using GPS devices and screened the ticks for the presence of Rickettsia, Ehrlichia, Anaplasma, and Borrelia spp. Two hundred and sixteen ticks were identified and found to belong to 3 different species, *Dermacentor variablis*, *Amblyomma maculatum*, and *Amblyomma americanum*. Total DNA was then isolated, and PCR was used to test for the tick-borne pathogens. Ehrlichia, Anaplasma, and Borrelia spp. were not detected, but Rickettsia spp. were found. By assessing the prevalence of pathogens harbored by these ticks and determining where on the Berry College campus they are found, we gain further insight into the human risk of these diseases.

Rachel Caldwell It's in the Bag: Holding Bag Composition Effects on Stress in Eastern Bluebirds
Mentor: Dr. Renee Carleton Poster Number: 18

Capture and handling of free-ranging animals produces an acute physiological stress response. This study sought to provide a potentially less stressful method of holding birds prior to examination. Thirty-two Eastern Bluebirds (*Sialia sialis*) were individually sampled for physiological, exertional and behavioral stress responses after 20 min of confinement in either an opaque cotton (OP) holding bag or a polyester mesh (ME) holding bag to determine how bag composition affects corticosterone (CORT) and blood glucose (BG), and timing, number, and duration of struggling bouts in bags, and number of vocalizations. Controls were sampled immediately on capture and released. Carbon dioxide (CO2) diffusion through the fabrics of OP and ME bags were also quantified and compared as a possible factor in a stress response. There was no difference in CO2 diffusion between the bags; birds in ME bags had lower BG than those in OP bags or the controls, and birds in ME bags had a greater CORT release than those in OP bags or the controls. These results suggests the OP bag would be a better choice under typical capture and handling circumstances.

Kate Harnage Range of the Georgia *Alnus maritima*
Mentor: Dr. Cathy Borer Poster Number: 20

Alnus maritima, or the Seaside Alder, is a tree species that has an unusual distribution with only a few populations found in Delaware area, Oklahoma, and Georgia. More extensive research has been done on the population in Oklahoma, compared to the alder population in Georgia. It is now known that there are two subpopulations found in Drummond Swamp, in Bartow County, Georgia, on land owned by Georgia Power. Georgia Power is currently working to acquire all the land on which the Seaside Alder is found to preserve the species and give research teams full access to the populations. In this project, we are currently working to obtain an

updated and definitive boundary of the range of the Georgia Seaside Alder in Drummond Swamp, and create a map that includes all individuals of this species. We are also working to identify which trees are Seaside Alders versus Hazel Alders, a similar species that also grows in the area. In this work, we hope to evaluate and conserve the Georgia Seaside Alder. We are also working with local organizations to create educational material for the site that emphasize the ecology of wetlands and educate the public about this unique species of alder.

Clara Hanger and Ethan Hollis — Analysis of Water Quality of Ponds during Drought versus Non-Drought Seasons
Mentor: Dr. DeLacy Rhodes — Poster Number: 31

Nonpoint source (NPS) pollution of waters is one of the leading threats to water health, with microbial content serving as an indicator of water quality. NPS pollution impacts human drinking water by diffusing into groundwater through aquifers. The increasing prevalence of NPS pollution necessitates continued research of variables affecting water quality. Previous studies in our lab have sought to investigate potential differences in water quality of ponds accessed by wildlife alone versus those accessed by both wildlife and livestock. While the data suggested differences in water quality, the sampling period fell during an exceptional drought in our region. To better understand the potential impact of rainfall on microbial content as an assessment of water quality, as well as differences in animal access, the same ponds were sampled in a non-drought year and numbers were compared to previous counts. Initial findings suggest greater bacterial loads in ponds accessed by both livestock and wildlife than ponds exclusively accessed by wildlife. Data also indicates the number of bacteria in wildlife ponds is consistent regardless of rainfall, while bacterial loads in livestock ponds are weather-dependent. Analysis of microbial concentrations indicates variability in NPS pollution between differing amounts of rainfall and type of animal access.

Alisa McConnell — Species Identitification of Plant Roots in Caves via DNA Extraction
Mentor: Dr. Cathy Borer — Poster Number: 60

Roots are essential for plants, yet they are difficult to study because they must either be disturbed or placed into unusual circumstances to access them. However, it is common to see roots hanging from the ceilings of caves, providing relatively easy access to study their physiology and ecology without substantially disturbing them. While roots hanging into caves may be accessed for research, species identification can be a challenge. In this project, we are developing and testing techniques necessary to identify the species of roots in caves. Roots were collected, both exposed at the surface of the soil, and in caves. A QUIAGEN DNeasy Plant Mini Kit was used to purify the DNA from collected roots. Root samples were disrupted and homogenized using a mini centrifuge, column chromatography, and various buffers, to separate the DNA from the other components within the cell and purify it.A variety of methodologies have been tested, but DNA has not yet been isolated. The Quiagen kit was developed to extract DNA from leaf material rather than root material, which contains less DNA than leaf tissue, which has provided challenges in isolating the DNA. The main issue in extracting sufficient amounts of DNA appears to be the disruption method. Disrupting and homogenizing the roots with liquid nitrogen, with a mortar and pestle is not sufficient to extract a usable amount of DNA to perform the necessary steps to identify the plant. The next steps will be to evaluate additional cell disruption methods, to isolate DNA for analysis and species identification.

Joe Mann, Kylie Aiken, Shannon Whitney, Claire Mulkey, and Meredith Wrye — Species Richness within an Urban Coyote (*Canis latrans*) Territory
Mentor: Dr. Chris Mowry — Poster Number: 64

A common assumption in the southeastern United States is that coyotes (*Canis latrans*) are non-native species that negatively impact biodiversity either via a trophic cascade or competitive exclusion. We investigated vertebrate community composition within an urban coyote territory in Atlanta, Georgia for 20 consecutive months to investigate these potential links. Our study site consisted of approximately 1.2-ha within an 8-ha mixed pine-hardwood forest bisected by a small creek and surrounded by housing development. An active coyote den was first detected at the site in March 2016. Remote cameras were placed throughout the study site beginning in May 2016, and they were in continuous operation for the duration of the study. Trapping effort (# of cameras deployed x # of days deployed) averaged 78.7 days per month. Over 700 coyote images were obtained, coyotes were detected in every month, and 2 litters of pups were born and raised. Coyote images were most commonly captured between 6:00 - 8:00 and 20:00 – 22:00 hrs. Contrary to a paucity of native wildlife, we found high vertebrate species richness (n = 16) in conjunction with a resident urban coyote group, including bobcat (*Lynx rufus*), red fox (*Vulpes vulpes*), and North American river otter (*Lontra canadensis*).

Chemistry

Paula Kahn — Crystal Structures of Potassium Salts of 3-Nitrophenol and 4-Nitrophenol
Mentor: Dr. Ken Martin — Poster Number: 8

The overall aim of this project is to study the properties of substituted phenolates in the investigation of the alpha effect. A measure of the alpha effect can be evaluated by studying atomic charges. Atomic charges can be determined by doing a charge density study, but first the crystal structure must be solved. 3-Nitrophenolate and 4-nitrophenolate potassium salts were synthesized with 3-nitrophenol and 4-nitrophenol as solutes and potassium hydroxide as solvent. The crystals were analyzed with X-ray diffraction to determine their crystal structures. As expected, the 4-nitrophenolate displayed a 1:1 ratio of phenolate and potassium ions, and contained a water molecule. However, the 3-nitrophenolate did not contain any water molecules, and displayed a 2:1:1 ratio of phenols, phenolate, and potassium. The 3-nitrophenolate crystal is a novel structure and will be submitted for publication.

Jonathon Brace — Preperation of Click Fragments for the Discovery of Novel CFTR Correctors
Mentor: Dr. Mark Turlington — Poster Number: 34

Cystic fibrosis (CF) is a lethal pulmonary disease caused by mutation to the cystic fibrosis transmembrane conductance regulator (CFTR) protein. Mutations to CFTR result in misfolding and degradation of the protein. VX-809 is a drug known to partially correct the misfolding of the protein; however, better corrector molecules are needed for CF treatment. Synthesis of a novel VX-809 analog was accomplished via copper catalyzed click chemistry to replace the amide with a triazole structure. The biological activity of the triazole analog was observed to be 70% of VX-809. These studies show that the triazole structure is a suitable substitute for the amide, but the lower efficacy suggests that the triazole functionality is not optimal within the VX-809 structural framework.

Benjamin Minor — Development of a bioorthogonal probe: synthesis of an unnatural amino acid
Mentor: Dr. Lindsey Davis — Poster Number: 39

Bioorthogonal reactions are those that can be performed within living systems without interfering with their innate physiology. There are only two bioorthogonal reactions currently reported in the scientific literature: the Staudinger ligation and copper-free click chemistry. Our research group aims to expand the current methodology by synthesizing an unnatural amino acid containing a functional group that will act as a bioorthogonal substrate in a cross-metathesis reaction. Allenes have unique reactivity and are not present in biological systems; as such they show great potential as a bioorthogonal substrate. An allene-containing unnatural amino acid (AA1) has been synthesized from acetylallene and sulfonylamino acetate in a 14% yield. Allenes have been shown to be successful substrates in cross-metathesis reactions. Commercially available allenes, similar in structure to AA1, have been screened in a cross-metathesis reaction using Grubb's first-generation catalyst. Details of the synthesis of AA1 and the results of the screening allenes will be presented.

Daniel Leon — Development of Glucose Biosensors
Mentor: Dr. Alice Suroviec — Poster Number: 45

The development of biosensors continues to provide less invasive techniques to quantify the chemical components in biological systems. Specifically, the study of substrate concentrations in biochemically revelant states using an immobilized enzyme on glassy carbon electrodes has the potential for inexpensive and reliable methods to "sense" the concentrations of a target molecule, whether it be a macromolecule, a neurotransmitter, the waste-products of a cell, etc. The experiments presented focus on implementing cyclic voltammetry to measure the activity of the enzyme glucose oxidase at the electrode surface. When submerged in glucose solutions of varying concentrations, the current produced due to the enzyme successfully interacting with glucose can be measured at a known potential. The reliability of the "biosensor" can be determined by comparing its currents to known enzyme kinetics using Michaelis-Menten equations. The implications of reliable, inexpensive, and less invasive glucose biosensors are relevant to monitoring the blood glucose levels of diabetic patients.

Amber Kelley — Organocatalyzed Domino Reactions
Mentor: Dr.Lindsey Davis — Poster Number: 58

A domino reaction is a chemical process that includes at least two consecutive reactions such that each subsequent reaction occurs because of the previous step. These reactions increase the efficiency of a complex synthesis because intermediates do not have to be isolated in between each synthetic step. In the current literature, there are very few reports of organo-catalyzed domino reactions that include the Diels-Alder reaction. The Diels-Alder reaction is synthetically useful as it creates two new carbon-carbon bonds and forms a ring. In addition, organocatalysis provides a more cost-effective and environmentally-friendly approach to organic synthesis. Research in our group is focused on utilizing the Diels-Alder reaction in an organo-catalyzed domino process. 2-((3-Methylbut-2-en-1-yl)oxy)benzaldehyde has been successfully synthesized from 3,3-dimethyl allyl bromide and salicylaldehyde in a 53% yield. This aldehyde serves as a suitable substrate for an organo-catalyzed carbonyl-ene/elimination/Diels-Alder domino reaction. Various organocatalysts such as diphenyl phosphate and diethyl phosphoramidate have been screened to optimize the domino reaction and various reaction conditions have been modified such as temperature, concentration, and reaction time.

Britton Ody — Synthesis of azide containing VX-770 analogs used to treat CF
Mentor: Dr. Mark Turlington — Poster Number: 65

Cystic fibrosis is a lethal lung disease caused by a mutation to the cystic fibrosis transmembrane conductance regulator (CFTR) protein. Orkambi, a combination drug therapy composed of VX-770 and VX-809, was approved by the FDA in 2015 to treat CF. Bioisosteres are functional groups with similar spatial properties to existing functional groups but are advantageous in drug molecules due to increased stability. Research in our group is focused on the synthesis of an analog of VX-770, in which the amide in VX-770 is replaced with the triazole bioisostere. A triazole-containing VX-770 analog was successfully synthesized in 10 steps from commercially available starting materials, but the analog had lower biological activity than the original compound. These results demonstrate that the triazole is a stable substitute for the amide structure, but that use of the triazole biosostere does not always produce analogs with equal biological activity.

Communication

Trent Griner — Provider Empathy: What does it look and sound like?
Mentor: Dr. Samantha Nazione — Poster Number: 13

Empathy, expressed by both verbal and nonverbal means, is essential to the provider-patient relationship. This study evaluated the patient perception of each verbal and nonverbal variables using an online 2x3 experimental design. 466 participants were randomly assigned scenarios in which the sex of the provider and the nature of the scenario were manipulated and were asked to rate how they would feel if the physician said a series of 19 verbal statements or did a series of 21 nonverbal acts. The highest rated verbal statements were "My entire staff is here for you," "I'm here for you," and "Is there something I can do to be helpful?" The highest rated nonverbal acts were spending extra time and having a warm tone of voice. Differences among conditions and provider gender were found. This study was IRB approved (Floyd Medical Center IRB and Berry College IRB).

Creative Technology

Eric Remoroza — Easier Access to Touchscreens for Children with Limited Mobility
Mentor: Mr. Zane Cochran — Poster Number: 6

Cerebral palsy is a loss of motor function due to brain damage. Children with Level IV Cerebral Palsy are generally able to walk short distances and control their arms with physical assistance or powered mobility. This study is focused on children with limited control over their arms and little to no control over their hands. Through interviews with and observations of caregivers and children, this project serves to simplify their experience navigating a touch screen through the development of a wearable conductive hand stylus.

Jerome Payne — Dynamic PT
Mentor: Mr. Zane Cochran — Poster Number: 12

Cerebral Palsy (CP) is a term used to describe a host of neurological conditions that affects the movement of the body, muscular coordination, and balance. There are an estimated 500,000 children under the age of 18 who have CP and 10,000 more that are diagnosed each year. While there is no cure for CP there are ways to treat the symptoms, ranging from physical therapy (PT) to surgery. In-home PT, physical therapy that is done at home, consists of a list of exercises provided to the child by their physical therapist to be completed in between their physical therapy sessions done in an institution. In performing these repetitive exercises the child can become emotionally detached from the exercises resulting in them becoming less motivated to perform the exercises. By developing Dynamic PT children are provided with a dynamic and enticing form of PT using an Xbox Kinect. The child physically interacts with the game, which has them perform the same exercises they would perform in traditional PT, to affect its state.

Nina Kowalke — Creating a Web Solution for Businesses and Influencers to Establish Sponsorships
Mentor: Mr. Zane Cochran — Poster Number: 14

According to women's lifestyle brands, social media is the key to modern marketing. These brands' marketing teams are tending to put traditional methods aside to work with "influencers". "Influencers" are social media users with at least 2,000 followers, sometimes reaching up to several million followers. The power of these influencers' loyal followings is being harnessed by brands through sponsored content that features their products or services. The following research explores the world of low-following Instagram influencers (2,000-11,000 followers) and the current options available to them for establishing relationships with brands. Through surveys, several of these influencers expressed having been contacted multiple times by brands, but never reciprocating interest because of safety concerns and disinterest in the brands. Thus, this research addresses how influencers could be proactive and pursue brands they actually love. In an effort to provide a solution to this problem, I have developed a website that returns influence to the influencers by means of an auction element. This website allows influencers to state the price that they are willing to complete a brand deal for, and the website then determines the best influencer for the deal.

Sidney McAdams — User Composed Percussive Foot Pedal
Mentor: Mr. Zane Cochran — Poster Number: 21

This project is the incorporation of percussive elements into the user's acoustic guitar performance with ease. It is geared towards college students that are beginner acoustic guitar players. This group tends to have difficulty doing such task on their own and cannot afford current technology to help achieve what they're looking for. This foot pedal device fulfills these complications for the user. The device sits on the floor in front of the user's feet and a long wire with a microphone connected to it can help record the user's percussive sounds made from their guitar. The user simply sticks the microphone to any location in proximity to where they'd create their percussion. With comprehensive foot presses of the pedal, the user can record, stop recording, play, stop playing, and change the percussion type. A loudspeaker within the device provides quality sound of the user's percussion and a volume dial on the microphone wire will help adjust the sound level to the user's preference. This device is different from current devices sold in stores, because it is more affordable, easier to use, and the user only needs one of the devices to do multiple functionalities.

Gabrielle Marquez — The Cheap Traveler

Mentor: Mr. Zane Cochran — Poster Number: 23

This research investigates the needs of young adults who struggle to find places to stop at night on domestic road trips. This study was conducted by researching existing tools and systems in this space. One find that highly influenced the design solution for this project was a website called Airbnb, which allows people to rent out their personal spaces to travelers. Primary and secondary stakeholder groups were identified and interviewed. This included people ages 18-25 who had experience with road tripping, and the parents of said travelers. Through the interviewing process, discoveries were made on the immense lack of structure during these trips. From these findings, it was determined that there is a need for something that helps organize where road trippers are going to stay at night with a focus on minimizing safety risks while allowing for spontaneity and last-minute changes. A web-based app was developed in response to these needs. The app allows travelers to locate and rent nearby driveways, providing them with immediate options for safe places to park and sleep in their car. It works by displaying the closest driveways available for rent and each driveway's address, cost, and ratings.

Joshua Cutter — Connecting Amateur Fimmakers to Cast and Crew through Common Connections

Mentor: Mr. Zane Cochran — Poster Number: 29

Amateur filmmakers often run into difficulties when beginning production of their new film projects. One of the areas that proves most difficult is the process of finding people with appropriate skill sets to fill their cast and crew. Filmmakers often turn to their own social groups to fill these roles, however they often fail to find exactly what they need and are unable to afford to hire outside help. The following research, obtained through interviews and a general analysis of current industry practices, shows the extent to which filmmakers feel constrained by what cast and crew members they can find for their projects. To solve this problem, I have developed a website that will allow filmmakers and other crew members to easily connect with each other on a project by project basis.The system will work by matching crew members with filmmakers based upon sharedpast connections. This will not only speed up the process of finding a crew by utilizing other crew member's connections, but it will also allow filmmakers to take advantage of using crew members who already have experience working together.

Dexter Serrao — makrSpace

Mentor: Mr. Zane Cochran — Poster Number: 35

My project is focused on Hackberry Lab, a collaborative workspace and design studio, specifically to help people find tools and replace them. Interviews showed that most people leave things out because of forgetfulness, not knowing where things go, or negligence and apathy. These interviews helped guide the design process and ultimately lead to the development of a web app, which is an interactive website that can be easily viewed on mobile devices. This web app brings an additional level of social interaction to the lab by making it easy to see who is currently working in the space and what tools they may currently be using or have recently used. It will also provide helpful reminders to those using the lab to clean up after themselves and help them return tools to their proper space.

Hunter Tracy — Preventing Package Pirates through Prototyping

Mentor: Mr. Zane Cochran — Poster Number: 37

Through observational research and interviews, it was discovered that there is a widespread problem with Amazon packages being stolen off porches with 31% of people saying that they have experienced package theft. In addition to this, subjects interviewed during this project have expressed interest in a device that will help eliminate the risk of package thieves. In response to this user input, the prototype that is in development is a device that will fit into Amazon user's front doors and will allow delivery drivers to simply pass packages through a small package door into the user's home. The prototype will utilize a barcode scanner that will verify the identity of the delivery driver, and utilize a camera to record the package delivery. This device will help curb the number of packages that are stolen from people's homes.

Jessica Peters — Where did the time go?: Improving Time Management through Task Prevention

Mentor: Mr. Zane Cochran — Poster Number: 41

College students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) may overlook certain responsibilities or struggle to fully complete tasks in a timely manner due to a skewed perception of time. Through observational research and personal interviews, it was determined that this disorganization can result from an ADHD individual's inability to efficiently prioritize assignments, especially when multiple obligations fall within a short period of time. This project helps college students with ADHD effectively complete assignments by algorithmically determining the best utilization of their free time. The prototype consists of a web-based interface that generates a prioritized task list based on a multi-factor analysis from user input about their daily schedule and assignments.

Rob Himmelwright — Initiating Social Interaction with Autistic Students

Mentor: Mr. Zane Cochran — Poster Number: 48

One of the most important aspects of college life is socializing with new people, however people with autism struggle with this aspect. These people have huge social anxiety and sometimes can avoid these interactions all together. From observations and interviews, there is a defined need for communication devices for autistic college students This idea is consistent at parties and other main college

socializing activities. This project explores a solution that solves autistic college students having trouble starting conversations at parties because of the anxiety, unclear social cues, and times where people do not want to socialize. I have developed a name tag that show users' interests and eliminates social anxiety when trying to begin conversations with others.

Tyler Browning — Gun Safe Integrated Night Stand
Mentor: Mr. Zane Cochran — Poster Number: 51

From just a small amount of research, one can find that there are much too many gun related accidents and deaths involving children with them gaining access to firearms that should not be accessible. This is due to some stigmas surrounding storing weapons and their placement. Many people do not want to store their weapon securely for the simple fact that if needed, the firearm needs to be accessible quickly. The idea behind this design is to address some issues that came up in some individual research. These ideas being the need for quick and smooth access in a necessary circumstance, but firm denial otherwise. This design will also alert the owner if the safe is attempted to be accessed by a child but fails. This is to provide a parent the opportunity to educate the child should this situation arise. From these few criteria came the Gun Safe Integrated Night Stand which has a built-in gun safe accessible by fingerprint from the outside, which, when accessed incorrectly, sends a text alert to the owner's phone.

Rory Fleming — Don't Throw it Away, Donate it Away
Mentor: Mr. Zane Cochran — Poster Number: 54

Usable items get thrown out at the end of the school year by students who need to get rid of them for whatever reason, likely due to spacial concerns when traveling. This project addresses this problem by maximizing the opportunities for items to be repurposed by other students rather than filling dumpsters. This reduces both the amount of waste that is produced at Berry College as well as expenditures by students on items that are of interest to them. Other campuses have incorporated environmental programs that drastically reduce the amount of waste produced in addition to other programs that provide a platform for students to sell their items to others. Through personal observation and interviews with students and graduates, it has been noted that many usable items get wasted and that the conviction of individuals repurposing items vary greatly. Through this work, I have developed a web-based application that provides opportunities for students to have access to these used items and save them from the dumpster. The senior donator simply uploads a photo of the item and the other users on the app can view it and go pick it up at the designated area if they are interested.

Nathan Hirsh — Vortex Vessel
Mentor: Mr. Zane Cochran — Poster Number: 63

The purpose of the Vortex Vessel is to create an immersive experience for college musicians playing calming/relaxing music in their dorm rooms. Research, observations, and interviews I have conducted show that both flowing water (vortex) and interactive light elements (sound-reactive LEDs) create a state of relaxation and immersion. This supports the design and purpose of the Vortex Vessel. The Vortex Vessel consists of a device about the size of a small lamp that uses an auto-gain microphone to react to music by adjusting the brightness and colors of multi-colored LEDs. As the name implies, the main aspect of the Vortex Vessel is a meticulously designed liquid vortex. The sound-reactive LEDs will shine through the bottom of the vortex, illuminating it to create an immersive experience for the musician.

Economics

Jocelyne Miller, Richards Scholar — Voter ID Laws and Voter Turnout: A Couny-Level Perspective
Mentors: Dr. Lauren Heller and E.Frank Stephenson — Poster Number: 3

Voter ID laws have recently become an important topic, as many states have imposed increasingly strict identification requirements in order for citizens to vote. While proponents of these laws contend that they are necessary to minimize the chance of voter fraud, opponents argue that they infringe on people's right to vote, increasing the burdens of civic engagement particularly among voters of color. Building on previous work (Heller, Miller, and Stephenson 2018), our main research question examines the precise extent to which voter ID laws affect turnout at the county level, both for the population as a whole and among a variety of different demographic groups. Specifically, this research examines data for all counties in Alabama and Georgia between 2006 and 2014. Since Alabama and Georgia counties should follow parallel voting trends prior to 2006 (after controlling for a wide variety of time-varying and county-specific characteristics), we employ a difference-in-difference regression approach to see if Georgia voter turnout decreases relative to Alabama after Georgia passed their voter ID laws in 2008. The results have implications for Voter ID laws more generally and in these states in particular, as Alabama eventually passed a strict voter identification requirement in 2014.

History

Kristen Feathers, Richards Scholar — Père Lachaise and 19th Century Paris
Mentor: Dr. Jennifer Hoyt — Poster Number: 4

Père Lachaise cemetery, originally established by Napoleon in 1804, embodies the beginning of a new age for the city of Paris in 19th century. While its 110 acres once belonged only to Louis XIV, this cemetery provided the people of the city with a sanctuary to bury their dead in lieu of mass problems with population density and lack of sanitation. Today, Père Lachaise is the most visited cemetery in the world and admired as the world's first garden cemetery. Residents of Paris find respite in the land's natural beauty and innovative architecture. As I prepare for my research in Paris this summer, it is essential that I have a deeper understanding of the

city's history as well as that of Père Lachaise specifically. Using a broad selection of studies over the city's history, I will present a poster showing the relationship between urban development in Paris and the significance of Père Lachaise in a city landscape. By constructing a timeline of important events in 19th century Paris, I can assess the evolution and importance of the cemetery's location within the city's walls. In doing so I will identify more specific transformative moments to focus on while carrying out archival research.

Kinesiology

Hannah J. Parker — Diabetes and Lactate Threshold
Mentor: Dr. David Elmer — Poster Number: 33

Lactate is a byproduct of glucose utilization in muscle cells, and lactate threshold is reached when lactate production exceeds lactate removal in the body during exercise. It has been thought universally that the better the training level in an individual, the greater the intensity will be at lactate threshold. However, due to differences in glucose handling in diabetics, there is the potential for the relationship between exercise intensity and lactate threshold to be altered. We evaluated the lactate threshold in type 1 diabetics and non-diabetics matched for activity level to see if the lactate threshold is different.Ten healthy Type 1 Diabetics, and ten healthy non-diabetics, were tested in a single session during which a VO2max test was performed including lactate and blood glucose testing. The VO2max test started at 1.0% incline and 4.0mph and increased 0.5mph every three minutes when we collected the lactate reading as well as the blood glucose reading. Once lactate threshold was reached (near 4.0mmol) the speed was increased 0.5mph every minute until the participant could no longer run and he/she reached their VO2max. Lactate and blood glucose were collected one more time after the participant finished a three-minute cool-down.

Jessica Terrell and Jared Boldt — Caffeine and Exercise Performance in Novice Rowers
Mentor: Dr.Angela Lanier — Poster Number: 46

Research has shown that caffeine can be effective for improving performance in cardiorespiratory endurance activities such as cycling and running. Although the exact mechanisms of the improvement in performance are currently unknown, it is thought that caffeine may have a hypoalgesic effect, reducing perceptions of muscular pain and exertion. The purpose of this study is to investigate the effects of caffeine on exercise performance in novice rowers.Ten healthy, caffeine-naïve college students who are untrained rowers are participating in this study. Following a maximal cardiorespiratory endurance test on a rowing ergometer and two familiarization trials, the participants are being asked to regulate their rowing intensity at a "moderate" pain perception on two separate days and conditions: 1) 400 mg caffeine 2) placebo. During each trial, participants' performance (watts, strokes per minute, distance travelled) and physiological responses (heart rate, muscle pain and ratings of perceived exertion) are being recorded.

Jenn Leahy and Molly Horton — Exercise Modality and Body Image-Related States, Thoughts, and Motives
Mentor: Dr. Elizabeth Hubbard — Poster Number: 66

The body image literature suggests that chronic exercise positively impacts trait body image. The acute effects of varying types of exercise modalities on state body image and body image-related thoughts and motivations has yet to be determined. This study aimed to examine the effects of two different modalities of acute exercise on state body image, mood, and within-exercise thoughts and motivations related to body image. Female undergraduate participants were recruited for this study. The baseline session included an informed consent and risk stratification, questionnaires, anthropometric measurements, and a familiarization portion where participants were shown all exercises. Participants engaged in two exercise sessions: aerobic exercise (AE) and resistance exercise (RE). State body image, positive mood, and negative mood were measured before and after each experimental session and a qualitative interview included questions regarding body image-related motivations for exercising, thoughts before, during, after exercise, and enjoyment. Data on exercise-related state body image and mood changes will be presented. Themes relevant to within-session, body image-related thoughts and motivations will also be discussed. This study will act as a catalyst to designing targeted body image-related exercise interventions in college-aged females.

Brittni Hoover — Shoulder Muscle Strengthening for Swimmers
Mentor: Dr. David Elmer — Poster Number: 68

Introduction: Shoulder injuries are the most common injuries in the competitive swimming community. Research has been done on the effects of shoulder injury and return to sport, but there have been no studies which cover preventative measures. The purpose of this experiment was to see if adding a shoulder rehab regiment to competitive swimmers' weekly routines would show improvements in strength in the shoulder stabilizing muscles found most weak.
Methods: Seven participants were tested for isometric strength at five different angles of internal and external rotation, both before and after completing a shoulder strengthening program. Each participant received a rehab exercise program to complete independently 3 times per week for four weeks. Each week the participants filled out a questionnaire confirming that they completed all three rehab sessions and if they experienced any shoulder pain or new shoulder injury that week. Participants also filled out a research questionnaire including personal information i.e. age, year in school, etc. as well as any past shoulder injuries or surgeries, any past shoulder rehabilitation performed, as well as season best times used for future qualitative data analysis.
Results: Data is being analyzed at this time.

Mathematics

Alex Byerly, Frankie Reda, Maggie Sills, and Joseph Stewart — Understanding Dimensions: A Foundation for STEAM
Mentor: Dr. Jill Cochran — Poster Number: 10

For students to be successful in many STEAM activities, they must develop an understanding of 3D objects and intuition about dimension. Through a research-based project, we explored how students develop understanding and representations of 3D objects or ideas using physical objects like building cubes, 2D artistic representations, and 3D design software. We have explored trends seen in our results such as differences in each representation by grade, gender, and prior exposure to 3D design programs, such as Minecraft. These trends lend a deeper understanding of when and how students are able to understand and represent three-dimensional figures.

Savannah Lane, Savannah Sweet, And Rachel Ruiz — Online Disucssion Blogs: Reform-Based Mathematics Instruction
Mentor: Dr. Anne Marie S Marshall — Poster Number: 27

This qualitative research uses a multiple case study methodology to provide a lens into the ways three prospective elementary school teachers (PSTs) engaged in online discussion blogs when exploring the geometric concepts of area and perimeter. The online discussion blog protocol utilized reform-based instruction consistent with social constructivism. Through collaborative discussion and negotiation, these PSTs refined, reconsidered, or modified their views about teaching and learning mathematics.

Nursing

Leah Berndt, Morgan Massey, Clair Turman, and Kate Ulrich — The Effects of NICU Design Layout on Family-Centered Care
Mentor: Dr. Rebecca Logan — Poster Number: 24

Every year 15 million infants are born prematurely (WHO, 2017). Neonatal Intensive Care Units (NICUs) are designed to promote family-centered care of premature infants. The evidence-based practice question guiding this literature review was to compare open bay design to single family rooms and the effect on family-centered care. Due to the overwhelming environment, NICU parents often feel stressed by the critical care of their infant. However, changing the layout to single family rooms has been found to drastically decrease these stress levels. By converting the NICU into a private room, parents become an essential part of the care team and are more involved in their infant's care. The articles gathered from experimental, quasi-experimental, and systematic review methodologies provided good and consistent evidence needing further investigation. The synthesis of the literature review found that converting the NICU into a private or semi-private layout created a positive environment for staff and families to care for the neonate. Future research should include a pilot study of the NICU design layout and the direct impact on growth and development of the neonate. Once studies are implemented and information is gathered, hospitals can move forward with confidence in the chosen NICU design.

Melody Dreyer, Lauren Gage, Pheobe Spahn, and Hunter White — Combating Nurse Burnout
Mentor: Dr. Pamela Dunagan — Poster Number: 30

Despite significant daily stressors within the healthcare environment, nurses are held to high expectations of care; which can be detrimental to their mental, physical, and emotional health and ability to cope with professional stressors long-term. The research question is to explore factors that improve the nurse's ability to provide increased quality of care to patients. Recent literature has shown that there are significant steps that management and administration can take to improve these outcomes. High expectations become problematic when there are few hospital policies in place to reduce stress on medical personnel. Decreased access to training and resiliency programs for nurses can also quickly lead to burnout. The focus of this research is to specifically look at burnout rates within the healthcare field, and to determine how feelings of stress and anxiety either positively or negatively affect the nurse's ability to provide safe and quality patient care. The level of research found was mostly high quality (meta-analysis, critical literature review, and quasi experimental) for the synthesis. Stress reduction programs should be made accessible to all nurses to help them process and cope with work-related stress in a positive manner, thus improving patient outcomes.

Thu Bui, Brooke Mackelburg, Kaitlyn Spurgeon, and Laura Weber — Synthesis of Insulin Pens Versus Vials and Syringes in the Impatient Setting
Mentor: Dr. Katie Morales — Poster Number: 40

Diabetes is the seventh leading cause of death in the United States. As a result, it is imperative insulin be delivered safely, effectively, and cost-efficiently. Traditionally, the method of choice to deliver insulin is vials and syringes. Recently, insulin pens have provided an alternative to vials and syringes. Because insulin is a high-risk medication, which yields dangerous results when errors occur, it is pertinent to research the comparison of the two delivery methods. The practice question guiding the research is: How do insulin pens compare in terms of efficiency, safety, and equity to insulin vials and syringes in the inpatient setting? The synthesis incorporates five studies (two systematic reviews with quantitative studies, two quasi-experimental, and one quantitative non-experimental study). The studies demonstrate good evidence with consistent results indicating the use of insulin pens positively correlates with nurse satisfaction, patient adherence, cost effectiveness, and efficiency when administering the medication and providing patient education. However, there were inconclusive results when comparing the safety regarding infection control between the two delivery methods. Based on the evidence, a pilot study is recommended to further investigate the inconsistent safety concerns and build upon the research to determine the efficiency, safety, and equity of insulin pens.

Sarah Holloway, Garrison Bemis, Hannah Kate Thompson, and Hogan Barris

The Effects of Nurse Residency Programs on Nurse Retention and Job Satisfaction
Mentor: Dr.Cindy Johnson Poster Number: 53

Today's nursing leaders believe that only 10% of new graduate registered nurses are fully prepared to enter the field of nursing. Ill-prepared new graduate nurses often experience feelings of stress, inadequacy, and unhappiness upon entering a new job. As a result, the field of nursing is experiencing a high new graduate turnover rate, which ultimately costs hospitals more money. In an attempt to lower costs and bridge the educational gap, hospitals across the nation have instituted nurse residency programs as opposed to traditional orientations. To further explore the issue, an evidence-based practice question was formulated: Do nursing residency programs provide positive influences on an individualistic to holistic level by increasing nursing retention, job satisfaction, and maximizing cost effectiveness? The research provided quasi-experimental studies, of which two of the articles are systematic reviews and one is retrospective. The articles used show that nurse residency programs have decreased 12 month turnover rates from 36.08% to 6.41% and increased competency equal to that of a nurse with 17 months of experience or more. There is strong, compelling evidence to support the use of a residency program. A pilot study will need to be performed to establish the acceptance and effectiveness of a nurse residency program.

Mary Fronk, Jacquelyn Bruun, Michala Bibbins, and Yennifer Clarin

The Effect of Kangroo Care on the Development of Preterm Infants
Mentor: Dr.Rebecca Logan Poster Number: 56

Kangaroo care has been shown to reduce the risk of neonatal mortality by preventing the development of sepsis, hypoglycemia, and hypothermia. Kangaroo care is defined as the early, continuous, and prolonged skin-to-skin contact between infant and caregiver (Smith, Bergelson, Constantian, Calsangkar, & Chan, 2017). The question that guided this literature review was does kangaroo care improve the development of preterm neonates? Research articles revealed that kangaroo care has numerous benefits. Some examples of the benefits include thermal regulation, increasing weight, length, head circumference, promoting breastfeeding. Kangaroo care also raises maternal satisfaction, fosters early attachment, and significantly decreases pain from newborn procedures. Therefore, nurses need to educate parents on the benefits of kangaroo care and encourage frequent implementation of the practice. Of the four different research studies reviewed, the results provided good and consistent evidence gathered from both experimental studies and systematic reviews. As such, further research should continue to explore the benefits of kangaroo care for parents and neonates.

Physics, Astronomy, and Geology

Maddie Bess

Moving Beyond Coal: How a Community can Transition
Mentor: Dr. Tamie Jovanelly Poster Number: 11

The goal of the Sierra Club's Georgia Chapter "Beyond Coal Campaign" is to educate members of coal-dependent communities on coal plant retirement and issues associated with transitioning to clean energy in efforts to combat global climate change. This research project focuses on the development of educational materials for people in Northwest Georgia who will be impacted by these closures so that they can identify and legislate for best-case options. Specifically, Plant Hammond, is a coal-fired power plant near Rome that is threatened with shut-down. In this project, we use examples from other coal dependent communities (e.g. Georgia, Alabama, Tennessee) that have undergone the transition to provide Plant Hammond stakeholders with innovative options for their future. This can include facility recycling, applying for private or public funding, or inviting new industry into the region. Conversely, we also provide examples of decision making that lead to worst-case scenarios of tax revenue and job loss. These data-driven scenarios can be used as a tool to educate any coal plant-dependent community regarding potential cause and effects of clean energy transitions.

Cecilia Ratke

The Effect of the Hubble Constant and Energy Indicies on the Measured GRBs Redshift Distribution
Mentor: Dr. Truong Le Poster Number: 15

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 have a correlation 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. Current observations have indicated that the observed H0 is in question, so we investigate how that value affects our results. Next, the GRB model depends on the power-law spectrum, which relies on the low- and high-energy indices α and ß, where the accepted values are currently assumed to be constants. Hence to understand the origin of this excess of low-redshift LGRBs, first the effect of the observed Hubble constant on the outcome of the calculated distribution will be explored. Then we examine whether the values of α and ß depend on redshift.

Jared Mooney

Applying Percolation Method of Galaxy Formation to 3-Dimensions and Different Velocity Curves for Sheer
Mentor: Dr. Truong Le Poster Number: 17

This project strives to expand on Percolation and Galaxies (eg. L. S. Schulman & P. E. Seiden), by recreating the model they presented. We account for differing velocity curves for sheer, and additionally plan to expand this idea to create a 3-dimensional model. This will be done through a computer simulation of progressing states, allowing us to watch how the system propagates over time. The results of this will give a expanded model into galaxy formation which could be applied to other systems.

Cameron Bensley — Two Dimensional Generalization of a Classical Analogy for Quantum Band Formation
Mentor: Dr. Shawn Hilbert — Poster Number: 26

Electrons in the atoms of a solid must exist at specific allowed energy levels. These energy levels fall into certain allowed ranges, called bands, but these ranges are separated by forbidden values, called band gaps. Past research has shown that a string of harmonic oscillators levitated on a one-dimensional air track form resonant frequencies that duplicate this band structure. These harmonic oscillators demonstrate frequencies grouped together, forming bands, and ranges where they are not found, forming band gaps. Due to this trend appearing in one dimension, the next step is to test the presence of band structure in two dimensions to form a better analogy to real-life three-dimensional band structure. Using the same concept of levitating harmonic oscillators, except on a two-dimensional table, research in the future will focus on whether this similar band structure will be formed with the oscillators in two dimensions. Here, we will present our progress in constructing and testing a two-dimension apparatus.

Justyn Patterson — Inkarstable Interactions: Berry College Groundwater Hydrology and Sinkhole Activity
Mentor: Dr. Tamie Jovanelly — Poster Number: 42

An important aspect of sinkhole formation, is the geologic substrate and groundwater flow patterns that can influence sinkhole activity through the process of suffosion. The purpose of this study is to visualize groundwater data from the Berry College campus, to highlight significant seasonal patterns that correlate with sinkhole events, and to provide a baseline for future monitoring activities. In this project, we evaluate 9 representative monitoring well sites. Over 5-years (September 2014 through November 2017) the groundwater levels have been monitored weekly. Within an area of 3 km2 all 9 well sites responded to changes in seasonal precipitation with water level data mimicking influxes of precipitation. In this study, we identified three high precipitation (> 120 mm) periods of rainfall (January 2-23, 2015, February 13-March 13, 2015, and February 16-April 6, 2017). Site comparison mapping of sinkhole formations show that areas of campus nearest to sites PZ 1, PZ 3, PZ 13, PZ 14A, and PZ 18 were the most affected post rainfall events. Identifying large fluctuations in groundwater levels (> 7 m) due to periods of rainfall episodes lasting (> 2 weeks) and inputs of precipitation (> 120 mm) maybe linked to sinkhole dissolution.

Nigel Groce-Wright — The Effect of Lavender Mountain on Local Rainfall Distribution Due to Orographic Lifting
Mentor: Dr. Tamie Jovanelly — Poster Number: 59

Rain shadow effects result when topographic barriers cause prevailing winds to lose moisture on the windward side, causing the leeward side to be without moisture. The purpose of this case study is to determine whether minimum relief (~275 m) in the Ridge and Valley Region can influence rainfall distribution whereby the amount and pattern of localized rainfall has implications on watershed interactions, aquifer recharge, and storage capacity. This is important to local communities and other water based services (e.g. Rocky Mountain Reservoir Hydroelectric Facility). By using 8 rain gauges spread across the ridge of Lavender mountain (four on the Northern slope and four on the Southern slope) we have been able to identify existing orographic effects on precipitation. During the summer of 2017, May-September, 7 rainfall events (> 5 mm) were recorded. By adding the total rainfall from the Northern and Southern slopes and calculating the percent difference, three rainfall events produced differences in rainfall total across the ridge more than 5%; 5/28 (8%) 6/4 (13%) and 9/5 (21%).

Paolo Francisco — A Classical Analogy to Defects in Quantum Band Formation
Mentor: Dr. Shawn Hilbert — Poster Number: 62

Electrons in solids are restricted to specific energy levels that form bands. Such bands are separated by gaps of physically impossible energy ranges for electrons. Defects in solids' interacting atoms can create an extra band in these formerly forbidden energy ranges. Because this interaction is at the atomic level, building a classical analogy allows for easier visualization of the phenomenon. This analogy uses a line of paired harmonic oscillators, which are masses connected by springs. Each pair in this system plays the role of an atom in a solid. Defects are introduced by changing two different parameters: spring constants and oscillator masses. We will demonstrate changes in the band structure by introducing these defects, yielding the expected resonant frequencies inside the forbidden region. These changes in the band structure also match the resonant frequencies predicted by theory.

Dalton Sharpe and Nigel Groce-Wright — Topo-Stratigraphic Mapping of Taylor Ridge (Gore, GA)
Mentor: Dr. Tamie Jovanelly — Poster Number: 72

The purpose of this study was to update the geologic maps of Taylor Ridge (34º22'30''N, 85º15'00''W) regarding the different formations of rock. The geologic map that was used (Cressler, 1961) included the geology of Chattooga County. Although much of the area was ground surveyed for the Cressler map, the data included for Taylor Ridge was speculative. The physical ground mapping was conducted during Summer 2017. The equipment used during this mapping project was a phone application called Terrain Navigator Pro. This application allowed us to use topographic maps to delineate conformable units of the Red Mountain sandstone (434-444 my), Armuchee Chert (383-393 my), and Fort-Payne Chert (348-359 my). From this study we concluded that the Armuchee Chert is both stratigraphically present and has a unit thickness of ~0.3 m at 34º26'41.1167"N, 85º17'52.9753"W. Whereby the existing geologic map (Cressler, 1961) only identified the Red Mountain Sandstone and Fort Payne Chert formations on Taylor Ridge. This update is important particularly for suggesting inaccuracies in current geologic surveys and the need for continued comprehensive mapping in the state of Georgia. With improved methods of mapping the present stratigraphy can be more accurately represented. This data will be used to aid in the identification of a limestone formation contacting the basal unit of the Fort-Payne

Chert. In addition to identifying missing formations in the geologic maps of the region, improved accuracy will allow local and regional officials to make informed decisions regarding fossil fuel exploration, mineral rights, and issuance of building permits.

Teacher Education

Victoria Millard — Pronunciation in ESL: Student and Teacher Perceptions with a Textbook Analysis
Mentor: Dr. Eliana Hirano — Poster Number: 1

Research in pronunciation is an aspect of second language acquisition that has not received enough attention in the literature. This study focuses on the pronunciation needs of adult English language learners in an English as a Second Language (ESL) context vis-à-vis the pronunciation practice they receive in their ESL classes as well as the opportunities provided in their textbook. Students in the Berry College ESL program will be surveyed to identify their pronunciation needs. Teachers in the program will also be surveyed and observed to see how they implement pronunciation practice in their classroom. The current ESL textbooks will be analyzed to see how they integrate the teaching of pronunciation since general skills ESL textbooks typically do not provide a large variety of pronunciation techniques and activities. The poster will include preliminary findings from the classroom observations, the results from the textbook analysis, and the questions to be used in the teacher and student surveys.

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 you 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.

A special thanks to the 2017-2018 Council on Student Scholarship committee members:

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