

WINTHROP UNIVERSITY  
**UNDERGRADUATE SCHOLARSHIP  
& CREATIVE ACTIVITY 2019**

University College and Winthrop University proudly present *Undergraduate Scholarship and Creative Activity 2019*. This eighth annual University-wide compilation of undergraduate work chronicles the accomplishments of students and faculty mentors from at least 34 academic departments and programs, spanning all five colleges of the university: College of Arts and Sciences (CAS), College of Business Administration (CBA), College of Education (COE), College of Visual and Performing Arts (CVPA) and University College (UC).

We think you will be impressed by the depth and diversity of scholarly and creative research highlighted within these pages. As you will see, these student projects grew from a variety of origins, including curricular requirements and extra-curricular programs, and were supported by a range of intra- and extramural funding sources. Students also shared their projects in a remarkable array of venues: publishing papers in refereed journals; presenting and performing scholarship at regional, national, and international conferences; and showing work in juried exhibitions. We congratulate all our student scholars on their creation of new knowledge and new forms of creative expression, as well as their development of professional skills and attributes that have prepared them to pursue nationally competitive awards, graduate and professional degrees, and employment in their chosen fields. In particular, we acknowledge undergraduate Maggie Feltman-Ruiz, a visual communication design major who completed the entire design and layout of this book.

We also recognize the faculty members who served as mentors, coordinators, thesis readers, and reference writers, whose commitment and dedication enabled students' accomplishments. We thank them for helping to sustain a vibrant learning environment on campus and for contributing to the development of the next generation of curious, engaged professionals. Lastly, we thank Alexa Maddox, program assistant in the Undergraduate Research Office, for invaluable editorial help.

We hope you enjoy our compilation! Please note that much of the work described here will be presented, performed, or displayed during the Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE) on April 12, 2019. We hope you will join us!

**Robin K. Lammi, Ph.D.**  
*Director of Undergraduate Research*

**Gloria G. Jones, Ph.D.**  
*Dean of University College*

*“Mistakes are the  
portals of discovery.”*

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**James Joyce**, Irish novelist (1882-1941)

*“I think the best  
work flows out of a  
collaborative environment.”*

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**Steven Bochco**, American television writer and producer (1943-2018)

*Undergraduate Scholarship and Creative Activity 2019* represents research and projects in a variety of different degrees and fields. Despite these differences, all the undergraduate studies are still a part of the same campus. This common ground inspired my cover design.

**- Maggie Feltman-Ruiz**

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# WINTHROP UNIVERSITY UNDERGRADUATE RESEARCH INITIATIVE

The Winthrop University Undergraduate Research Initiative supports a student-centered learning environment that fosters student research, scholarship, and creative activities. The Initiative encourages students and faculty mentors to collaborate in the design and implementation of projects and the dissemination of results.

## University-Wide Undergraduate Research Advisory Committee:

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**Robin K. Lammi, Ph.D.**

Director of Undergraduate Research

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College of Arts and Sciences

**Merry Sleigh, Ph.D.**

College of Arts and Sciences

**Laura Ullrich, Ph.D.**

College of Business Administration

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**Nicholas Grosseohme, Ph.D.**

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**Kunsiri Grubbs, Ph.D.**

Biology

**James M. Hanna Jr., Ph.D.**

Chemistry, Physics, and Geology

**Anna Igou, Ph.D.**

World Languages and Cultures

**Peter Judge, Ph.D.**

Philosophy and Religious Studies

**Hye-Sung Kim, Ph.D.**

Political Science

**Hope Lima, Ph.D.**

Human Nutrition

**Robert Prickett, Ph.D.**

Associate Dean, College of Arts and Sciences

**Merry Sleigh, Ph.D.**

Psychology

**Ephraim Sommers, Ph.D.**

English

**Bradley Tripp, Ph.D.**

Sociology, Criminology, and Anthropology

**Scott Werts, Ph.D.**

Environmental Sciences and Studies



# PUBLICATIONS

## Visible Light-Promoted Alkylation of Imines Using Potassium Organotrifluoroborates

**Students: Davis P. Plasko, Christopher J. Jordan, Brittney E. Ciesa, and Madison A. Merrill**

A mild, redox-neutral alkylation of imines with potassium alkyltrifluoroborates is described. The reaction proceeds under photoredox conditions at approximately 30 °C with primary, secondary, and tertiary alkyltrifluoroborates, leading to alkylation products in moderate to good yield in most cases. Aryl-, vinyl-, and cyclopropyltrifluoroborates failed to react under the reported conditions.

*Photochemical & Photobiological Sciences, 2018, Volume 17*

*Supported by the Donors of the American Chemical Society Petroleum Research Fund; an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS); and the Winthrop University Research Council*

*Faculty Mentor: James M. Hanna Jr., Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## Positive and Negative Events Predict Burnout and Engagement in Athletes and Non-Athletes

**Student: Alyssa M. Nelson**

We compared predictors of engagement and burnout in adolescent athletes and non-athletes by focusing on daily positive and negative performance-related events (e.g., performing well in team practice) and interpersonal events (e.g., sharing a laugh with teammates).

Participants were recent high school graduates (71% female; 53% Caucasian) who retrospectively reported participation in high school sports or heavy investment in alternate activities (e.g., marching band). The athletes and non-athletes were similar in how many hours they practiced and competed each week, frequency of activity-related travel, and performance level. In addition, the two groups did not differ in the extent to which their high school identity and self-esteem were based on their participation. For both groups, positive performance events predicted activity engagement (characterized by dedication, vigor, and enthusiasm). However, the experiences of athletes versus non-athletes differentially predicted burnout (marked by emotional and physical exhaustion). In athletes, burnout related to both performance and interpersonal events. In non-athletes, burnout was only related to performance events. In addition, burnout was positively associated with coach focus on winning (a situation more common for athletes) and negatively associated with coach focus on fun (a situation more common for non-athletes). Our findings indicate that experiencing positive and negative events is a precursor for engagement and burnout in high school athletes and non-athletes. Promoting positive (relative to negative) events during training, practice, competitions, or performances could enhance benefits and prevent maladaptive outcomes of participation in extracurricular activities. Positive social interactions may be particularly important for preventing burnout in adolescent athletes.

*The Sport Journal, March 1, 2019, [www.thesportjournal.org](http://www.thesportjournal.org)*

*Faculty Mentors: Donna Nelson, Ph.D., and Merry Sleight, Ph.D.*

*CAS – Department of Psychology*







# HONORS THESES

The Honors Program at Winthrop University is designed to enrich the college experience for highly talented and motivated students. Through interactions with outstanding faculty and peers, a vital community of scholars is created that embraces the pursuit of knowledge for the enhancement of intellectual and personal growth. Founded in 1960, Winthrop's Honors Program is one of the oldest in the nation. Then President Charles S. Davis, realizing the importance of an enriched education for high-achieving students, appointed faculty member John S. Eells as the founding director of our Honors Program. Eells became a member of a national organization that was formed as a clearinghouse for information on honors activities, the Inter-University Committee on the Superior Student (ICSS). The ICSS received funding from the Carnegie Foundation, the National Science Foundation, and the U.S. Office of Education to help establish honors programs at colleges and university across the U.S. When the ICSS disbanded in 1965 for lack of external funding, several members of that group formed the National Collegiate Honors Council (NCHC), in 1966, which was committed to maintaining a professional association of honors educators. Eells was elected the fourth President of NCHC in 1970. Over the years, the Winthrop University Honors Program has continued to flourish, and in the early 1980s, it was divided into a program for entering freshmen and a program for upperclassmen. At that time, there was a national trend toward creating "learning communities" (see Gabelnick, 1986, for a review), and the Winthrop honors administration created the Clustered Learning Units for Educational Success (C.L.U.E.S.) program, in which new honors freshmen enrolled in a cluster of three honors classes together. This program later became the Freshman Honors Program. Seeing the need for a more cohesive honors experience, the honors administration under the leadership of Anthony J. DiGiorgio combined the programs in 1997. Today, the Honors Program at Winthrop University enrolls approximately 350 students across all of the degree-granting colleges of the university. To graduate with an Honors Program Degree, a student must complete 23 hours of honors courses, which includes an honors thesis, while maintaining at least a 3.30 grade point average. The honors thesis is the culminating experience for an Honors Program student, in which he or she works collaboratively with a faculty director and two faculty readers to produce a project that evaluates knowledge, concepts and methodology, examines major issues, integrates complex information, and develops and appropriately defends an argument. While most students complete the honors thesis during the course of the senior year, some students complete the project earlier in their academic careers. The Honors Program students and I would like to thank the faculty members who have worked as honors thesis directors and readers throughout this process. Their expertise, guidance and commitment should be highly commended.

**Kathy A. Lyon, Ph.D.**

*Director of the Honors Program*

## 2018 – 2019 Honors Advisory Committee

**Kathy Lyon, Ph.D.**

*Director, Honors Program, Chair*

**Spiro Shetuni, Ph.D.**

*Dacus Library*

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*ex officio, Dean, University College*

**Adrienne McCormick, Ph.D.**

*ex officio, Dean, College of Arts and Sciences*

## Blockchain Solutions for Financial Data Integrity

### Student: Matea Milojkovic

Since the infamous financial scandals of the early 2000s, business regulatory agencies have established increasingly stringent regulations for public companies to follow. Controls over financial data have become imperative for companies to maintain. Current data management systems would greatly benefit from advances in blockchain technology, strengthening controls over data integrity and data availability. This paper proposes a blockchain-based framework to verify the integrity of financial information. This framework, Akeraiotita, leverages smart contracts in an Ethereum-based blockchain to confirm financial data have been unaltered; the framework allows companies to layer blockchain technology on top of their current data management systems. Two systems are proposed: the first, Eunomia, is for a company to use internally; the second, Eulabeia, is for companies to post transactions with third parties. The goals of this paper are to analyze how Akeraiotita would interact with a company's current data management system, allow companies to post transactions to a global blockchain, and understand how the framework could address longstanding transactional security concerns.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: William Thacker, Ph.D.; Andrew Besmer, Ph.D.; and Pablo Guglielmetti, M.B.A.*

*CBA – Department of Computer Science and Quantitative Methods*

## The Political Intervention and Public Policy Influencing High Tuition Rates at South Carolina Colleges and Universities

### Student: Zuri Anderson

Winthrop University students often ask why the institution's tuition rates are so high. This is an important question for students, who wonder why they pay higher tuition and fees to Winthrop compared to other universities with similar services. This investigative journalism project informs people, especially curious Winthrop students, about the complex reasons for Winthrop's tuition rates. Open records, government documents, primary and secondary sources, public sources, news articles, in-depth interviews, and statistical research were utilized and analyzed for the research. Following the 2007 recession, which changed the financial landscape for colleges and universities, postsecondary and higher education faced funding issues. State governments attempted to address these issues with legislation and funding initiatives. South Carolina, in response to the recession, slashed education funding across the board and established the South Carolina Education Lottery to fund education. However, the Palmetto State has the second highest average tuition rates in the Southeast at \$12,615 as of 2018. Virginia was first with an average tuition of \$12,820 – a difference of \$205. Some politicians, including South Carolina Governor Henry McMaster, blame South Carolina colleges and universities for high tuition prices, despite state funding for postsecondary education institutions decreasing steadily since 2008. Colleges and universities also have to keep up with building maintenance and update services and equipment to stay competitive and continue to attract students. This project also addresses the efforts Winthrop is taking to adjust to new funding needs.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: William Schulte, Ph.D.; Aimee Meader, Ph.D.; and Guy Reel, Ph.D.*

*CAS – Department of Mass Communication*

## Effect of Emotionally-Laden Writing Prompts on Perceptions of Siblings

### Student: Sarah Reid

Previous research has demonstrated the power of forgiveness and gratitude for improving relationship quality, as well as how writing can be a catalyst for healthy thought processing. We applied these ideas to the sibling relationship and explored whether young adults' perceptions of their siblings can be modified through brief writing exercises. Participants encountered one of five different writing prompts asking them to focus on the sibling to whom they are emotionally closest. One prompt asked participants to write about a positive memory, one about a negative memory, one about a time of gratitude, and one about a time of forgiveness. The last prompt was a control condition, instructing participants to describe physical aspects and hobbies of the chosen sibling. After writing for five minutes, participants responded to published scales that assessed sibling relationship quality and participants' resilience. Data collection is underway.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Merry Sleigh, Ph.D.; Donna Nelson, Ph.D.; and Cheryl Fortner-Wood, Ph.D.*

*CAS – Department of Psychology*

## Irish and American Adults' Religious, Sexual, and Feminist Beliefs

### Student: Sydney Strother

We examined the shame and guilt surrounding sexual, feminist, and religious views. To expand the current knowledge, we recruited both American and Irish samples, the first study to do so. Because of highly publicized tensions in Ireland related to Catholicism and abortion laws, we hypothesized that Irish adults would score higher on shame and guilt regarding sex and feminism. We also explored their attitudes toward religious fundamentalism. Participants were 134 young adults (60% women; 50% Caucasian) with a mean age of 21.26 (SD = 5.17). Sixty percent were United States citizens and 40% were Republic of Ireland citizens. Participants responded to the following scales: Religious Fundamentalism, Liberal Feminist Attitude and Ideology, Feminist Self-Identification, and Brief Sexual Attitudes. After each scale, participants responded to the State Shame and Guilt Scale. We also asked participants to evaluate how similar they were to their friends, family, and society regarding each of these issues. Young adults across cultures were similar in their support of feminism but differed in their religious and sexual beliefs. Irish participants held more religiously traditional attitudes, but were less likely to attend church and share religious beliefs with their families. Across participants, traditional religious views predicted more shame and secretiveness. Irish participants' sexuality was more conservative and influenced by their society. Across participants, matching societal values was associated with sexual conservatism, while matching family values was associated with sexual openness. These findings suggest that the influence of family versus society may differentiate Irish and American young adults.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, CEPO Student Research Award for Women or Minority Issues, SEPA Annual Meeting, March 2019*

*Honors Thesis Committee: Merry Sleigh, Ph.D.; Peter Judge, Ph.D.; and Tara Collins, Ph.D.*

*CAS – Department of Psychology*

## Homeschooling Effects on College Students and Perceptions

### Student: Samantha Lee

There are many preconceived notions about those who are homeschooled and how it hinders their social development. Because they are believed to be mainly in contact with their parents rather than their peers, it is thought that homeschooled children become dependent on their parents and do not adapt well to the real world and becoming independent people who can take care of themselves. This study will focus on how being homeschooled affects the socialization of children after they begin college. We will measure the number of friendships as well as the quality of those relationships for those who were homeschooled compared to those who received traditional schooling. We will also measure their dependence on and relationships with their parents, and whether they believe their education was a beneficial overall experience. The methodology used in this study will consist of an online Qualtrics survey given to 100-200 students, regardless of whether they were homeschooled. This will give us a control group and a way to find out what preconceived notions some have toward homeschooling. A question on the survey will ask the participants if they were homeschooled and, if so, will invite them to continue in the study by participating in a focus group interview. The homeschooled focus group will ideally consist of 5-7 students; they will be asked discussion questions, with their responses recorded.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Cheryl Fortner-Wood, Ph.D.; Giancarlo Anselmo, Ed.D.; and Matthew Hayes, Ph.D.*

*CAS – Department of Psychology*

## The Role of Women in Technology and How to Encourage Young Girls to Enter the Field

### Student: Christina Sadak

Women have been underrepresented in technology since the introduction of the field. In the past, women were not thought to be as capable as men in science, technology, engineering, and math. Though more people today think that women and men are equally capable to perform these jobs, women are still outnumbered by men in the technology industry, with less than 20% of bachelor's degrees in computer science being earned by women. Even fewer of those women who earned a degree in computer science remain in the technology workforce. The purpose of this research is to determine ways in which young girls can be encouraged to pursue the field of technology by identifying commonalities among women in tech as to what encouraged them along the way. This research was conducted by interviewing women at different stages of their technology careers to determine ways in which young girls can be encouraged to pursue the field of technology. Additionally, a literature review was conducted to supplement the interview data. The expectation of this study is that there will be one or more common factors among the women interviewed that relate to what drew them to technology. These similar encouragements may result from motivating teachers or parents, or perhaps from the negative comments spoken by influential adults.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Chlotia Garrison, Ph.D.; Bryan McFadden, M.S.; and Kristen Abernathy, Ph.D.*

*CBA – Department of Computer Science and Quantitative Methods*

## Young Adults' Perceptions of Immigration through the Lens of Foreign Language

### Student: Lashana Delduarte

The purpose of our study was to better understand how young adults view immigration as well as the factors that may influence their views. We were particularly interested in how adults' experience with foreign language and travel might influence their views of immigration. In addition, we assessed young adults' knowledge of immigration to see how knowledge and attitude relate to one another. Participants responded to a scale that assessed their attitudes toward immigrants. For one third of our participants, the scale referred to "immigrants." For another third of our participants, the scale specified "legal immigrants," and for the final third of our participants, the scale specified "illegal immigrants." All participants subsequently responded to scales to assess their fear of missing out, ambiguity tolerance, knowledge of immigration laws and statistics, and international experience.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Merry Sleigh, Ph.D.; Jeff Sinn, Ph.D.; and Darren Ritzer, Ph.D.*

*CAS – Department of Psychology*

## Cross-Generational Perceptions of Interracial, Interpolitical, and Interreligious Relationships

### Student: Caitlan Boudreaux

We examined adults' perceptions of interracial, interreligious, and interpolitical relationships across ages. We hypothesized that younger adults would be more accepting of interracial and interreligious relationships, while older adults would be more accepting of interpolitical relationships. Participants were 197 adults (77% women; 77% Caucasian) with an age range of 18 to 75 and a mean of 36.98 ( $SD = 15.02$ ). Participants responded to a scale that assessed attitudes toward interracial romantic relationships. Participants then responded to the same scale; however, "interracial" was replaced with "interreligious." Interreligious was defined as two people of different religious belief systems. We then took the same questions and used the term "interpolitical," defining it as two people with different political belief systems. Participants also ranked how important race, politics, and religion are when choosing a romantic partner. In addition, we asked participants to rate how important they thought those same factors would be to other age groups. We divided participants into three age categories: 18-40 (young adult), 41-60 (middle adult); 60-75 (older adult). Results revealed that adults of all ages find religion to be the most important factor and race to be a less important factor when selecting a romantic partner. Adults misperceived other age categories by assuming that politics would be most important to young adults, and race would be most important to older adults. Interestingly, when we asked participants to guess what other people in their own age group would value, middle adults were the only group that had accurate self-perceptions.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Merry Sleigh, Ph.D.; Darren Ritzer, Ph.D.; and Donna Nelson, Ph.D.*

*CAS – Department of Psychology*

## Skin Cancer Prevention: Analysis of an Interdisciplinary and Educational Intervention Program Targeting College-Aged Individuals

### Student: Brittney Ramsey

Skin cancer is the most common cancer facing today's society. Between 1982 and 2011, the percentage of Americans who developed melanoma doubled, and 1 in 5 Americans will develop skin cancer within their lifetime. If preventative measures are not taken, 112,000 new melanoma cases are expected to develop in the year 2030 alone. One method of combating the rising incidence numbers is through creating an educational program to address the lack of proper skin care and skin protective knowledge. From previous literature, it is clear that young adults are a key demographic to consider when creating an interventional educational program. A customized education program was developed in collaboration with a local oncology nurse navigator. This program was presented to Winthrop University students, who were given a survey to assess their base knowledge and attitudes both before and immediately after the program. This study seeks to determine the extent to which an interdisciplinary and educational intervention program targeting college-aged individuals would be able to help combat high incidence rates of skin cancer.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Ginger Williams, Ph.D.; Victoria Frost, Ph.D.; and Richard Jackson, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490H – Williams)*

## What Effect Does Education Level Have on Students' Understanding of Evolutionary Theory?

### Student: Alexia Hall

Evolution by means of natural selection, Charles Darwin's revolutionary idea detailed in his book *On the Origin of Species* (1859), is considered the underlying principle of biology today. Despite its importance, high school and college students still hold misconceptions and misunderstandings regarding evolutionary theory. These issues may arise from the lack of secondary school curricula devoted to the subject. There are no universal standards for high school teachers to follow, and those students who are not biology majors in college may never be exposed to or fully understand Darwin's theory of evolution. The purpose of this thesis is to determine what effect, if any, education level has on students' understanding of evolutionary theory. To research this, high school seniors and college senior biology and non-biology majors were given a survey to assess their understanding of fundamental evolutionary concepts. Using a two-way analysis of variance, I found that declared major in college had more of an effect on student's understanding of evolutionary theory than education level did.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: William Rogers, Ph.D.; Janice Chism, Ph.D.; and Jessica Boulware, M.S.*

*CAS – Department of Biology*

## Confirmation of the High Affinity Metal Binding Site in Nur

### Student: Keyerra Daniels

*Streptomyces coelicolor* is a soil-dwelling bacterium that is medically important because it is able to create several different antibiotics. Nickel is beneficial to the bacterium, but high concentrations of nickel are harmful to it. To regulate levels of nickel within bacteria, the nickel uptake regulator, Nur (a part of the Fur family), is used. The Nur protein contains two metal binding sites: the M-site and the Ni-site. Previous literature has suggested that the Ni-site is the regulatory site for the protein and that the M-site serves as a structural component. However, previous Grosseohme lab members have hypothesized that the M-site is the regulatory site for Nur. This project's first goal is to develop a new method to determine the metal concentration of the protein of interest, avoiding instrumental difficulties associated with previous techniques. A fluorescence assay was developed that was expected to reliably measure concentrations of  $Zn^{+2}$  and  $Ni^{+2}$ . The standard curve developed gave a standard equation of  $y = (-90,659 \text{ mM}^{-1})x + 1 \times 10^6$ . Due to the lack of good protein expression, the lab has not yet been able to validate the usability of the metal concentration assay.

*Supported by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Honors Thesis Committee: Nicholas Grosseohme, Ph.D.; Takita Sumter, Ph.D.; and Clifton Harris, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## How Educators Can Overcome the Controversies Surrounding Border Immigration

### Student: Matthew Dylan Haney

A stigma surrounds modern U.S. border policy with Mexico, as it has never been a more polarizing topic or the subject of such heated debates. Within the education field, border policy is a very delicate topic that is often overlooked due to these controversies. However, educating students about border policy is important, because knowing about this issue at the forefront of contemporary political debate can improve their civic awareness. Therefore, how can educators overcome the stigma behind immigration and best explain to students the issues surrounding U.S. border immigration policies over time? I believe the best way to accomplish this is to dissect the opinions from experts in various fields in order to identify the major issues surrounding these policies and to then provide this information to students and peers as a resource for formulating their own opinions on the policies. In order to accomplish this, two main disciplines will be utilized: history, which shows what effects policies had in the past, and geography, which offers a viewpoint into both immigrants and American citizens. Utilizing both disciplines together allows for an interdisciplinary approach and multiple perspectives. In addition, viewpoints from the education field will also be used to lend information to the educational portion of this research. This research will include an empirical analysis of sources from the three disciplines previously described, along with lesson plans to suggest how to teach the issues to students.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Ginger Williams, Ph.D.; Margaret Gillikin, Ph.D.; and Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490H – Williams)*

## A Mathematical Model for Tumor Growth and Treatment Using Virotherapy

**Student:** Jessica Stevens, McNair Scholar

We present a system of four nonlinear differential equations to model the use of virotherapy as a treatment for cancer. This model describes interactions among infected tumor cells, uninfected tumor cells, effector T-cells, and virions. Using various stability analysis techniques, we establish a necessary and sufficient treatment condition to ensure a globally stable cure state. We additionally show the existence of a cancer persistence state when this condition is violated and provide numerical evidence of a Hopf bifurcation under estimated parameter values from the literature. We conclude with a discussion on the biological implications of our results.

SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019

Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education

Honors Thesis Committee: Zach Abernathy, Ph.D.; Kristen Abernathy, Ph.D.; and Trent Kull, Ph.D.

CAS – Department of Mathematics

## The Impact of the Tax Cuts and Jobs Act on Arts Nonprofits

**Student:** Katelyn Arledge

The importance of nonprofit organizations is widely known. Federal policies that impact nonprofits deserve examination to ensure the vitality of such organizations. This thesis examines the impact of the Tax Cuts and Jobs Act on nonprofit organizations. Nonprofits rely greatly on donations to operate, and the new tax code's changes concerning deductions and marginal tax rates alter incentives for charitable contributions. Through predictive analysis, the influence of these tax changes on charitable giving to nonprofits will be examined. The effects of the Tax Cuts and Jobs Act will begin to be seen as 2018 data are revealed; however, many of the effects are predicted to ensue in 2019 after individuals learn the new tax law. The magnitude of the change in charitable contributions will be dependent upon the price elasticity of charitable giving, which will be estimated and used to calculate giving reductions. The impact nonprofits will experience is also dependent upon the type of nonprofit organization. Arts nonprofits are among those that are expected to fare the worst, as most donors are marginally attached to these organizations as compared to others. The economic impact of the arts has been well established, lending concern to this prediction. If donors respond to the Tax Cuts and Jobs Act as expected, and changes are not made by federal legislation or nonprofit administration, negative impacts on the nonprofit arts community will ensue. Proposals for individual giving behavior, nonprofit donor strategy, and policy are presented to reveal how these negative results can be alleviated.

Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019

Honors Thesis Committee: Laura Ullrich, Ph.D.; Louis Pantuosco, Ph.D.; and Kelly Ozust, M.F.A.

CBA – Department of Accounting, Finance, and Economics

## Locating Mutagen-Sensitivity Gene *mus109* in the *Drosophila melanogaster* Genome Using Deficiency Mapping

**Student:** Chandani Mitchell, McNair Scholar

The complex processes involved in repairing damaged DNA are still being elucidated. Some genes that are known to have roles in the DNA repair process have been identified, such as the mutagen-sensitivity genes, or *mus* genes, in *Drosophila melanogaster*. However, the precise genomic location of some *mus* genes is still unknown, including *mus109*. It is known that mutations in *mus109* cause chromosomal aberrations resulting in larval death, and previous research has mapped *mus109* to a region of the X chromosome consisting of over 520,000 nucleotides and 41 genes. Therefore, this study aimed to locate *mus109* using deficiency mapping. The *mus109*<sup>92</sup> male flies were crossed to four deficiencies covering the 8F10-9B1 region of the genome, producing four possible classes of offspring. Brood 1 larvae and Brood 2 larvae were treated with H<sub>2</sub>O and 0.05% MMS, respectively. Offspring were scored for sex and eye phenotype, and these data were used in complementation analysis to narrow the probable genomic location of *mus109* to 12% of the original.

SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; SC INBRE Science Symposium, Columbia, South Carolina, August 2018; Black Doctoral Network Conference, Charlotte, North Carolina, October 2018; Annual *Drosophila* Research Conference, Dallas, Texas, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019

1st Place, Life Science Oral Presentations, SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018

Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education and by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)

Honors Thesis Committee: Kathryn Kohl, Ph.D.; Matthew Stern, Ph.D.; and Laura Glasscock, Ph.D.

CAS – Department of Biology



## An Analysis of Perspectives on Conservation of Mammal Species Using a Biome-Level Approach

**Student: Morgan Bowers**

Conservation of species and preservation of biodiversity are essential to life on Earth, but they have not always been emphasized by humans. As we continue to learn about the extensive damage done to the planet and its inhabitants by anthropogenic activities, we need to make conservation a priority. We recognize that there are natural fluctuations in environmental conditions that affect all living organisms. However, in addition to these natural changes, living organisms must contend with alterations that have been initiated or exacerbated by humans and their actions for centuries. This thesis aims to analyze research conducted on attitudes toward and perceptions of conservation by individuals from multiple regions around the world. While this approach could be used to analyze the effects of anthropogenic activities on any taxonomic category of organisms, this research focuses specifically on mammal species. I provide examples of mammal species in need of conservation efforts in three different biomes: African savanna, Asian and South American tropical rainforests, and marine waters in the Northern Hemisphere. My goal is to showcase the work being done by researchers and to direct individuals' attention to conservation issues and their importance, while also encouraging people to support the conservation of mammals and the preservation of mammalian biodiversity.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: William Rogers, Ph.D.; Jennifer Schafer, Ph.D.; and Cynthia Tant, Ph.D.*

*CAS – Department of Biology*

## Congenital Adrenal Hyperplasia due to 21-Hydroxylase Deficiency: A Review of the Literature

**Student: Ashley Cooper**

Congenital Adrenal Hyperplasia (CAH) is an inherited disorder due to mutations in coding genes for enzymes involved in the production of adrenal hormones. The term congenital means that the condition is present from birth; however, symptoms and diagnosis may be presented later in life. In CAH patients, the adrenal glands are unable to produce corticosteroids, hormones related to the control of salt and blood glucose levels, blood pressure and body immunity. Low corticosteroid levels cause an imbalance of the brain's negative feedback mechanism, resulting in continuous stimulation and enlargement of the adrenal glands (hyperplasia). The inability of corticosteroid production triggers the adrenals to shift their anabolic pathway toward increasing the production of sex hormones. As a result, CAH can manifest with a wide range of severities, including various degrees of virilization of female external genitalia. Deficiencies in different enzymes can result in CAH diagnosis. This paper will concentrate on describing clinical, biochemical, and genetic aspects of CAH caused by 21-hydroxylase deficiency. In addition, it will discuss methods of diagnosing and treating the disease to avoid or minimize the development of ambiguous genitalia prior to birth. In conclusion, a call will be made for a more holistic approach to caring for CAH patients, advocating for better parental/community education and psychological support.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Silvia Wozniak, Ph.D.; William Rogers, Ph.D.; and Laura Glasscock, Ph.D.*

*CAS – Department of Biology*

## Comparing Mathematical Understanding: Inquiry-Based Instruction versus Traditional Instruction in an Eighth Grade Pre-Algebra Classroom

**Student: Hannah Tucker**

This study examined inquiry-based mathematics instruction and traditional mathematics instruction in the setting of two eighth-grade pre-algebra classrooms. The goal was to determine whether one method of teaching has a greater impact than the other on the mathematical understanding of students. The two classes were taught the same content across the same days. Class A was taught using an inquiry-based instructional approach for mathematics, wherein students worked in small groups on carefully planned tasks with little more than guiding questions from the teacher to construct their own meaning and understanding of mathematics concepts. Class B was taught using a traditional instructional approach for mathematics, wherein the teacher presented the topic, demonstrated the steps to solve a problem, and then had students practice the same procedure by solving similar problems. Data obtained from pre- and post-assessments were analyzed to compare and contrast mathematical understanding between the two groups. Field notes from the researcher and the host teacher were also analyzed to provide further insight into student understanding. Implications from the findings may be useful to mathematics teachers who are contemplating the advantages and disadvantages of traditional versus inquiry-based approaches.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Kelly M. Costner, Ph.D.; Jessica Hamm, Ph.D.; and Sarah Marie Catalana, Ph.D.*

*COE – Department of Counseling, Leadership, and Educational Studies*

## Community Needs Assessment on Educational Programming in Lee County, South Carolina

**Student: Timothy Smith**

Research shows that afterschool and summer programming can benefit children in many ways, but a lack of resources in rural communities often prevents access to such programs. This lack of educational programming leaves children with limited options for extra-curricular activities and forces many of them, especially black males, to have some form of involvement in an organized sport. In a 2018 study, the Aspen Institute reported that 61.1% of males between the ages of six and 12 had played a team sport at least one day in 2016. Rates for males participating in sports in rural communities was also higher than that of males in urban settings. Although the research on black sports socialization is limited, Stodolska, Shinew, Floyd, and Walker (2014) were able to link black sport involvement to cultural and gendered forms of socialization, which are often perpetuated through interpersonal relationships and interactions. The purpose of this study is twofold: (1) to analyze the quantity of educational programming in Lee County, South Carolina, and (2) to see if that level of educational programming has a connection to the level of sport participation amongst African American males in rural communities.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Joshua Kirven, Ph.D.; Anthony Hill, Ph.D.; and Monique Constance-Huggins, Ph.D.*

*CAS – Department of Social Work*

## Microfinancing in the MENA Region

**Student: Anna Waked**

This paper seeks to answer the question: Is implementation of microfinancing institutions in the Middle East and Northern Africa (MENA) region a viable method to increase economic development? Microfinancing is the practice of issuing small loans to those who are unable to borrow from typical banking institutions, due to either location or lack of collateral. Microfinancing can jumpstart small businesses and positively affect small economies. Not only does microfinancing help the immediate borrower, but it also has potential to aid in the economic development of the entire surrounding community. The MENA region includes some of the most affluent countries in the world, as well as some of the poorest, which makes generalizing about the economic state of this region difficult. By carrying out a literature review on the topics of microfinancing and MENA economic development, in tandem with analysis of data from regions with a history of microfinancing that are relatively comparable to MENA regions, I will examine the promising future of microfinance implementation in the MENA region.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Laura Ullrich, Ph.D.; Danko Tarabar, Ph.D.; and Nicholas Moellman, Ph.D.*

*CBA – Department of Accounting, Finance, and Economics*

## Expression, Purification and Preliminary Crystallization of a Putative Chaperonin from *Xanthomonas cynarae*

**Student: Augustine Vinson**

*Xanthomonas cynarae* is a phytopathogenic bacterium responsible for causing blight on artichokes, resulting in crop loss. The presence of the bacterium on artichoke leaf tissue triggers a hypersensitive response, a type of programmed cell death characterized by tissue collapse, electrolyte leakage, and extensive modifications to the cell walls and surrounding apoplastic tissues. The hypersensitive response is triggered by the interaction of bacterial avirulence proteins (Avr proteins) with plant resistance proteins (R proteins) in the plant cytosol. The Avr proteins are injected into the plant cell via the Type III Secretion System, a modified flagellum that serves as a molecular needle, unfolding the proteins on the bacterial end and injecting them into the plant cytosol. We have recently identified a protein, named XopAZ, that may aid in the proper refolding of these injected Avr proteins. This protein has shown sequence identity to the FK506 binding protein family of peptidyl-prolyl isomerases and the Sensitive to lysis (Slp) family of chaperonins. We have cloned the gene encoding XopAZ from *X. cynarae* into a prokaryotic expression plasmid and purified recombinant XopAZ from the resulting bacterial culture. The recombinant protein was purified using metal-chelating affinity and gel filtration chromatographic methods. The resulting purified protein was screened to find conditions suitable for crystal growth in attempts at structural characterization of the protein.

*Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, Georgia, November 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Honors Thesis Committee: Jason Hurlbert, Ph.D.; Fatima Amir, Ph.D.; and Christian Grattan, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552H – Hanna)*

## Expression and Purification of AvrBs1.1, a Protein Tyrosine Phosphatase from *Xanthomonas euvesicatoria*

**Student: Erin Hershelman**

Bacterial spot of pepper and tomato is a plant disease that leads to significant crop loss from the shedding of pepper and tomato blossoms and young, developing fruit. *Xanthomonas euvesicatoria* is a phytopathogen that, when infecting plants, causes bacterial spot. Genomic studies of these strains of *Xanthomonas* have revealed several conserved genes that encode effector proteins that contribute to the virulence of the bacteria. One of these effector proteins, AvrBs1.1, has been identified as a phosphatase by bioinformatic studies. AvrBs1.1 elicits a hypersensitive response (HR) in plants when injected by the Type III Secretion System. The goal of this research was to successfully express and purify AvrBs1.1. The AvrBs1.1::pET28a plasmid DNA was used to transform *E. coli* BL21(DE3) cultures, which were then used to produce the recombinant AvrBs1.1 protein. Cell pellets of *E. coli* BL21(DE3) AvrBs1.1::pET28a were suspended in 50 mM TrisHCl, 250 mM NaCl, pH 7.2, and lysed via sonication. The recombinant protein in the supernatant was then purified via metal-chelating affinity chromatography with a Ni<sup>2+</sup> HisTrap FF column. Analysis of the column eluate revealed contaminating proteins, indicating that AvrBs1.1 was not completely purified. Other chromatographic methods, such as anion-exchange chromatography, may be more successful in the future. Growing the cells in a different *E. coli* strain or at a different temperature may also yield more pure protein.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jason Hurlbert, Ph.D.; Fatima Amir, Ph.D.; and Clifton Harris, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552H – Hanna)*

## The Impact of Feminism on Varying Groups in Society

**Student: Elizabeth Brown**

The purpose of this paper is to analyze how the feminist movement has helped and/or hurt various groups of individuals within a global context. Women in many countries throughout the world face oppression in one way or another. Feminist groups have formed in order to combat these forms of oppression. Feminism has developed in many countries and globally to achieve this goal. My research will be examining how the feminist movement should look at international, national, or transnational feminisms. It is important for women within each nation to develop their own sense of what feminism should hope to accomplish within that society. However, it is also important for women in a global context to develop a comradery under the term feminism. In particular, my research aims to explore the extent to which feminism should look at these multiple levels of the term. I conclude by asserting that feminism should not be an either-or study, but rather it should encompass both national, international, and transnational components.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jennifer Disney, Ph.D.; Michael Lipscomb, Ph.D.; and John Holder, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490H – Disney and Lipscomb)*



## An Investigation Into Post-Secondary Options and Outcomes for Students with Intellectual Disabilities

### Student: Sara Griffith

This research and review discusses post-secondary options and outcomes for students with mild to moderate intellectual disabilities who have graduated from or completed high school. Options such as post-secondary education programs, vocational or technical programs or careers, and entry-level workforce jobs are options that are discussed in depth. Curricula that are taught to students with intellectual disabilities are discussed, and the effects of general education inclusion on these students and their success is considered, as well. Graduation options including alternate diplomas (certificates of completion, certificates of attendance, and diplomas based on meeting IEP goals) are explained and analyzed as potentially viable options presented to students with disabilities and their families in order to help these students graduate from or complete high school by the time they age out of the services they receive through the Individuals with Disabilities Education Act (IDEA 2004) and through Free and Public Education (FAPE). The researchers conducted a short survey of the family members of participants in a Think College post-secondary education program to gain insight into the questions they were asking in their study. The survey was distributed through the Think College program, approved by the Institutional Review Board (IRB), and the results of the survey are explained and discussed.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Bradley Witzel, Ed.D.; Linda Pickett, Ph.D.; and Crystal Glover, Ph.D.*

*COE – Department of Counseling, Leadership, and Educational Studies*

## SDO Leadership Preferences

### Student: Kelly Sharpe

Researchers typically view Social Dominance Orientation (SDO) as a hierarchy-favoring disposition favoring support for existing social hierarchies. However, this interpretation does not offer any explicit sociofunctional benefits for those holding this preference. In contrast, recent research suggests SDO may represent a fast-life, pro-self exploitation strategy. Using a survey designed to compare racial preferences and interpersonal orientation (i.e., kind, cold, competitive, or sadistic), we hypothesized that individuals high in SDO would prefer (1) high-status (European American) leaders, (2) leaders who signal a willingness to tolerate exploitation (sadistic leaders), and (3) sadistic leaders more than European American leaders. In the present study, we examined whether participants would choose leaders who reinforced racial hierarchies or provided opportunities for exploitation. We manipulated leader race (European American, African American, or Hispanic/Latino) and interpersonal orientation (kind, cold, competitive, or sadistic). We predicted SDO would interact more strongly with interpersonal orientation than race, so that high-SDO individuals would show more of a preference for sadistic leaders than European American leaders. Preliminary results suggest that participants high in SDO favor cruel and sadistic leaders over kind leaders, supporting our hypothesis.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jeff Sinn, Ph.D.; Matthew Hayes, Ph.D.; and Sarah Reiland, Ph.D.*

*CAS – Department of Psychology*

## Ideology of a Logo and the Impact on Consumers

### Student: Carmen Little

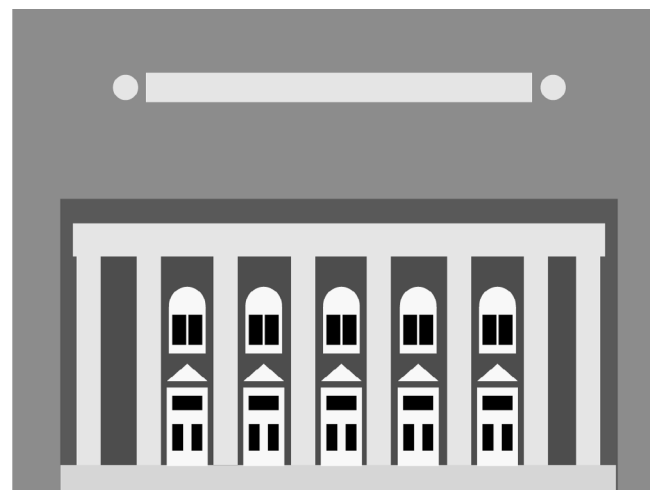
What goes into the making of a memorable, effective logo? For my thesis, I analyze brands and logo trends in order to explore how brands use specific colors, shapes, fonts, and logos to convey messages to consumers. To fully understand logos and how they have evolved, I explore the history of logo design to understand what methods are long-lasting or trendy. To bring all that research together, I gave myself logo challenges to brand or rebrand companies and created a logo look book that displays my logo designs and educates readers about effective logo design. In addition to focusing on what makes an effective logo, an overarching theme I address in my thesis is the prevalence and power of implicit branding. Even if a logo designer conducts research to develop an effective mark, understands the brand's statement and purpose, and uses those tools to make a logo that speaks to the public, how can the logo still be misconstrued by consumers? How much of a role, if any, do consumers play in shaping the brand? What impact do consumers have on a brand over time? Are designers catering toward consumer expectations and trust of brand, or are they solely focused on the identity of the brand its messages and intents? My goal is to discover just how much power consumers have and who is actually the brand mastermind.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jason Tselentis, M.F.A.; Jesse Weser, M.A.; and Hannah Maschoff, B.A.*

*CVPA – Department of Design*

*(VCOM 487H – Tselentis)*



## The Effectiveness of Physical Therapy versus Surgery for Treating Carpal Tunnel Syndrome

### Student: Audrey Hughes

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper extremity. CTS is caused by compression of the median nerve in the carpal tunnel of the wrist, resulting in pain and numbness in the parts of the hand innervated by the median nerve. Although multiple treatment options are available, this review examines the viability of physical therapy as a non-invasive alternative to surgery. Both open and endoscopic carpal tunnel release surgical methods are included for comparison analysis, as they are equally effective. Soft tissue mobilization and nerve gliding techniques are examined as physical therapy treatments. Preliminary research indicates that both surgery and physical therapy are successful long-term treatments, each demonstrating reduction in pain levels and improved function. Additionally, physical therapy may result in more effective short-term results. Further research directly comparing physical therapy and surgery is still needed. These studies may be expanded to explore how treatment options are impacted by hormonal changes that can influence CTS and differences in unilateral versus bilateral expressions of CTS.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Courtney Guenther, Ph.D.; Blair Salvatore, Ph.D.; and Jessica Boulware, M.S.*

*CAS – Department of Biology*

## Three-Dimensional Printing in Life Science Education

### Student: Anneke van Eldik

This project examines why three-dimensional (3D) printing is an excellent resource for both students and educators in the life sciences. Both the completion of the 3D printing workflow and the use of 3D printed objects in the classroom and/or lab can foster an improved educational experience and deeper understanding of life science concepts. By incorporating the 3D printing process into the curriculum, life science graduates can be better prepared for the technological skills demanded by employers. The use of 3D printing by educators also allows for the creation of customized classroom resources and can be a more cost-effective alternative to purchasing the supplemental materials and models that are commonly used in life science courses. In theory, the same types of biological models printed for life science education could also be used for patient education in fields like genetic counseling and oncology, where it is necessary to communicate complex biological concepts. Here, I present a novel lesson plan that follows the create-design-implement-operate (CDIO) framework for the process of 3D printing. I also discuss how 3D printed objects can be used as “hooks” on which students can base their understanding of complex concepts and the potential to use 3D printed objects in patient education.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by grants from the Winthrop University Research Council*

*Honors Thesis Committee: Matthew Stern, Ph.D.; Kathryn Kohl, Ph.D.; and Jennifer Schafer, Ph.D.*

*CAS – Department of Biology*

## Dynamics of an HIV-1 Virotherapy Model

### Student: Mary McBride

In this project, we extend the work done this summer on the dynamics of an HIV-1 virotherapy model. We now consider a model with six equations, disregarding the number of free HIV virions in the system. We establish the existence of disease-free, single-infection, and double-infection equilibrium points. We use Lyapunov functions to determine the global stability of the disease-free and single-infection equilibrium points. We also calculate the basic reproductive ratios for both the HIV virus and recombinant virus. We explore the stability of the double-infection equilibrium point using numerical simulations. We finish with a discussion of the viability of virotherapy as a possible treatment for HIV-1.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Kristen Abernathy, Ph.D.; Trent Kull, Ph.D.; and Zach Abernathy, Ph.D.*

*CAS – Department of Mathematics*

## The Impact of Globalization on American Society

### Student: Robert Paul Napoli

The topic of twentieth-century globalization since World War II is an interdisciplinary topic that must be thoroughly addressed in secondary social studies classrooms. Too often, students in history classes merely skim over 20<sup>th</sup> century history after 1945, making few historical connections to modern-day phenomena and failing to appreciate how history since World War II has strongly molded the modern world. Globalization is a broad, diverse topic with some controversy, as it does not always pan out fairly and can benefit some nations while hurting others. This topic of globalization since the latter half of the 20<sup>th</sup> century is integral to American life and society, as it impacts the jobs individuals have, where their goods are made, and how their respective nations deal with others on an international level. Additionally, this is a topic that must be better explained to American high school students in social studies classes. With this broad, interdisciplinary topic, a research question arises: What is the impact of globalization on American society? This question is important for several reasons. Globalization is the foundation of modern international relations, trade, economics, commerce, and livelihood for billions of people. Globalization explains how interconnected the world has become and how international relations have drastically changed since World War II. Three disciplines that fit this research topic are history, geography, and educational theory. Globalization has had an immense impact on American life since 1945, regarding jobs, trade, livelihood, politics, geography, and goods, and must be thoroughly taught to all social studies students.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Ginger Williams, Ph.D.; Margaret Gillikin, Ph.D.; and Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490H – Williams)*

## Phylogenetic Study of Viruses

### Student: Sydney McCall

Phylogenetic trees are used to study evolutionary relationships among biological entities. Since phylogenetic trees are hypotheses for how organisms are related from an evolutionary viewpoint, there exist many algorithms for constructing a phylogenetic tree based on the acquired biological data. In this talk, we focus on the maximum likelihood algorithm. We'll begin with a discussion on how phylogenetic trees aid in the study of viruses. We'll then proceed by providing some mathematical background to better understand the maximum likelihood algorithm and an example of creating a phylogenetic tree for Enterovirus D68 using this algorithm. We'll conclude with a discussion of potential strengths and weaknesses of the maximum likelihood algorithm, as well as a survey of other algorithms commonly used to construct phylogenetic trees.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Kristen Abernathy, Ph.D.; Zach Abernathy; and Kristi Westover, Ph.D.*

*CAS – Department of Mathematics*

## Consistency is Kief: Problematic Discrepancies in Marijuana Policy, the Bible Belt Says NO to Drugs

### Student: Tabytha Beu

The stigmatization of marijuana consumption continues to run rampant in society, especially in minority communities. Inconsistencies in drug policy between various regions in the United States create divisive attitudes toward marijuana consumers. These wild policy variations add to further exaggerate the assumed health threat of cannabis use and overemphasize the criminal threat of marijuana through sale and distribution. The consequences of these policy variations contribute to mass incarceration, the overuse of state budgets, and few solutions to the crime issue. This paper will examine the benefits of education about recreational marijuana use, create an open dialogue about marijuana approval or disapproval without stigmatization and stereotyping, and offer solutions to the aforementioned policy consequences.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jennifer Disney, Ph.D.; Adolphus Belk, Ph.D.; and Christopher Van Aller, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490H – Belk and Van Aller)*

## Navigating Contradictions: LGBT Identity-Building on Christian College Campuses

### Student: Joshua Goley

This research examines Lesbian, Gay, Bisexual, and Transgender (LGBT) students at Christian colleges and universities as intersectional subjects. LGBT students face traditional college stressors, along with the difficulty of navigating significant identity contradictions. At Christian colleges, negative campus climate compounds the risk of identity fragmentation, as very few Christian denominations unconditionally accept sexual and gender minorities. Drawing on political theory and contemporary sociological research, I examine how LGBT students can more effectively navigate these contradictions. I argue that they may do so through mixed methods, building solidarity and activist groups, which act as fora through which transgressive, queer theologies can be developed.

*North Carolina Political Science Association Annual Meeting, Charlotte, North Carolina, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Jennifer Disney, Ph.D.; Michael Lipscomb, Ph.D.; and Brandon Ranallo-Benavidez, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490H – Disney and Lipscomb)*

## Expression, Purification, and Crystallization of a Phosphodiesterase (PDE11A)

### Student: John Pike

PDE11A is a protein found in *Homo sapiens* that causes disorders such as major depressive disorder, bipolar disorder, and others when it undergoes mutations. When it is not mutated, it is responsible for the regulation of the intracellular concentrations of cyclic adenosine monophosphate, cAMP, and cyclic guanosine monophosphate, cGMP, by cleaving the phosphodiester bonds in these molecules. This makes PDE11A an important regulator of signal transduction, since cAMP is an important second messenger in the cAMP/protein kinase A pathway. PDE11A has three domains: the phosphorylation domain, the GAF domain, and the catalytic domain. The structure and function of the GAF domain is unknown. Determining its structure will enable researchers to make inhibitors to counteract the disorders caused by mutations. The gene encoding the GAF domain of PDE11A was cloned into a prokaryotic expression plasmid and purified recombinant PDE11A from the resulting bacterial culture. The protein was purified via metal-chelating affinity, anion exchange, and gel filtration chromatographic methods.

*Honors Thesis Committee: Jason Hurlbert, Ph.D.; Fatima Amir, Ph.D.; and Christian Grattan, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552H – Hanna)*

## Roses Red and White: The Contemporary Impact and Historical Significance of Queens and Noblewomen during the Wars of the Roses

**Student: Lauren Leonard**

Although noblewomen during the Middle Ages were generally relegated to the background of medieval society as wives and mothers, the women at the forefront of the English aristocracy during the Wars of the Roses dramatically influenced the outcome of the conflict, and they created an important legacy by demonstrating how medieval upper-class women could hold political power and social influence in their own right in fourteenth-century Europe. Over the course of this paper, my purpose is to highlight the unique significance of each of the key female figures in the Wars of the Roses, and to explain how their contributions connected to create a unified, complex narrative that is still as fascinating today as it was in the wars' immediate aftermath.

*Honors Thesis Committee: Gregory Bell, Ph.D.; Dave Pretty, Ph.D.; and Adam Glover, Ph.D.*

*CAS – Department of History*

*(HIST 590H – Bell)*

## The Effects of Information and Communication Technologies on Total Factor Productivity

**Student: Riley Moody**

The production function is impacted by three elements: capital, labor, and Total Factor Productivity (TFP). TFP defines this portion of production that is not explained by either capital or labor. I have identified the variable TFP as my dependent variable, using cross-country panel data. To determine if the presence of Information and Communication Technologies (ICT), specifically Internet, is impactful on TFP and economic growth across countries, I have regressed Internet and other control variables against TFP. Defining the impacts of ICT factors will help identify sources of improvement to increase economic growth in lesser developed countries.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Danko Tarabar, Ph.D.; Louis Pantuosco, Ph.D.; and Nicholas Moellman, Ph.D.*

*CBA – Department of Accounting, Finance, and Economics*

## TIDES UP

**Student: Carson S. Carroll**

The earth is in the midst of a colossal pollution wave, and the issue will only continue to increase unless some equally immense changes occur. The initial act to inciting change is to promote recognition of the issue. TIDES UP is a body of work that exists at the intersection of fine art and science. It confronts the pressing issues of throw-away culture, single-use plastics, and marine pollution through artistic research and fieldwork. The methodology behind this work includes physical collection and documentation of beach litter, along with found material and environmental exploration. The data that were generated and exhibited in TIDES UP were collected over a three-month period from the three public beaches of Charleston, South Carolina. This body of work takes the form of a multimedia installation that combines sculpture, video projection, and photographs. It encourages viewers to contemplate their current impact on the environment and their future position for change. *(Please see image, page 78.)*

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Claudia O'Steen, M.F.A.; Shaun Cassidy, M.V.A.; and Marsha Bollinger, Ph.D.*

*Faculty Mentor: Claudia O'Steen, M.F.A.*

*CVPA – Department of Fine Arts*

## The Synthesis and Optimization of a Sphingosine Kinase Inhibitor with Improved Hydrophilicity

**Student: Caylie McGlade**

Cancer is a widespread disease that affects millions of people. There are many ways to treat cancer, including development of new cancer drugs by the targeting of a specific pathway. In this study, we target the ceramide/sphingosine-1-phosphate (S1P) pathway, which produces high levels of S1P in many types of cancer. We are developing a new drug to target the enzyme that makes S1P, sphingosine kinase (SK), by using the scaffold of a previously developed inhibitor, SKI-I. SKI-I has very low water solubility and therefore cannot be absorbed well in the body. To improve the use of SKI-I as a cancer drug, we are working on improving its solubility through modifications to the molecule. The modified compounds are then tested in an activity assay to assess their effectiveness. The most effective modifications will be combined into one improved compound.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Honors Thesis Committee: Christian Grattan, Ph.D.; Fatima Amir, Ph.D.; and Jason Hurlbert, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552H – Hanna)*





# **PUBLIC PRESENTATIONS AND PERFORMANCES**

## Effects of Picture-Based Vocabulary Instruction during Read-Aloud Activities for Students with Intellectual Disabilities

### Student: Rhyna Simmers

Read alouds are used as an evidence-based practice when teaching/exposing students to new vocabulary. When thinking about applying this teaching method with students, typically elementary students come to mind. Why, though? If using a read aloud can teach vocabulary words, give students background knowledge, and expose students to new information as an effective research-based strategy to use for elementary students, why isn't this strategy seen in a high school setting? Arguably, typically developing students would be accessing texts on a much more advanced level than picture-based read-aloud texts to gain exposure to new vocabulary words and obtain background knowledge. However, for students who are not typically developing and those who have severe or profound disabilities, does embedding instruction within illustrated read alouds have an effect on vocabulary growth? Data collected from a study with two participants with severe intellectual disabilities show that embedding vocabulary instruction with illustrated read alouds is an effective strategy to use.

*South Carolina Council for Exceptional Children (SCCEC) Annual Conference, Myrtle Beach, South Carolina, March 2019*

*Faculty Mentor: Debra Leach, Ed.D.*

*COE – Department of Counseling, Leadership, and Educational Studies*

*(EDUC 495 – Leach)*

## Effects of Physical Activity and Exercise in Women with Gestational Diabetes Mellitus

### Student: Lindsey Ott

The purpose of this review of literature was to develop a better understanding of the effects of physical activity (PA) and exercise in pregnant women with gestational diabetes mellitus (GDM). GDM is an increasingly common metabolic disease that is acquired during pregnancy when glucose levels are unstable; it is also linked sedentary behaviors. Research shows that when a woman develops GDM, long-term effects can result for the mother and the baby. The studies in this review of literature investigated the effects of activity levels in pregnant women with and without GDM to acquire a better understanding of how these factors can affect a woman's body during gestation. The methods in these studies included examining low, moderate, and vigorous intensity PA and exercise. All studies concluded that, as compared to being sedentary, any intensity of activity and movement can reduce a woman's chances of developing type II diabetes after pregnancy, specifically for women with GDM. Decreased chances of gestational weight gain (GWG), hypertension, and other pregnancy complications, such as preterm delivery, were also found. Some participants in the study also reported having an increase in energy or metabolism. This review of literature is significant, because it will enable doctors, pregnant women, and those thinking about becoming pregnant to identify the risk factors associated with GDM, and to recognize that being active can assist in eliminating these risks.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## South Bay Salt Pond Restoration Project: Dream or Nightmare?

### Student: Paulette Hannah

California taxpayers are funding the South Bay Salt Pond Restoration Project to restore the decimated tidal marsh wetlands ecosystem of the San Francisco Bay estuary over the next 50 years. This paper calls for increased scrutiny from the agency serving as a watchdog over this project by delaying the next phase until identified uncertainties have been addressed and the questions of whether the complexity and costs of restoring these wetlands outweigh the ability to achieve the project goals have been answered. I incorporate peer-reviewed scientific research that describes success rates of previous wetlands restoration projects; analysis and recommendations for ecosystem restoration; and project-related documents that identify environmental impacts of the project; planning and monitoring approaches; and a published summary of findings from the first phase of the project implementation. Recently, sea-level rise due to climate change has been raised as a question by the managers and researchers actively participating in the project. This is a significant uncertainty which could undermine the entire project's success and one which must be addressed before the next phase of the project begins. Political and economic pressures to move the project forward must be tackled by the watchdog agency to ensure integrity and long-term success.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jo Koster, Ph.D.*

*CAS – Department of English*

*(CRTW 201 – Koster)*

## Strength Across Generations: A Cross-Sectional Analysis of Strength Characteristics

### Student: Emma C. Harris

According to Duan and Ho (2016), character strengths are considered human behaviors or qualities that are positive enough in nature to have valuable impact on the surrounding population. This research is a multi-generational study that will aid in the understanding of strength characteristics and the modifications made to them over time. I hypothesized that strength virtues of wisdom, humanity, and justice will be prevalent in the older generations; strength virtues of transcendence, temperance, and courage will be more prevalent in the younger generations; and older generations will feel more satisfied with their lives. A convenience sample of 104 participants took the online survey: 16 Baby Boomers, 25 Generation X, 19 Generation Y, and 33 Generation Z. I used ordinary least-squares estimation to analyze the data. Compared to younger generations, older generations were less likely to show character strengths of curiosity, perspective, self-regulation, honesty, and judgment. Older generations were less likely than younger ones to show character strengths of perseverance, zest, and humor at a marginally significant level. There was no significant relation between generation and life satisfaction. My results suggest that the virtues of courage, transcendence, temperance, and wisdom are more prevalent in the younger generations. These findings are important because they show a trend that can help further the understanding of strength characteristics and their behaviors over time.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 510 – Kim)*

## Communist Cuba, Hypermasculinity, and Feminism

**Student: Hannah Hundley**

This paper will examine the way Cuban culture influences and maintains traditional norms that affect Third-World women and Third-World feminisms, specifically looking at the Third-World communist country of the Republic of Cuba. Cuba has a communist political system, which affects every person in its society, men and women. Women, historically, are responsible for unpaid work such as childcare and housework; this is not only a product of Cuba's economic norms, but also a product of Cuban hypermasculinity and machista culture. Hypermasculinity is evident when looking at prominent public figures in Cuba such as Fidel Castro. Feminism's influence in Cuba emerges from its Marxist-feminist struggle within communism. Many Cuban women are excelling outside of the home, but are still ultimately responsible for "women's work" inside the home; thus, the double day continues. Unity Feminism is offered as a solution for incorporating both men and women of all intersections into the fight for equality for all.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jennifer Disney, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 510 – Disney)*

## Codeine References in Rap Music Increase after Codeine Availability Decreases

**Students: Emilee Roberts and Kara Byars**

Increased consumption of "purple drank," a combination of codeine cough syrup and soda, is linked to more frequent listening to rap music. In 2014, combined promethazine/codeine was pulled from the over-the-counter market. We examined how rap lyrics reflected this change in codeine availability. We focused on the time periods 2011-2013 and 2015-2017, which represent the three years before codeine availability decreased and the three years afterwards. We hypothesized that decreased availability would relate to an increase in positive references to codeine use in rap songs. We randomly sampled 49 rap songs equally divided between the two time frames, specifically seeking songs that had at least one mention of codeine. We searched keywords known to be street terms for codeine (e.g., lean, dirty sprite, purple drank, double cup). Each song was coded by two raters for number of references to codeine in the lyrics. The reference was further identified as either having a positive, negative, or neutral connotation. The rap artist for each song was also identified by geographic region, because "purple drank" originated in Texas. Results revealed that codeine was mentioned more frequently and more positively in rap songs after it was no longer available over the counter; this pattern did not differ across regions. These positive references are concerning because of the widely documented association between rap music and substance abuse. Our study identifies a specific form of drug abuse perpetuated by the rap music industry and adds to the very limited scholarly research on this issue.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Darren Ritzer, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Ritzer)*

## Violence and Sex Exhibited by Human and Non-Human Characters in Family Movies

**Students: Cynthia Wolff, Lexus Rain, and Myles Ray**

We examined the level of violence and sex in movies targeted toward children, specifically focusing on animated films produced by Pixar and Dreamworks. We also explored whether there was a difference in violence and sexual activity between human cartoon (e.g., Aladdin) and non-human cartoon characters (e.g., Shrek). We selected G or PG movies considered "Top Grossing Family Films" in the IMDb database. We coded each minute of movie time by recording the number of verbal and physical sexual acts, and the number of verbal and physical violent acts, as well as the type of character exhibiting and receiving the act. (An example of a verbal sexual act would be catcalling, while an example of a physical sexual act would be passionate kissing.) Two raters evaluated the movies to provide inter-rater reliability. We found that male characters were more violent than were female characters. We also found that sexual acts were committed equally by male and female characters. These outcomes are noteworthy because we focused our study on movies targeted toward children and families. Children may be receiving a message about gender-specific behavior, related to both violence and sexuality, without even realizing it. We did not find differences between our human and non-human characters, suggesting that levels of violence and sex are being presented at similar levels regardless of the type of movie character. These findings add to what we know about characteristics of movies likely to be viewed by youth and may be of particular interest to parents.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Darren Ritzer, Ph.D.*

*CAS – Department of Psychology*

## A Thorn in the Mind: An Interpretation of 2 Corinthians 12.7b-10

**Student: Matthew Squires**

In his second letter to the Corinthian church, Paul describes a "messenger of Satan" being sent to him in the shape of a "thorn in the flesh" to serve as a reminder that Christ's grace is sufficient for him (2 Corinthians 12.7b-10); however, the exact interpretation of what this thorn represents is unclear. I present a historical overview of this passage, along with the three common opinions as to what the thorn actually is—a physical ailment, an enemy of Paul, or, verbatim, a messenger of Satan—along with biblical evidence for each of these opinions. I argue, however, that an additional, equally valid interpretation—that the thorn represents, in modern terms, a mental affliction—can also be supported with biblical evidence. In addition, I discuss the evangelical Protestant Church, its view of mental health, and the role it can play in using 2 Corinthians 12.7b-10 to minister to those suffering with mental illness.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Peter Judge, Ph.D.*

*CAS – Department of Philosophy and Religious Studies*

*(RELG 495 – Judge)*



## The Impact of Social Media on Self-Worth and Social Comparison

**Students: Sydney Beth Gowitzka and Alannah Kristen Visbeck**

Although there are many benefits to social media use, such as having a sense of connection with others, heavy social media use can negatively affect one's mental health. Our project examined the relationship between social media use, personality, self-worth, and social comparison. Participants were 130 women and 48 men from different backgrounds who were recruited through social media, and a variety of undergraduate and psychology classes. Through an online questionnaire, we assessed participants' personality types, social media use, self-worth, and social comparison. Our results revealed that individuals higher in neuroticism and lower in conscientiousness were more dependent on social media. We also found that social media dependency significantly predicted one's appearance-related self-worth, competitive self-worth, academic competence self-worth, and the tendency to seek others' approval. Lastly, we found that social media dependency significantly predicted the level of social comparison. Our results conclude that social media has an impact on users' self-worth and the way they compare themselves to others. We can also conclude that personality types influence social media use. These results suggest that increased social media use influences social comparison. The social comparison that occurs on social media may impact users' self-worth and ultimately affect their overall well-being

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Collins)*



## Effects of a Hierarchy of Supportive Consequences on Task Completion

**Student: Mia Champion**

The purpose of this research is to measure the effects of the hierarchy of supportive consequences on task completion. A hierarchy of supportive consequences is a series of positive behavioral supports developed by Dr. Debra Leach and Dr. Shawna Helf (2016). The hierarchy of supportive consequences used during the research process is sequenced as follows: 1) proximity control; 2) planned ignoring; 3) visual reminder; 4) verbal reminder; 5) conference with student and/or offer assistance to get started; 6) alter task. The population featured in this research includes one female subject attending an elementary school in the Southeast. The participant also receives instruction in a resource setting to provide specific behavioral support to support needs related to a diagnosed emotional/behavioral disorder. Baseline data indicate that the participant was completing an average of 22% of work administered during a 50-minute instructional period. The independent work assigned during the baseline and intervention process reflects the typical assignments distributed by the classroom teacher. The intervention involves the researcher using the hierarchy previously described when the participant was off task. The results yielded a positive response. The intervention data indicate an average task completion of 100% when the hierarchy was used to prompt task completion-related behaviors. The data presented through this research prove that the hierarchy of supportive consequences increases the percentage of task completion.

*South Carolina Council for Exceptional Children Annual Conference, Myrtle Beach, South Carolina, March 2019*

*Faculty Mentor: Debra Leach, Ed.D.*

*COE – Department of Counseling, Leadership, and Educational Studies*

## Animal Testing of Cosmetics and the Growing Trend Toward Change

**Student: Shannon Simmons**

The purpose of this enterprise-multimedia work was to investigate the necessity of animal testing in the cosmetics industry and the use of alternative methods. The need for this work was precipitated by the far-reaching effects animal testing has on cosmetics, the consumer, and the global economic impact of the cosmetics industry. Investigative journalism techniques were used throughout the study to gather and analyze evidence. Freedom of Information Act (FOIA) requests were filed to two government agencies, the Food and Drug Administration (FDA) and the Office of Laboratory Animal Welfare (OLAW). In-depth interviews were conducted with experts in the field, as well as a makeup artist and the owner of a diagnostic testing lab. Research was also collected from scientific journals. The Depository Library Program was used to find other supporting evidence and government literature. Although more research is necessary for this study, data collected show that government agencies like the FDA and National Institutes of Health (NIH) have strict policies companies must follow when testing their products. Furthermore, evidence suggests that there is a growing trend toward increased use of alternative methods because of the costs, regulations, and consumer consciousness associated with animal testing.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: William Schulte, Ph.D.*

*CAS – Department of Mass Communication*

*(MCOM 441 – Schulte)*

## Socioeconomic Status and Indigenous Identification in Mexico

### Student: Kaitlyn Clingenpeel

The objective of this research is to investigate the effects of adding a new question of indigenous ethnic identification on the socioeconomic status and education of the indigenous population in Mexico. The research will compare indigenous language users to those who are indigenous by a sense of ethnic belonging. It will also compare these indigenous populations to the non-indigenous population and investigate how the indigenous population has changed over time. Data from the 1997 and 2014 National Surveys of Demographic Dynamics (ENADID) were used to make these comparisons. T-tests and logistic regressions were used to analyze these data. Those who identify as indigenous by ethnic belonging had a higher education level than language users, a similar socioeconomic status to language users, and similar socioeconomic status and education levels to the rest of the population. In 2014, indigenous language users had a similar socioeconomic status and a lower education level compared to the non-indigenous population. The number of indigenous language speakers increased from 1997 to 2014, and both the socioeconomic status and education levels increased, as well. Future research should utilize a more consistent survey and find a way to include income as a variable.

*Southern Sociological Society (SSS) Conference, Atlanta, Georgia, April 2019*

*Faculty Mentor: Maria Aysa-Lastra, Ph.D.*

*CAS – Department of Sociology, Criminology, and Anthropology*

*(SOCL 516 – Aysa-Lastra)*

## Maid Marian

### Student: Lily Parker

I will design four costumes that will bring to life Maid Marian, the heroine of the Robin Hood legends in English folklore, and I will produce one design as a complete costume. This project involves extensive research on the story of Maid Marian and on the history and clothing of medieval England, followed by many hours of hands-on work to draw my designs and sew the finished garment. The final presentation will include concept sketches and illustrations, professional photographs of the finished costume being worn and used in its intended environment, and the costume itself complete with props and accessories. I intend to revitalize a traditional, familiar female character and bring her to life as a heroine to whom girls of all ages can relate, without turning her into a Disney Princess or a gender-swapped Robin Hood. Girls in our culture should learn that strong women have existed in history and folklore for millennia without royal status, happily ever after, or contemporary feminism. By combining Maid Marian's historical context with my own interpretation, I'll create a strong female character who—rather than redefining femininity—seeks to embody the true beauty and power of womanhood.

*Winthrop University Department of Design Senior Show, Charlotte, North Carolina, April 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; G. David Brown, M.A.; Janet Gray, M.F.A.; and Lisa Cody-Rapport, M.F.A., Rollins College*

*CVPA – Department of Design*

*(VCOM 487 – Tselentis)*

## Young Adults' Similarity and Honesty with Their Mothers and Fathers

### Students: Nicole Brito, Amerika McDaniel, and Ramonica Berry

We hypothesized that greater similarity would relate to more honesty with both mothers and fathers. Participants were 100 young adults (66% women; 49% Caucasian) with a mean age of 20.33 ( $SD = 2.79$ ). Participants rated their personal agreement with 18 value statements. Participants were then asked to respond twice more to the same statements, answering as they thought their own mothers and fathers would. Next, participants responded twice to a published openness scale that assessed participants' willingness to be honest with their mothers and fathers. Results supported our hypothesis. The more similar a young adult was to a particular parent, the more open and honest he or she was with that parent. Perhaps parents are more receptive to honesty when everyone agrees, or perhaps honest parent-child communication leads to agreement. Interestingly, young adults did not seem to believe that similarity drove their honesty, as young adults' openness scores did not predict their similarity self-ratings. This perception of uniqueness may reflect young adults' developmental task of solidifying their own identities. Similarity with fathers related to father-child closeness, whereas similarity with mother extended beyond the mother-child relationship by predicting less concern about being a disappointment and how flexible the young adults' thinking was. Men reported being more influenced by their fathers, while African Americans reported being more influenced by their mothers. These data add a new perspective on how similarity with parents influences adolescent and young adult outcomes.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Sleight)*

## “Flay Steak and Sautéed Fingers”

### Student: Zuri Anderson

The short fiction, “Flay Steak and Sautéed Fingers,” will explore the childhood anxieties of sharing the contents of a lunchbox with classmates. Hannah Hearne is starting public school for the first time, endorsed by her father and condemned by her mother. The caveat, however, is to keep her lunch concealed, which is a cannibalistic delicacy. Focusing on scene building and interiority craft, the literary work will exemplify the fear and apprehension over revealing cultural norms and practices with those unfamiliar with them, using food as a vehicle for these worries. This short story will tackle the use of food as an expression of one's cultural and socioeconomic background.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Dustin M. Hoffman, Ph.D.*

*CAS – Department of English*

*(WRIT 507 – Hoffman)*

## Relationships with Parents Predict Willingness to Forgive Male and Female Transgressors

**Students: Sarah Reid, Maya Whaley and Tamia Thompson**

We examined how relationships with their mothers and fathers predicted young adults' willingness to forgive male and female offenders. We hypothesized that a higher quality of relationship with each gendered parent would relate to greater forgiveness of the same-gendered transgressor. Participants were young adults ( $n = 106$ ; 78% women, 56% Caucasian) with a mean age of 19.87 ( $SD = 1.82$ ). Participants imagined a serious offense by a female and by a male transgressor. After each situation, participants completed a forgiveness scale. Participants also responded to three scales (granted autonomy, warmth, and involvement) to assess their relationships with their mothers and fathers. In sum and in support of our hypothesis, higher relationship quality with fathers predicted greater willingness to forgive male offenders. Higher quality relationships with mothers predicted young adults' greater willingness to forgive both male and female offenders. Religious adherence and parental modeling of forgiveness were linked to participants expressing positive attitudes toward forgiveness, but did not predict a greater forgiveness toward their transgressors. Young adults, especially women and African Americans, were more forgiving of female offenders, perhaps because the offenses participants reported coming from men (in open-ended responses) were more severe. These findings offer the first insight into how relationship quality with mothers and fathers differentially impact young adults' forgiveness of male and female transgressors.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Sleight)*

## Space Guard, a Brand System

**Student: Michael Petersheim**

How does one create a brand identity for a military organization? More importantly, how does one design for an organization that does not exist yet? Each branch of the armed forces has its own unique culture and identity and is presented graphically to the public through several forms of media, including billboards, commercials, movies, and websites. The branches have their own mottos, emblems, and ethics, but above all, they have unique skill sets which are shown graphically in their branding. My thesis entails the development of a brand system for the future Space Force outlined by President Donald Trump in August 2018. This project includes logo development, colors and standards, website development, uniform items, rank structure, and collateral pieces such as coins, stickers, and t-shirts. The Space Force, which I have renamed Space Guard for reasons outlined in my thesis, will keep with the standards, regulations, and traditions of the Department of Defense visually and symbolically whilst maintaining its own unique culture and identity.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A., and Jesse Weser, M.A.*

*CVPA – Department of Design (VCOM 487 – Tselentis)*

## Planit: Customizable Planners

**Student: Kaitlyn Blackman**

For my senior thesis, I will design two customized, personalized agendas from a website I have developed and designed. Available options include color customization, stickers, weekly, monthly or daily layouts, as well as a variety of other custom selections the consumer may include to create the most functional planner for his or her lifestyle. The final result from the consumer's end would be the middle road between a digital and traditional planner, as well as something that consumers can call their own. The customization process would be more personal than walking into Hobby Lobby and selecting an off-the-shelf journal, but much more automated than creating your own unique planner from scratch, much like the Bullet Journal, where users draw and create their own custom planners by hand. I have analyzed and explored trends within the community, from which I have created two fleshed out personas that will serve as potential users of my final planner sets.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; Jesse Weser, M.A.; and Hannah Maschoff, B.A.*

*CVPA – Department of Design*

*(VCOM 487 – Tselentis)*

## The Impact of Pet Ownership on Romantic Relationships

**Students: Rebecca Causey and Kayla Thompson**

Researchers Cloutier and Peetz (2016) found that owning pets benefits romantic relationships by helping to foster a feeling of wellbeing and empathy among couples. Along with empathizing skills, pet ownership provides the opportunity to develop attachment, investment, and commitment skills. Our first hypothesis is that pet owners have more commitment in romantic relationships than non-pet owners. Our second hypothesis is that pet owners are able to express more commitment through actions of investment than non-pet owners while in romantic relationships. Our third hypothesis is that pet owners are more loyal and less likely to cheat in romantic relationships than non-pet owners. Our participants consisted of college students from Winthrop University as well as recruitments from social media contacts. We had our participants answer a survey consisting of a scenario section, seven measures, and a demographic section, totaling 68 questions. The scenarios were to manipulate the feelings of pet ownership. The measures are listed in order: likelihood of cheating, self-reported commitment felt in romantic relationships, current and previous number of pets, self-reported cheating history on significant other, time spent with pet(s), and experiences in past relationships. All of our hypotheses were found to not have significant results. From our findings, we cannot conclude any definitive answers. Our most predominant limitation was a lack of accurate representation of true non-pet owners. Participants were picked through convenience sampling, and the conditions were created by which scenario they received. We had four genuine non-pet owners out of 83 total participants.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Collins)*

## Academic Entitlement Linked to Job Entitlement and Reduced Grit

**Student: Caitlan Boudreaux, McNair Scholar**

Our study examined whether academic entitlement predicted job entitlement. Further expanding on the research in this area, we explored how these two constructs related to the trait of grit, a perseverance and passion for long-term goals. Participants were 26 men and 75 women with a mean age of 31.20 ( $SD = 13.98$ ). Seventy-eight percent were Caucasian, 12% were African American, and the remainder reported other ethnicities. Participants responded to scales that assessed general entitlement, academic entitlement, and grit. We developed a job entitlement scale loosely based on scales that assessed general and academic entitlement. Our findings suggest that individuals who feel a sense of entitlement in one realm of their lives are likely to experience that sense of entitlement in other realms. Specifically, a sense of academic entitlement predicted a sense of entitlement in the workplace. Men were more prone to academic entitlement but reported similar levels of job and overall entitlement as women, suggesting that these are independent constructs. Previous research documented negative outcomes associated with both academic and job entitlement. Our results directly compared these types of entitlement, with academic entitlement predicting lower college grades and less perseverance toward long-term goals, and thus emerging as more detrimental.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Darren Ritzer, Ph.D.*

*CAS – Department of Psychology*

## Marketing Strategies Influencing NHL Fan Base

**Student: Ivy Johnson**

The beauty of sport is that it has the ability to reach people from all areas and walks of life. For professional sport organizations, it is crucial to utilize every possible resource to maintain and continuously build the prominence of their specific league throughout the market. Within the last decade, the National Hockey League has implemented an event known as the Coors Light Stadium Series that features a sequence of outdoor professional hockey games. Events such as this illustrate ways in which the NHL has intentionally engaged with their current market and established a positive perception in the minds of those in other segments. The purpose of this research is to examine the effect of the marketing strategies specifically behind the expansion and special events of a professional sport organization as they relate to the potential success and prosperity of the league across North America. This will determine the impact this league's efforts have ultimately made regarding fan popularity, recognition, and following. Sport professionals can utilize the findings from this research and implement the data into strengthening their marketing strategies to engage current and new markets.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinwook (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## They will never be...

**Student: Kylie Smith**

As a future educator, I am alarmed by the normality of school shootings in American society. These tragedies have been increasing over the last decade and have left many in fear that something as simple as sending a child to school may result in a life lost. My choreographic piece seeks to bring awareness to the issue of school shootings to which our society has become numb. This piece was shaped through research on various school shootings that have forever changed American society. My dancers represent the students we have lost by showcasing their lives and the senseless reasons why they are no longer with us today. The voice that you will hear at the end comes from a letter to parents from an elementary school principal on the third anniversary of that shooting. It is a plea for you and I to work and dream for a society where acts of violence such as these have no place. It is also a reminder to love your students and to care for them because in this world that is truly all we can do.

*Senior Choreography Showcase, Winthrop University, December 2018; American College Dance Association, Kennesaw State University, Georgia, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Kelly Ozust, M.F.A.*

*CVPA – Department of Theatre and Dance*

*(DANA 442 – Ozust)*

## From Hospitalitas to Themata: Late Antique Precedents for the Theme System

**Student: Evan Schultheis**

The theme system was the military-administrative complex characteristic of the Roman empire during the first half of the Middle Ages. Its proper establishment is now typically attributed to the reign of Emperor Nikephoros I in the ninth century, yet the "settlement" of the Roman field armies in Anatolia can be traced back to the middle of the seventh century CE, as declining territory and revenue forced the region to become the primary producer for the empire. However, this "settlement" was not a proper landing of the military, by which a system of "farmer-soldiers" was created, but rather bore similarities to earlier fourth- and fifth-century practices of supporting the army and the "settlement" of the barbarian *foederati* in the western Roman empire. This paper seeks to explore how the system of *hospitalitas* outlined by Walter Goffart, which involved granting allotments to "settling" *foederati* from the tax value of the land, could serve as a precedent to the system implemented by the Roman Empire in the mid-seventh through eighth centuries to support the field armies in Anatolia, as outlined by John Haldon. Embedded in these two unique historiographies, culminating with Goffart and Haldon, lies a connection between the fifth-century technique of accommodation and the fiscal accommodation of the seventh- through ninth- century field armies. Further, the context of *hospitalitas* requires a complete reassessment of the understanding of the granting of hereditary military lands (*stratiotika ktemata*) under Emperor Constantine VII in the tenth century.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Gregory Bell, Ph.D.*

*CAS – Department of History*

*(MDST 510 – Bell)*

## College Students' Attitudes toward Service and Emotional Support Animals on Campus

**Students: Adalaina Musheff, Margaret Adkins, Nadirah Madyun, and Kali Smith**

The presence of emotional support animals (ESA) has dramatically increased on college campuses. Despite the increased prevalence, there are misconceptions, controversies, and concerns regarding the value and rights of ESA, even among psychologists and university counselors. Thus, we examined college students' perceptions of service animals (SA) and ESA. We hypothesized that acceptance would be higher for SA than for ESA, and that personal experience with pets and mental health issues would predict increased acceptance of ESA. Participants were 101 young adults (74% women; 54% Caucasian) with a mean age of 21.0 ( $SD = 4.25$ ). Participants randomly encountered one of two scenarios describing a classroom situation where either a service dog or an emotional support dog was present and were asked to evaluate the appropriateness of the situation. Participants then completed a knowledge quiz related to ESA, SA, and the ADA. Next, participants responded to questions to assess their personal attitudes toward assistance animals, the GAD-7 to assess recent anxiety symptoms, and questions about their experience with mental health issues and pets. In support of our first hypothesis, we found that people were less supportive of ESA owners than SA owners. Participants were generally supportive of SA. In contrast, ESA acceptance was predicted by increased knowledge, experience with ESAs, and mental health issues. In addition, mere exposure to a scenario about an ESA in a college classroom resulted in more openness to ESA in college classrooms. In contrast to our hypothesis, pet ownership was not a useful predictor.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Sleight)*

## Cracked Foundation

**Students: Tiffany Moss, choreographer, and Emmalee Bradley, dancer**

My choreography, *Cracked Foundation*, explores the estranged relationship between a mother and daughter. It takes a look at both perspectives: a daughter feeling abandoned and in need of support in contrast to a mother who feels stuck and wants out. This piece was created and shaped due to by my personal experiences with my own mother. Even though this is my inspiration for the piece, it can appeal to anyone as a story of abandonment and estrangement.

*Senior Choreography Showcase, Winthrop University, December 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Meg Schriffen, M.F.A., and Kelly Ozust, M.F.A.*

*CVPA – Department of Theatre and Dance*

*(DANA 442 – Ozust)*

## Fabrication and Characterization of p-Type Hematite Thin Films

**Student: Cale B. Gaster**

Zn-doped hematite thin films have been prepared on transparent conductive oxide substrates by a pulsed cathodic electrodeposition technique. The films are comprised of monodisperse nanoparticles, and are strongly adherent, uniform and crack-free. Under illumination, the films exhibit p-type conductivity. By pairing this material with a suitable co-catalyst, we aim to demonstrate sustainable photocurrent under neutral pH conditions in the absence of sacrificial reagents.

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2018; Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, Georgia, November, 2018*

*Supported by a grant from the National Science Foundation EPSCoR Program (MADE in SC)*

*Faculty Mentor: Clifton Harris, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552 – Hanna)*

## Young Adults' Reliance on Mothers and Fathers during Decision Making

**Students: Derek Velez and Griffin Rohrer**

We examined how much young adults involve their parents in different decisions. We hypothesized that better quality parent-child relationships would predict greater parental reliance for both academic and personal decisions. Participants were young adults ( $n = 101$ ; 60% women; 72% Caucasian) with a mean age of 20.57 ( $SD = 2.02$ ) who responded to a published scale to assess the quality of the parent-child relationship. First, participants focused on their mothers when responding and then on their fathers. Next, participants shared difficult school-related and personal decisions and responded to questions regarding how much they involved their parents in them. As we hypothesized, we found that the better the quality of the relationship, the more participants relied on their parents during decision making. Young adults relied on their mothers more frequently than their fathers, particularly for personal decisions versus academic ones. Although adults followed both parents' advice, a higher quality relationship resulted in participants finding their mothers' advice helpful but not their fathers'. One explanation might be that mothers changed their advice depending on the situation, while fathers were more consistently logical. However, when decisions were stressful, participants decreased their reliance on their mothers, perhaps because mothers' advice was more emotional. Age, race, gender, and GPA did not predict reliance on parents; instead, we found commonalities among these demographic groups. These data add to our understanding of young adults, their decision making, and parental involvement.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Sleight)*

## Using Social Media to Express Disenfranchised Grief

**Students: Dai'Jahniue Jackson and Amber Jones**

Thanatechnology refers to the use of technological resources to support individuals and families coping with death, grief, and life-threatening illnesses. Although initial thanatechnology studies focused on home videos and computer-assisted instruction programs to help survivors process grief, this area of research has flourished with the growth of online connectivity. Social media platforms such as Facebook, Twitter, and Instagram are uniquely equipped to afford users a metaphorical place to grieve and share their feelings and experiences with others, particularly those coping with losses that are not typically recognized by society. This type of loss is called "disenfranchised" because it is a marginalized type of grief that most people do not acknowledge as real, like the loss of a pet, a miscarriage, or a divorce. Disenfranchised grief also includes loss due to a type of death that others are uncomfortable talking about, such as suicide or murder. The current study used interview methodology to collect stories from ten participants regarding how they used Facebook to help cope with disenfranchised loss. The main research question for the study was the following: How does Facebook help individuals cope with disenfranchised grief? The findings indicated that Facebook helps to validate disenfranchised grief, which in turn makes the bereaved feel better. Facebook also helps them to connect with others that have dealt with similar types of loss.

*South Carolina Association of Family and Consumer Sciences, Myrtle Beach, South Carolina, February 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Lisa Moyer, Ph.D.*

*COE – Department of Counseling, Leadership, and Educational Studies*

## A Diminutive Late Devonian Recovery Fauna from the Cleveland Shale

**Students: Sara P. Dixon and Dakota P. Shope**

The Hangenberg Event was one of several extinction pulses at the end of the Devonian period marked by significant diversity loss and ecological turnover. Although the long-term consequences of this event are quite well documented, the immediate aftermath is less well constrained. This study presents a fossilized fauna immediately after the Hangenberg Event that is preserved in the uppermost Cleveland Formation in Northern Ohio and compares it to the well established fauna from the overlying Bedford Formation. Four localities from which the Hangenberg Event has been previously constrained reveal that a diminutive, pyritized recovery fauna, while locally abundant, was geographically limited. The fauna is dominated by brachiopods, with less common bivalves and gastropods. They are rarely greater than 1 cm along the greatest axis, and they range from fragmented to butterflyed in preservation. This fauna contrasts in size and dominant taxa from the abundant and diverse Bedford fauna found at these localities just several meters above the recovery fauna interval. We interpret the Hangenberg recovery fauna to represent opportunists making an initial colonization during ongoing stressful conditions associated with the extinction event.

*Geological Society of America Southeast Sectional Meeting, Charleston, South Carolina, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Diana Boyer, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## The Impact of Financial Strain and Academic Workload on Stress in College Students

**Students: Precious Suber, Kelsey Caldwell, and Ryan Brazell**

In our current study, we looked at stress in college students, financial strain, and academic workload. Participants were 149 students from a small university in South Carolina. Data were collected in a convenience sample with an online questionnaire. We manipulated academic workload using high- and low-workload scenarios. We also manipulated financial strain using high- and low-strain scenarios that were given to the students randomly. After each scenario, we measured the amount of stress participants would feel if they were in that financial/academic situation, using the Situational Stress Scale of Edwards, Edwards and Lyvers (2015). We conducted an independent-samples *t*-test to examine the effect of course load on stress. There was a significant difference in the amount of stress between the high ( $M = 6.02$ ) and low ( $M = 5.08$ ) academic load conditions ( $t(130) = 4.22, p < 0.001$ ). We also conducted an independent-samples *t*-test to examine the effect of financial strain on stress. There was a significant difference in the amount of stress between the high ( $M = 6.52$ ) and low ( $M = 3.88$ ) financial strain conditions ( $t(78.15) = 10.87, p < 0.001$ ). The results show that students who have a larger course load are more stressed than students who have a smaller course load, and students who have higher financial strain are more stressed than students with low financial strain. Implications for future research on college students and stress are discussed.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Collins)*



## Political Ideology and Personal Involvement Influence Perceptions of Political Disagreements

**Student: Kalea Young-Gibson**

We examined how seriously a political argument between romantic partners would be viewed. Participants were 262 adults with an age range of 18 to 87 and a mean of 25.58 ( $SD = 12.17$ ); the sample was primarily women (77%) and Caucasians (59%). An online system randomly presented participants with one of the three experimental conditions, each describing an argument involving two long-term romantic partners (with gender-neutral names); the arguments differed only in their focus: cheating exposed ( $n = 88$ ), where to eat dinner ( $n = 77$ ), and opposite voting ( $n = 99$ ). Participants reported their reactions and also responded to the Intolerant Schema Measure, Distress Tolerance Scale, and Buss Perry Aggression Questionnaire. We found that the perceived seriousness of a political argument depended on level of personal involvement and political ideology. Young adults felt that political disagreements would be as disruptive as cheating for other people's relationships; however, they reported being more tolerant if it happened in their own relationships. Interestingly, cheating and disagreeing politically were considered to reveal fundamental differences about the individuals involved; the cheating situation would likely reveal moral differences, raising the question of what fundamental difference was being revealed for the politically motivated arguers. Perhaps Democrats perceived the fundamental political difference to also be a moral one, as Democrats reacted more personally and strongly to the political disagreement than did Republicans. These findings shed additional light on how political disagreements are viewed, a timely topic in the midst of current political polarization and incivility.

## Thin Films of Cu-Doped CdS Prepared by a Pulsed Cathodic Deposition Method in Dimethylsulfoxide

**Student: Blake McCloskey**

Thin films of copper-doped CdS were prepared on conductive oxide substrates (FTO) by application of a cathodic current in an electrolyte bath of  $Cd^{2+}$ ,  $Cu^{2+}$ , complexing agents, and S(0) in DMSO at elevated temperature with a duty cycle of 20%. Film thickness was controlled via the number of pulses and later confirmed by profilometry analysis. P-type conductivity was confirmed by open-circuit and Mott-Schottky analyses. Furthermore, the photoactivity of the films was assessed in neutral media using a three-electrode setup. By depositing this material onto the surface of a p-type oxygen-evolving catalyst (OEC) with suitable band structure, a z-scheme photocatalytic device can be produced and employed for water splitting.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleigh, Ph.D.*

*CAS – Department of Psychology (PSYC 471, 472 – Sleigh)*

## Clean Eating: How the Language of Diet Culture Assigns Moral Judgments to Food Choices

**Student: Kelsi Brown**

In this paper, I take a linguistic approach to analyze the way in which we talk about food and how the language we use to categorize foods assigns moral judgments to them. To argue this, I examine the effects of terms such as "clean eating," "superfoods," and "junk food" on feelings of moral rightness or wrongness. Building from the research of Jennifer S. Coelho, My Bui, and Nick Cullather on the impact of language on guilt associated with food and calories, I discuss how the language of diet culture leads to an increased tendency in people exposed to it to feel food-related guilt when they consume things that are classified as "bad." I also argue that people use the language of food description such as carbs, calories, and diet to impose limits that can sometimes become extremely restrictive on their own behaviors, and this shows that the language we use to talk about food has moral, even psychological, power over most people.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jo Koster, Ph.D.*

*CAS – Department of English (ENGL 507 – Koster)*

## Young Adults' Attachment to Cell Phones, Significant Others, and Marijuana

**Students: TJ Steinke, Danielle McComas, and Samantha Sanders**

We examined young adults' attachment to their cell phones, parents, friends, significant others, pets, and marijuana. Participants were 120 young adults (74% women; 48% Caucasian) with a mean age of 20.40 ( $SD = 2.14$ ). Participants evaluated their cell phone usage and reliance with a series of published questionnaires. We used the same reliance statements again, but modified the wording to assess participants' level of reliance on the parent to whom they were emotionally closest. The same statements were modified again to assess participants' level of reliance on the pet to which they have felt closest, followed by the best friend, significant romantic other, and marijuana. Next, participants responded to the Social Interaction Anxiety Scale and a self-esteem measure. Results revealed that young adults' attachment levels to their phones might exceed their attachment levels to most people in their lives, and this finding held true across race and gender in our sample. Participants ranked their romantic partners as their top attachment objects immediately followed by their cell phones. Next, participants ranked their attachment highest with their best friends, parents, and pets. Attachment to marijuana among users was ranked lowest. This ranking might reflect social desirability; however, many adults admitted their marijuana use and reported fairly high levels of drug attachment. The more attached users were to the drug, the more they relied on their cell phone and the less connected they were to significant others. These findings suggest that attachment to one object or person can impact attachment to others.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleigh, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Sleigh)*

## “Nicholas Delight”

### Student: John Robinson

The plot of this short story focuses on an adolescent character named Nicholas Hurts who has a habit of eating for pleasure. One day, he eats one too many treats (a large cake for a huge wedding that was purchased by a wealthy man) which will have its own consequences. At the end of the story, Nicholas reaches a dark fate; he is eaten after being turned into the cake he previously ate. Under the surface, this story attempts to address the issue of overeating and also to dissuade individuals from unhealthy indulgences, such as overconsumption, by providing a vivid, exaggerative picture of severe consequence. In addition to the focus on overconsumption, this short story also tackles the idea of masculinity and how it can have severe consequences in today's society.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Siobhan Brownson, Ph.D.*

*CAS – Department of English*

## Young Adults' Humor Judgments, Prejudice, and Experience with Discrimination

### Students: Janei Bethea and Markael Dodd

We investigated adults' perceptions of humor by having them evaluate humorous, but perhaps offensive, memes. We hypothesized that participants who experienced more discrimination would rate the memes as more offensive and less humorous. We also hypothesized that Caucasian participants and men would find the cartoons to be more humorous and less offensive. Participants were 73 young adults (80% women; 53% Caucasians) with a mean age of 21.63 ( $SD = 6.25$ ). Participants encountered seven memes making fun of different racial groups (African American, Mexican, Jewish, and Caucasian people), bosses, the cartoon viewer (i.e., the participant), and missing a day of school. After each meme, participants evaluated the humor and offensiveness. They also indicated how humorous the average person, their parents, and the targeted group would find the meme. Participants then responded to the Everyday Discrimination Scale and the Symbolic Racism 2000 Scale. Results revealed that adults evaluated racially prejudiced humor to be less funny and more offensive than other humor. It is unclear whether this finding reflects actual attitudes or social desirability. Participants whose scores revealed higher levels of prejudice were less offended by the memes. Prejudicial views were more predictive of how people evaluated cartoons than was personal experience with discrimination. Perhaps not surprisingly, race was more influential than gender and age in determining how adults responded to the racially charged memes. These findings add to our understanding of how personal characteristics impact cognitive appraisals of humor and may be of interest to researchers focused on either humor or prejudice.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, CEPO Undergraduate Research Award, SEPA Annual Meeting, March 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Sleight)*

## Personality, Race, and Knowledge Predict Political Ideology and Adherence

### Student: Kalea Young-Gibson, McNair Scholar

We examined whether personality traits that have previously been linked to the “Dirty Dozen,” such as empathy, directly impact political beliefs. We also examined the role of knowledge in political attitudes and voting. Adults ( $n = 126$ ; 56% Caucasian; 88% women) responded to scales to assess empathy, academic entitlement, self-esteem, and the “Dirty Dozen.” Participants also responded to a knowledge scale about the American government, provided their political affiliation, reported their voting behaviors, and rated their agreement with Republican and Democratic platform issues. Last, participants ranked five government-protected liberties from most to least valuable. Results revealed that personality variables impact political beliefs, with entitlement as more predictive than empathy or darker personality traits. For example, entitlement predicted political inflexibility, voting by gut instinct, and lower political knowledge; entitlement did not predict party affiliation. Adults high in empathy agreed more with a democratic platform and valued the right of petition. Knowledge predicted increased value placed on the idea of voting, but not increased voting behavior. Democrats agreed more with their party's platform than did Republicans; however, adults of both parties failed to strongly agree. Compared to Democrats, Republicans had higher political knowledge scores; however, political knowledge across groups was low ( $< 50\%$ ). These findings further emphasize the fact that political attitudes and behavior are complex and multiplicatively determined.

*McNair Scholars Conference, Florida International University, October 2018; Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*2<sup>nd</sup> Place, Social Sciences Oral Presentations, McNair Scholars Conference, Florida International University, October 2018*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

## Dynamics of an HIV-1 Virotherapy Model

### Students: Connor Hennessy, Mary McBride, and G. Tarque

In this project, we consider the dynamics of the HIV-1 virus under the effects of virotherapy and an immune response. We calculate basic reproductive ratios for the HIV-1 virus and recombinant virus, and use these ratios to establish existence and stability criteria for disease-free, single-infection, and double-infection equilibria. We utilize Lyapunov functions to prove the global asymptotic stability of the disease-free and single-infection equilibria. For the double-infection equilibrium, we explore its stability through numerical simulations and provide evidence of a Hopf bifurcation. We conclude with a discussion on the effects of using a recombinant virus to control HIV-1-infected cell populations.

*UNCG Regional Mathematics and Statistics Conference, Greensboro, North Carolina, November 2018*  
*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentors: Kristen Abernathy, Ph.D., and Zach Abernathy, Ph.D.*

*CAS – Department of Mathematics*



## Young Adults' Resilience and Emotional Reactions to Life Situations

**Students: Micayla Kelleher and Colleen Vaughn**

We examined adults' responses to a variety of life events, specifically comparing the emotional reactions of those who experienced the event to those who imagined it. We also examined whether resiliency reduced emotional responsiveness to the events. Participants were 108 young adults (78% women; 53% Caucasian) with a mean age of 21.10 ( $SD = 3.24$ ). Participants were presented with eleven life events and asked to indicate if they had personally experienced the event or not. Participants who had not experienced the event were instructed to imagine experiencing the event. Next, participants reported how they would respond/cope with the event and how their parents did (or would) respond. Participants also responded to the Devereux Adult Resilience Scale. The frequency with which our participants experienced the life events matched what is typical for young adults (e.g., a break-up was more common than a serious medical condition). We found that people emotionally recovered from difficult situations that others imagined they would not be able to survive (e.g., physical abuse, parental divorce, job loss), suggesting that anticipatory fear might be greater than reality and emphasizing the ability of humans to overcome challenging life situations. Only the experiences of losing a pet and ending a serious romantic relationship were worse than imagination. People high in resilience believed that they handled life events better than others, although their actual responses were no different. Gender predicted emotional reactions more than age or race. These findings add to our understanding of young adults' typical experiences and emotional coping.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Sleight)*

## A Time Delay Model of Immune Response with Drug Resistance in Tumor Cells

**Student: John Brotemarkle**

Drug resistance, also known as multidrug resistance (MDR), is the leading cause of chemotherapy failure in treating cancer. This drug resistance in cancer cells can be transferred from resistant cancer cells to sensitive cancer cells. Sensitive cancer cells can become resistant through three main methods: direct cell-to-cell contact with resistant cancer cells, through a membrane, or through exposure to the treatment drug. In our project, we take into account the transfer of drug resistance from resistant to sensitive cancer cells via direct cell-to-cell contact. We then introduce an immune response and chemotherapy, and establish conditions on treatment parameters in the resulting system to ensure a globally stable cure state. We provide evidence of a limit cycle and conjecture the existence of a Hopf bifurcation. Furthermore, we consider the effects of a delay on the immune response and numerically demonstrate how such a delay can cause further bifurcations of internal equilibria.

*UNCG Regional Mathematics and Statistics Conference, Greensboro, North Carolina, November 2018*  
*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentors: Kristen Abernathy, Ph.D., and Zach Abernathy, Ph.D.*

*CAS – Department of Mathematics*

## Predictors of Frequency and Type of Social Support Seeking in Response to Stress

**Student: Marissa McNeace, McNair Scholar**

An extensive body of research has documented that social support is a powerful resource that buffers individuals from stress, promotes mental and physical health, and facilitates optimal functioning. Comparatively little research has been directed at mechanisms for requesting help through the process of social support seeking. Traditionally, social support has been exchanged through face-to-face interactions. However, alternate means of communication such as social media, texting, and online communities have gained in popularity and may provide alternate venues for support seeking. We conducted a study to explore the relationships between personality, age, and type of stressor on preferences for face-to-face or online support venues. We also investigated how different types and frequency of support seeking relate to well-being. Participants were 136 adults (74% women; 71% Caucasian) between the ages of 18 and 65. We assessed the big five personality factors, subjective well-being, social network size, and support seeking behaviors. Our results revealed less frequent online support seeking compared to face-to-face support seeking. We also found that, while age was negatively associated with support seeking in general, extraversion and social network size predicted more frequent face-to-face support seeking. Individuals were most likely to discuss work/school stress in face-to-face support seeking and least likely to discuss friend/roommate stress in online support seeking. Finally, face-to-face support seeking promoted greater subjective well-being compared to online support seeking. Our findings contribute to the limited literature exploring social support seeking behaviors and factors that influence the amount and type of support sought in response to different stressors.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Donna Nelson, Ph.D.*

*CAS – Department of Psychology*

## The Nutritional Implications of Food In Harry Potter

**Student: Tori Reynolds**

For this paper, I decided to dig deeper into the nutritional implications of food in the Harry Potter series. When reading the books, many people don't seem to catch Harry's poor relationship with food in the beginning. Fortunately, he grows a better relationship with food and pulls himself out from malnutrition and a potential protein deficiency. There were many factors that contributed to Harry's poor relationship with food, including his so-called caregivers' relationships with food, the way he was treated and punished, and the Hogwarts eating routine. Moving out of the Dursleys' house and attending Hogwarts is what essentially saved Harry Potter and transformed him into the healthy, athletic wizard he is at the end of the series.

*The World of Food Interdisciplinary Conference, Winthrop University, February 2019*

*Faculty Mentor: Leslie Bickford, Ph.D.*

*CAS – Department of English*

*(ENGL 200 – Bickford)*

## Analysis of Mentorship in a Structured Undergraduate Program

**Student: Ta’Niss Robinson, McNair Scholar**

We examined mentorship in a structured undergraduate program from the perspectives of the undergraduate protégés. We examined the mentorship-protégé interactions and protégé satisfaction levels. The structured program that was the focus of this study was the Ronald E. McNair Scholars program, a scholarship program that provides support and resources for first-generation, low-income, or underrepresented students in higher education. Through the program, undergraduates conduct research in order to increase their competitiveness for graduate studies. McNair Scholars across the United States are paired with mentors, faculty, or advanced graduate students, who guide them through this research experience. McNair Scholars were recruited nationally for this study. Thirteen current McNair Scholars completed a very extensive online questionnaire, which included published scales and open-ended response options to assess variables such as acceptance, challenge, coaching, counseling, friendship, psychosocial support, protection, exposure, role modeling, social support, career support, and satisfaction. The published scales included the following: Mentoring Functions Questionnaire, Mentoring Role Instrument, Satisfaction with Mentor Scale, and Mentoring Functions Scale. We found that protégés appreciate professional guidance from their mentors rather than social friendships. Undergraduate protégés are not looking to replace their parents, but instead seem to desire mentors who can help them prepare for their careers and transition to being young professionals. These findings are noteworthy because the McNair Scholars in our study selected their mentors; instead of seeking the most comfortable social relationships, the Scholars seem to have prioritized preparation for the future when picking a mentor.

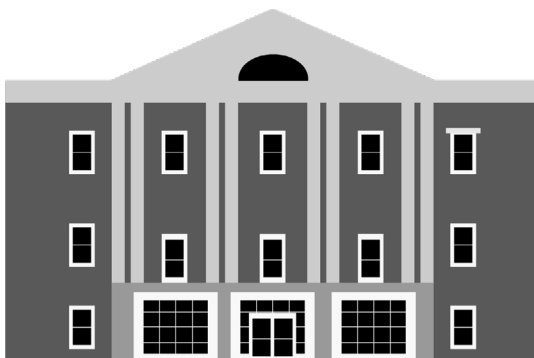
*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*1<sup>st</sup> Place, Social Science Oral Presentations, SAEOPP McNair/SSS Scholars Research Conference, June 2018*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Darren Ritzer, Ph.D.*

*CAS – Department of Psychology*



## Effect of a Single Bout of Yoga on Self-Esteem, Self-Efficacy, and Happiness of College Students

**Student: James White III, McNair Scholar**

The purpose of this study was to determine the effects of a single bout of yoga on happiness, self-esteem, and self-efficacy for exercise in a volunteer sample of 25 college students from a public university in the southeastern United States. Previous research explored long-term effects of yoga on mental health, but the effects of a single bout of yoga are unclear. Volunteers from a summer-session yoga course completed 26 items on demographics, happiness, self-esteem, and self-efficacy for exercise before and after their first 30-minute yoga session. Dependent *t*-tests showed no significant differences in pre- and post-test scores of measured variables: % happy ( $M = 62.7$ ;  $M = 62.9$ ;  $p = -0.031$ ), % unhappy ( $M = 23.2$ ;  $M = 25.1$ ;  $p = -0.442$ ), % neutral ( $M = 33.5$ ;  $M = 30.6$ ;  $p = 0.459$ ), self-esteem ( $M = 28.8$ ;  $M = 29.6$ ;  $p = -0.362$ ), self-efficacy to exercise ( $M = 16.0$ ;  $M = 17.4$ ;  $p = -1.077$ ). Although no significance was found, future research should focus on the impact of yoga (both single-bout and long-term effects) on health variables in a larger sample and within diverse populations. Future research should also consider the effects of other exercise protocols, including steady-state aerobic, high-intensity interval training, and resistance training.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Southeast American College of Sports Medicine (SEACSM) Annual Meeting, Greenville, South Carolina, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

## Clocking In for the Long Shift

**Student: R. Grey Atkins**

Enter a restaurant. Walk past the host stand. Ignore the proffered menu. Walk through the crowded wake of white linen shrouding dark tables. Bull towards the restroom. Do not stop to admire the gallery of good bites framed in white china. Pass beyond the pale. Crash through the door into the kitchen. Dodge the flying knives, the popping oil. Do not stop to shout insults with the dripping cooks. Go one further. Bang through the escape-hatch door. That is where the story happens. Out with the bloated dumpsters, the beach of cigarette butts, the sun that you swear is not the same sun from before. That is where you start clocking in for the long shift. This flash fiction piece asserts that the small moments of mundane life are important, even momentous. In an age when the literary audience is no longer comprised solely of the elite, the heroization of the prince, the epic hero, or the demigod is no longer congruous. Focusing on the extraordinary in the mundane, this story explores the beauty of the dish-washers, the nearly-homeless, and the invisible.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Dustin M. Hoffman, Ph.D.*

*CAS – Department of English*

*(WRIT 307 – Hoffman)*

## Abelard and Heloise: A Marriage of Minds

### Student: Abby Hieber

The scandal surrounding Peter Abelard and Heloise's love story has eclipsed the depth of their individual intellects. Their story is so fantastic that many scholars devote their writings to the couple's overly eroticized narrative; so much so that when the average individual hears the names of Abelard and Heloise, he or she more readily connects their persons to a fiery, twelfth-century tale of lost and forbidden love rather than the weighty, intellectual substance behind their relationship. After the condemnation of Peter Abelard and after Heloise commissioned herself into a convent, the relationship between tutor and tutee remained alive through an exchange of letters, liturgical music that Abelard composed for Heloise, and a quiet respect and love for one another's intellectual value. The true wonder of Peter Abelard and Heloise was, surprisingly, not their physical love story, but their individual intellects, which were the foundation of their relationship. Abelard formulated philosophical theses decades before some of the great philosophical giants, becoming one of history's most undervalued philosophers. Heloise was one of the most intellectually refined and well-read women in medieval history, whose personal writings reveal her scholarly prowess. Though their story has been adopted under the genre of a romance, this categorization falls short in conveying the highbrow substance of Abelard and Heloise, whose promiscuous beginnings have distracted historians from the intellectual wealth that was seemingly the foundation of their longstanding relationship.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Gregory Bell, Ph.D.*

*CAS – Department of History*

*(HIST 590 – Bell)*

## Investigating Spectator Motivations to Attend College Basketball Games: Comparison Between Age Groups

### Student: Alya Murad

The ability to attract attendees to performances is vital to the success of a university or sport organization. As a result, practitioners and academics made attempts to investigate motivations that drive fans to attend sporting events. The purpose of this research was to examine how different motivation factors impact and drive two different age groups to college basketball games. Previous studies have analyzed student motivations, but have not examined potential age-related differences. Utilizing an online survey, data were collected on demographics and 16 different motivation factors; t-tests were conducted for data analysis, comparing responses for younger (ages 18-23) and older (ages 24 and up) generations. Results indicated that the younger generation was drawn to college basketball games mainly because of the in-game entertainment, socialization, overall atmosphere, and promotions/giveaways. On the other hand, the older generation was motivated to attend the game because they had more knowledge about basketball and its statistics, and nostalgia. Based on these results, sport practitioners can utilize necessary motivators to create effective marketing strategies based on segmenting target markets for college basketball games.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinwook (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## Knowledge, Personality, and Race Predict Perceptions of Gun Control and School Shootings

### Student: Jasmine Goode, McNair Scholar

In the United States, 288 school shootings have resulted in injuries in the past nine years. Thus, we examined attitudes about school shootings, blame, and gun reform. We assessed whether gun law attitudes can be predicted by (1) gun law knowledge, (2) the personality traits of aggression, empathy, and entitlement, and (3) race. Participants ( $n = 122$ ) were adults, primarily women, with a mean age of 26.68 ( $SD = 11.93$ ). Fifty-one percent were Caucasian, 35% were African American, and the remainder reported other ethnicities. Participants responded to scales to assess aggression, empathy, entitlement, gun law knowledge, and attitudes toward school shootings. Results revealed that knowledge, personality, and race predicted gun law attitudes, with knowledge and race emerging as more influential variables than personality, but the patterns were not linear. Caucasians had higher empathy scores (related to gun restriction) but supported more lenient gun laws, while African Americans had higher entitlement scores (related to self-protection) but supported stricter gun laws. In a similar contradiction, individuals high in knowledge and entitlement showed some support for flexible gun laws; however, they also advocated for strict gun restrictions for anyone diagnosed with a mental illness. Aggression and knowledge both predicted support for guns, but perhaps for different reasons, as only knowledge related to owning more guns. Gun owners were informed about current laws, which may reflect a responsible and experiential component of gun support. Conversely, aggressive individuals did not own more guns, but knew about gun laws and supported the NRA.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

## Play Ball! Predicting Baseball Players' Salaries Using WAR and Other Variables

### Student: Olivia Greathouse

In Major League Baseball, Wins Above Replacement (WAR) is a measure to determine how many wins a baseball player could contribute to the team in comparison to a replacement player. It is considered a highly debatable topic among baseball fans to determine its role in understanding how well a baseball player is performing. In this research, we will statistically analyze the variable WAR and its relationship with baseball players' performance. This study focuses on studying the 2017 reported baseball players' salaries as a dependent variable with the WAR measure and other performance measures as predictor variables.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Duha Hamed, Ph.D.*

*CAS – Department of Mathematics*

*(MATH 471 – Hamed)*

## Stress Reactions in College Students: How Stressors Affect Psychological and Physiological Reactions Based on Personality Traits

**Students: Erin Streetman, Vanesha Paul, Jasmin Harrell, and Emily Gillespie**

College students are met with many stressors that can affect their everyday life as well as their academic performance. The current study examined the relationship between personality traits and stress factors in college students. A sample of 100 college students took part in an online survey which measured personality traits, including minority stress, extraversion, femininity, and masculinity, and stress reactions to specific stressor events, such as college examinations or being called on in class. We found that, overall, college students reacted to the given stressors with high-threat emotions, primarily anxiety. We were unable to connect stress reactions to specific personality types, which may be due in part to the limitations of our study, such as the fact that our sample was primarily female. These limitations could skew our measures of personality and therefore would not correlate to specific stress reactions due to a lack of representation for a variety of personality types. These findings suggest that college students, as a whole, are likely to respond to everyday stressors with high-threat emotions such as anxiety and fear. Later research should focus on a wider participant pool and the possibility of connecting the constructs of attitudes and confidence to stress reactions in order to obtain a more general and dynamic approach to the study.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Collins)*

## Toward a Game Analogue of Brooks' Theorem

**Students: Chris Chamberlin and Jacob DeCapua**

A graph is a collection of vertices and edges. A proper coloring of a graph is an assignment of color to each vertex so that no edge has the same color on both ends. One major result in the study of graph coloring is Brooks' Theorem, which bounds the number of colors required to properly color a graph by the maximum number of edges at any of its vertices. Shifting gears, consider the following game played by Alice and Bob on a graph. The players will take turns (with Alice going first) coloring the vertices from a common color set so that no edge has its two vertices colored the same color (i.e., after each player's turn, the partial coloring is proper). Alice wins if the entire graph is colored and Bob wins otherwise. Thus the question: given a graph  $G$  and a color set  $C$ , who has a winning strategy (i.e., can win independently of the other player's moves)? This problem was introduced in the 1980s and is a direct generalization of graph coloring. In this talk, we will discuss progress toward obtaining an analogue in the game coloring setting of Brooks' Theorem.

*UNCG Regional Mathematics and Statistics Conference, Greensboro, North Carolina, November 2018*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Arran Hamm, Ph.D.*

*CAS – Department of Mathematics*

## On Game Chromatic Number: Mycielskians

**Students: Hannah Elser and Dana Gerraputa**

A graph is a collection of vertices and edges. A proper coloring of a graph is an assignment of color to each vertex so that no edge has the same color on both ends. The chromatic number of a graph is the least number of colors that must be used in order for the graph to have a proper coloring. The Mycielski construction on a graph results in a new graph which requires one additional color to properly color. Shifting gears, consider the following game played by Alice and Bob on a graph. The players will take turns (with Alice going first) coloring the vertices from a common color set so that no edge has its two vertices colored the same color (i.e., after each player's turn, the partial coloring is proper). Alice wins if the entire graph is colored and Bob wins otherwise. Thus the question: given a graph  $G$  and a color set  $C$ , who has a winning strategy (i.e., can win independently of the other player's moves)? Our work focused on finding a relationship between the game chromatic number of a graph and that of its Mycielskian.

*UNCG Regional Mathematics and Statistics Conference, Greensboro, North Carolina, November 2018*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Arran Hamm, Ph.D.*

*CAS – Department of Mathematics*

## Conservative and Liberal Religious Beliefs Predict Sexual Activity and Politics

**Students: Sydney Strother and Kalea Young-Gibson**

Previous research focused primarily on conservative religiosity; however, many churches now teach liberal tenets of faith. Thus, we examined how different levels of adherence to conservative church theology relate to sexual behavior and political ideology. Participants were 117 young adults (70% women, 55% Caucasian, 78% heterosexual). Participants responded to published scales to assess sexual risk taking, guilt related to sexuality, and political ideology. Participants also rated their agreement with literal interpretations of biblical statements, allowing us to categorize participants according to their adherence to liberal, conservative, or no religious beliefs. Compared to those with liberal religious theology or no religious adherence, participants with conservative religious theology showed clear differences in sexual activity. Adherence to conservative theology predicted more church influence, more guilt, and less risk associated with sex. In contrast, religious theology did not have such a straightforward impact on politics. Compared to all others, participants with a conservative theology were more politically conservative; however, they were just as likely as those adhering to liberal theology to say that the church had influenced those political views. At the same time, those adhering to liberal theology were just as likely as people with no religious adherence to say that the church influenced their political views. In sum, liberal theology predicts different outcomes than conservative theology, with young adults who agree with liberal theology showing greater resemblance to non-religious versus conservatively religious adults. These findings emphasize the fact that adults who consider themselves to be religious are not a homogeneous group.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Sleight)*

## Synthesis and Evaluation of (Dihydroxyphenyl)pyridones as Aggregation Inhibitors for Alzheimer's Amyloid- $\beta$ Peptide

**Students: Mouskudah G. Murray, Brandy L. Crenshaw, Augustine V. Vinson, Benjamin P. Hernandez, and Matthew J. Hurtt**

Amyloid- $\beta$  peptide (A $\beta$ ) self-assembles into neurotoxic,  $\beta$ -structured aggregates, which are the primary component of the extracellular senile plaques characteristic of Alzheimer's disease. A variety of small molecules have been shown to inhibit the aggregation process; typically, these contain aromatic groups and one or more hydrogen-bond donors. Previous studies in our group have demonstrated that biphenyltetrols exhibit varying degrees of efficacy as A $\beta$  aggregation inhibitors. 3,3',4,4'-biphenyltetrol (3,4-BPT) effectively abrogates A $\beta$  aggregation at stoichiometric concentrations (IC<sub>50</sub> ~ 1X); other biphenyltetrol isomers were found to be less effective (IC<sub>50</sub> ~ 2X to >10X), perhaps due to differing abilities to bind to A $\beta$  through hydrogen bonding. Recent modeling studies suggest that binding of small molecules to A $\beta$  may occur via several types of intermolecular interactions, including both hydrogen bonding and  $\pi$ - $\pi$  interactions (i.e.,  $\pi$ -stacking). In addition, other studies indicate that  $\pi$ -interactions between benzene and electron-deficient heterocyclic aromatic rings are stronger than similar benzene-benzene interactions. Based on these observations, we hypothesized that incorporation of a pyridone unit into the above-described hydroxybiaryl scaffold may lead to increased inhibition of A $\beta$  aggregation. We therefore synthesized 5-(3',4'-dihydroxyphenyl)-2-pyridone (**1**) and 4-(3',4'-dihydroxyphenyl)-2-pyridone (**2**) via Suzuki coupling of 3,4-dimethoxybenzeneboronic acid with an appropriate bromomethoxy pyridine, followed by demethylation in aqueous HBr. Evaluation of these compounds using a Congo red spectral shift assay gave preliminary IC<sub>50</sub> values of  $3.3 \pm 0.3X$  for **1** and  $2.9 \pm 0.5X$  for **2**.

*Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, Georgia, November, 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentors: Robin K. Lammi, Ph.D., and James M. Hanna Jr., Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*



## Understanding Altruism: The Effects of Personality and Mood on Altruistic Behavior

**Students: Hannah B. Hough, Caroline Whitehead, Steven Cornacchia, and Ashley Porterfield**

Understanding the motivations behind altruism may be difficult to do because it contradicts aspects of learning theory, such as reinforcements influencing behaviors. Previous research suggests that altruistic behavior could be motivated by personal characteristics, including mood or personality traits. The primary goal of our current study was to add to the understanding of how these factors affect altruistic behavior. One hundred and two individuals (primarily women) were recruited through a convenience sample to participate in our study. Our survey asked people to respond to hypothetical scenarios measuring altruistic behavior, such as moving out of the way of someone on the sidewalk, depending on their own mood, the recipient's mood, and whether or not the other person was distracted by his/her phone. Our survey also measured participants' personality traits, mood, and frequency of altruistic behaviors. Our results revealed that participants were more likely to act altruistically if they were in a positive mood. We also found that agreeableness and intellect/imagination (also known as openness) significantly predicted altruism toward friends and acquaintances, and agreeableness significantly predicted altruism toward strangers. Lastly, we found that participants were significantly more altruistic to friends and acquaintances than other relationships. Our results conclude that mood and personality types can play a role in a person's motivation to perform altruistic behaviors. These findings also suggest that people may also be motivated by what relationships they have with recipients of their altruistic acts.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Collins)*

## Following the Link Between Air Pollutants and Violent Behavior via GIS

**Student: Bradley Ghent**

The murder rate in America spiked to the nation's highest in the 1920s and mid-60s to 70s. With hindsight, we can now see that this was heavily influenced by America's use of lead in paint, which poisoned the body, causing a shift to violent behavior, amongst other things. Lead has since been banned from paint, but that does not mean the environment is free from behavior-changing hazards. PM<sub>2.5</sub> particulates have been shown to alter brain structure and neural patterns, and to induce violent behavior in adolescents. This research will examine whether the trend of violent crimes in Cook County, Illinois, is in any way related to the production of PM<sub>2.5</sub> particulates. To do this, using geographic information systems, we will gather data from air quality stations in major cities of the United States over a range of 17 years and cross-examine with the trend of violent crimes in the county.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

## “Is the wine included?": A Study of Feasting, Drinking, and Self-Indulgence in Ernest Hemingway's *The Sun Also Rises*

**Student: Lauren Leonard**

In his 1926 novel *The Sun Also Rises*, Ernest Hemingway exemplifies the growing social trends of self-fulfillment and leisure in postwar Europe through the use of food and drink, with a special focus on alcohol. Throughout the book, Hemingway showcases how the novel's central characters choose to indulge in food and spirits, particularly within the café culture of Paris and in the elaborate fiesta scenes in Pamplona, to illustrate the “culture of excess” and the emphasis on indulging oneself that was characteristic of the 1920s in both Hemingway's American culture and the European world the novel describes. At the same time, however, Hemingway's extensive use of food and drink in the novel also serves to critique society's dependence on pursuing self-indulgent pleasures, for throughout the novel the characters' drinking to excess and feasting on European cuisine do nothing to avert the group's social and romantic tensions or its sense of disillusionment with the world following the First World War. The purpose of this paper is to explore the role that food, drink, and spirits serve in the novel's characterization and plot development, as well as its overall significance to the book in historical and cultural contexts.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019*

*Faculty Mentor: Leslie Bickford, Ph.D.*

*CAS – Department of English*

*(ENGL 300 – Bickford)*

## Predictors of Motivation to Coach in High School Students and Adult Coaches

**Student: Alyssa M. Nelson**

We explored the extent to which positive and negative experiences during high school (HS) extracurricular activities predicted engagement, burnout, and motivation to coach. Sample 1 included 106 recent HS graduates (77% women; 65% Caucasian). Sample 2 included 50 adult sports coaches (54% women; 84% Caucasian).

We questioned participants about their HS experiences and the coaching/mentoring they received. Those who invested in a HS sport focused on that sport (56% students; 89% coaches), while the remainder focused on an alternate activity (e.g., marching band). All participants responded to scales to measure positive and negative events experienced during extracurricular participation, as well as scales to assess burnout, engagement, and motivation to coach. Results revealed that HS students who identified with and were engaged in their extracurricular activity demonstrated a stronger motivation to be a coach in the future. Events associated with their extracurricular activities did not influence recent graduates' motivation to coach. In contrast, the adult coaches' positive interpersonal and negative performance events from high school influenced their motivation to coach. The coaches' data seemed to suggest that their coaching motivation was less tied to their personal identification and more linked to past experiences, including those connected with impactful coaches. Coaches with other-focused motivation, driven by past experiences, were vulnerable to experiencing burnout and amotivation. In conclusion, the quality of high school extracurricular experiences has implications that extend into adulthood. Our findings add to the limited research that explores the antecedents and consequences of coach-specific motivation.

*Eastern Psychological Association Annual Meeting, New York, New York, March 2019*

*Faculty Mentors: Merry Sleight, Ph.D., and Donna Nelson, Ph.D.*

*CAS – Department of Psychology*

## Interracial Dating on College Campuses: The Associations Between Race and Gender

**Students: Haley M. Whitman and Angel G. Salley**

We hypothesized that interracial couples would be perceived more negatively than same-race couples, that survey participants would find those of the same race more attractive, and that they would be more willing to date within their race. Our participants were from a convenience sample of 77 females, 22 males, and 3 non-binary individuals, most of whom attend Winthrop University. Most (64%) were between 18-24 years of age. We displayed a photo of an interracial couple and measured perceived levels of commitment, satisfaction, and physical intimacy. Next, we showed a same-race couple and measured the same variables. Then, we displayed a series of photos of similarly attractive people and asked the participants to rank their attraction to each photo along with their willingness to date the person photographed. Then, we asked for the background of the participants, including their numbers of interracial and same-race relationships. Finally, we asked a series of demographic questions measuring gender, race, and age. Statistical tests showed few significant differences between perceived attributes of photographed interracial versus same-race couples, with the exception that the woman in the interracial relationship was perceived to have a higher commitment level. Analyzing responses to photos of attractive people, we found that black participants were more attracted to and willing to date the black man than were white participants; white participants were more willing to date the white and Asian women than were black participants. In conclusion, perceptions of interracial relationships are not very different from those of same-race relationships, but people's dating behavior and attraction are still primarily within race.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tara Collins, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Collins)*

## A Mathematical Model for Controlling the Spread of Cholera through Disinfection, Vaccination, and Quarantine

**Student: Olivia Greathouse, McNair Scholar**

Cholera is a water-borne gastrointestinal disease that poses major health concerns and can be fatal. The spread of cholera can be controlled with proper treatment and prevention methods. In this talk, we present a mathematical model for the spread of cholera throughout a population, with basic control strategies of disinfection, vaccination, and quarantine. For our proposed model, we calculate the basic reproductive ratio,  $R_0$ , and prove global stability of the disease-free and endemic equilibria based on the value of  $R_0$ . We conclude with numerical simulations and a discussion of the effectiveness of the control strategies on the spread of cholera.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentors: Kristen Abernathy, Ph.D., and Zach Abernathy, Ph.D.*

*CAS – Department of Mathematics*

## Parenting Events Differentially Impact High School Athletes and Non-Athletes

**Student: Alyssa M. Nelson**

We explored the extent to which positive and negative experiences with parents during high school extracurricular activities predicted students' engagement, burnout, and desire to mentor. Participants were 106 recent high school graduates (77% women; 65% Caucasian). Those who invested in a high school sport (56%) focused on that sport, while the remainder (44%) focused on an alternate activity (e.g., marching band). We assessed burnout, engagement, willingness to mentor, and positive and negative parenting events related specifically to the sport or activity. Results revealed that high school students' experience of parenting events during their extracurricular activities impacted the quality of their participation. Parents emerged as more influential factors for non-athletes than for athletes in terms of engagement, identification with their after-school activities, self-esteem associated with the activities, and desire to mentor in the future. Compared to non-athletes, athletes may be less subject to parental influence because of the significant role played by other social agents in the sports arena. For example, coaches play a vital role in athletes' sport experiences, and peer support has been widely documented to be a significant resource for student athletes. Our results also suggested that the parents of athletes may be providing a qualitatively different type of support. Athletes reported experiencing equal levels of both positive and negative parental feedback, whereas non-athletes saw their parents as being either positive or negative. This study adds to what is extensively documented about adolescent athletes by comparing them to teens who are deeply invested in non-athletic extracurricular activities.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019*

*Faculty Mentor: Merry Sleigh, Ph.D.*

*CAS – Department of Psychology*

## Effects of Assimilation among Second-Generation Immigrants in the United States

**Student: Alicia Bouchard**

This documentary film will investigate linguistic and cultural assimilation of second-generation immigrants in the United States. I have observed that many individuals born to immigrant parents have either chosen not to, or been denied the option to learn the native language of their parents' countries of origin. In a 2002 study, Richard Alba theorized that by the third generation, the native language is predominantly replaced by English within the home. In *Aria: Memoir of a Bilingual Childhood* by Richard Rodriguez, the author shares feelings of guilt associated with linguistic and cultural acculturation. I want to see if this assimilation into American culture has affected individuals' relationships to their families. Have they had difficulties, or been unable to communicate with their relatives or close family? Do they have regrets, or are they content with their inability to speak their parents' native languages? I will be asking these questions of several Winthrop students who come from first-generation families and do not speak their parents' native tongues. This project will allow me to uncover the complex nature of some of these students' individual experiences, and bring a greater understanding to the effects of American linguistic and cultural assimilation on second-generation immigrants.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Anna Igou, Ph.D.*

*CAS – Department of World Languages and Cultures*

*(FREN 360 – Igou and Burmeister)*

## Using Deletion Mapping to Locate Mutagen-Sensitivity Gene *mus305* in the *Drosophila melanogaster* Genome

**Student: Jordan DeLoach**

All organisms experience DNA damage, and a variety of DNA repair mechanisms exist to combat this damage. The goal of this research was to localize the DNA repair gene *mus305* in the *Drosophila melanogaster* genome. To localize *mus305*, complementation analysis was conducted using three deficiencies while assaying for mutagen-sensitivity. Specifically, two broods were created by crossing virgin female flies containing a known allele of *mus305* to male flies containing one of three deficiencies. Brood 1 offspring were treated with water, which acted as the control, while Brood 2 offspring were treated with MMS. Progeny were scored, and then percent relative survival was calculated as the ratio of mutant to control flies in Brood 2, normalized to the same ratio in Brood 1. These data were used to narrow the potential genomic location of *mus305*. A candidate gene was identified in this refined region, and current research is focused on sequencing this gene in *mus305* mutants.

*Annual Drosophila Research Conference, Dallas, Texas, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Kathryn Kohl, Ph.D.*

*CAS – Department of Biology*

## Inclusion in Recreation

**Student: Brian Rittenberry**

The purpose of this research is to bring the issue of a lack of inclusion in recreation facilities for individuals with disabilities and members of the LGBTQ community. There are obvious psychological benefits that come to fruition when inclusion is broadly practiced and promoted. While it is mandatory for facilities to have handicapped-accessible features and amenities, there is little to no legislation and few effective policies to promote inclusion of all community members. The data for this paper came from scholarly, peer-reviewed studies published in notable journals in the field of recreation. The issue of inclusion for people with disabilities and members of the LGBTQ is typically a social issue; as a result, the studies done on this topic consist primarily of qualitative data in the form of questionnaires and interviews. Findings from these studies show that most recreational facilities face constant budget cuts, which reduce their willingness to spend on inclusion services; however, many facilities are willing to actively practice inclusion if financial assistance is available. Studies also show that recreational facilities with policies in place for inclusion are often undermined and sabotaged by their own employees ignoring said policies. Limitations of this research include a lack of quantitative data and the relative newness of the issue, considering that individuals with disabilities and members of the LGBTQ community have only recently begun to gain acceptance. In terms of its implications, this research strives to explain the need as well as the right for the LGBTQ community and individuals with disabilities to be included in sport and recreation. With more inclusive policies, recreational facilities will be able to build much stronger communities with the health of everyone in mind.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Ginger Williams, Ph.D.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490 – Williams)*

## Parents' Body Image Across Time Predicts Adult Children's Body Image

**Students: Victoria Newman, Michaela Buttel, and Brianna Brickle**

We examined how young adults perceived their parents' body image during childhood and currently, and also how parental body image and parent-child relationship quality related to young adults' body image. Participants ( $n = 108$ ) were young adults with a mean age of 20.40 ( $SD = 2.66$ ). Fifty-three percent of participants were Caucasian, and 74% were women. Participants responded three times to the Body Appreciation Scale: once from their own perspective, once from the perspective of the participant's closest parental figure regarding his/her own body while the participant was a child, and once from the same parent's current perspective on his/her own body. Participants also responded to the Parental Attachment Questionnaire and additional researcher-created questions to assess family exercise levels and critical body attitudes. Results revealed that parents who felt positively about their own bodies had children who felt positively about their bodies. Adult children were influenced by the way their parents viewed their own body when the participants were children, but even more so by how their parents viewed their own bodies currently. Children of parents who were critical of other people's bodies felt especially vulnerable to their parents, impacting their body image. The quality of relationships between adult children and their parents did not affect the adult children's body image; however, the quality of parental relationships predicted how parents modeled body image. When parents modeled a healthier body image, their children described the relationship as supportive and affective. Parents' attitudes about their own bodies can influence their children into young adulthood.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Sleight)*



## Petunia Dursley and Molly Weasley: How Food is Used as a Measurement for Love

**Student: Lily Barfield**

The purpose of this paper is to highlight the similarity that Petunia Dursley and Molly Weasley have in how they show their emotions through their use of food and mealtimes. The paper shows how these two matriarchs, though they seem to be mere opposites of one another, share a key similarity in how they express emotions that is pivotal to the reader's perception of them. My thesis is that, in contrast to the common argument that Molly and Petunia are solely opposites, with the given evidence of how they project emotions with food, the two share key characteristics and should be perceived as more than just opposites of one another. Using sources such as Barbara Fiese's article that looks into the importance of family gatherings around the table at mealtimes, as well as how a healthy child is fed in relation to the happiness felt in the home, this paper shows how greatly the drastic change in Harry Potter's home life affect his health, the importance of stability and health in young children, and how it affects them as teenagers and adults. It also looks into the proverbial phrases that help Harry establish trust within the Weasley family, as Haas argues in her article titled "The Wisdom of Wizards-and Muggles and Squibs: Proverb Use in the World of Harry Potter."

*World of Food Interdisciplinary Conference, Winthrop University, February 2019*

*Faculty Mentor: Leslie Bickford, Ph.D.*

*CAS – Department of English*

*(ENGL 200 – Bickford)*

## Assessing Latin American Development

**Student: Savanna Bannio**

What are the best ways to assess Latin American development? Many Latin American countries started out in the same underdeveloped situation, but some flourished into developed countries while others have stayed underdeveloped or are backsliding to becoming underdeveloped once again. There are many ways to assess development that give only a snapshot of a country's level of development. Depending on how they are assessed, countries may appear to be developed even when they lack key fundamental aspects of a developed country. The best way to gain an overarching view of a country's level of development is through an interdisciplinary approach, focusing on economic development, human rights development, and status with regard to external and internal peace. The three indexes used to measure these aspects of development are the Index of Economic Freedom (IEF), the Human Development Index (HDI), and the Global Peace Index (GPI). Rankings of developed countries vary between these three indexes; for example, some rank Peru as more developed than Brazil, while others claim Brazil to be more developed. The IEF focuses more on government freedom and development compared to the freedom that citizens experience; the HDI focuses on the wealth, health, and education of a country; and the GPI focuses on external and internal peace within a country. This paper will focus on a geographical and historical perspective with a touch of educational theory to demonstrate the best way to teach this topic.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Ginger Williams, Ph.D.; Margaret Gillikin, Ph.D.; and Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490 – Williams)*



## Understanding the Perceptions of Dry Needling in NCAA Division I Athletes

**Student: Shemeika McCray,**  
*McNair Scholar*

Dry needling is a pain management and recovery method that is becoming more popular despite the dearth of published literature on its effectiveness. The aim of this study was to examine the perceptions of dry needling for muscle pain management and/or recovery among NCAA Division I athletes. Seventy-seven NCAA Division I athletes completed a 15-item survey via e-mail. Participants who had experienced dry needling were asked to rate the perceptions of that experience. Those who had not experienced dry needling were asked to rate their perceptions and reasoning for non-exposure. The frequencies and descriptive perceptions of dry needling exposure or non-exposure were analyzed. The results indicated that 66% ( $n = 51$ ) of participants did not have experience with dry needling, while 34% ( $n = 26$ ) did have experience with dry needling. Those athletes not exposed to dry needling reported that they would rather use other treatments (26%); they were concerned with pain or bruising (13%); or they were not sure it would work for recovery (22%). Athletes who experienced dry needling reported that dry needling was effective and comfortable for efficient and speedy recovery (61%). They also reported that they would recommend that others use this recovery treatment (50%). In conclusion, for many athletes, dry needling is an effective treatment for muscle pain management or recovery. For other athletes, recovery treatments, such as massage therapy, electrical stimulation, and ultrasound are preferable. Future research could compare treatment protocols for pain management and/or recovery effectiveness.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Southeast American College of Sports Medicine (SEACSM) Annual Meeting, Greenville, South Carolina, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

## Quantification of Microplastics in the Catawba and Pee Dee River Basins

**Student: Chasity Moore**

Plastic pollution has become a worldwide ecological and economic issue. Plastic was originally a chemical-based alternative to using finite ecological goods such as wood and ivory. An overproduction of plastic, improper disposal, and faulty recycling practices have caused plastic to be prevalent in the environment at large. Plastic, and more recently, microplastic (plastic pieces smaller than 5 mm) pollution in the marine environment has become a major area of concern due to the occurrence of plastic in the guts of many aquatic species. Most research has been focused on marine microplastics; however, there has been very little research on inland freshwaters. In this study, we focused on the Catawba and Pee Dee Rivers and their tributaries to quantify and sort microplastics in surface water, sediment, and invasive freshwater bivalves, *Corbicula fluminea*. The samples were processed and quantified using the NightSea® fluorescent microscope adaptor. We found that tributaries had significant differences in the quantity of microplastics, and storm flows increased the quantity of microplastics in surface water samples. These data fill previous knowledge gaps in freshwater microplastic research in two of South Carolina's major river basins.

*South Carolina Academy of Science Annual Meeting, Florence, South Carolina, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Cynthia Tant, Ph.D.*

*CAS – Department of Biology*

## University to Work Transition and Career Development

**Students: Reagan Cady, Shadazia Jones, and Dominick Jenkins**

For this project, we examined how Winthrop University and the resources it makes available to undergraduate students were sufficient in helping them feel prepared to transition from college to the workforce. As Iris Yob asserts, the shift from a liberal arts education to a career in the field of study has become an important transition for university education by "taking into account what a student should know, be able to do, and what values and attitudes should be nurtured." To study this issue, we conducted four focus groups comprised of senior students at Winthrop. Drawing from majors across the university, we interviewed 4-6 students per focus group in order to draw a diverse sample of departments. The structure of the focus group allowed us to hear diverse perspectives and observe how students discuss college life with one another. Hosting focus groups generated enough discussion to understand the level of preparedness across the institution. By comparing the focus group data with additional data about career preparation gathered from Winthrop's website, we determined the overall effectiveness of the university's approach to helping undergraduates transition from college into the workforce. Our paper provides insight into Winthrop University's career development program and addresses how well student feel the university meets their needs. It also contributes to the ongoing debate about the changing goals of undergraduate education in the United States.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Michael Sickels, Ph.D.*

*CAS – Department of Sociology, Criminology, and Anthropology*



## The Effect of Semaphorin 3A on Chick Embryo Retinal Growth Cones

**Students: Allison Theresa Reed and Fatoumata Nancy Cisse**

Semaphorin 3A (Sema3A) is a crucial axon guidance cue in the nervous system during embryonic development. Axon guidance molecules interact with growth cones, extensions of growing or regenerating axons supported by microfilaments looking for their synaptic targets, in this case, the brain. Some inhibitory axon guidance molecules are known to cause growth cone collapse; Sema3A is one of them. When growth cones collapse, they cease to move and then retract, often turning away from inhibitory molecules. Sema3A has been shown to be important for axon guidance in the spinal cord. Luo *et al.* (1993) demonstrated that Sema3A causes growth cone collapse of chick embryo dorsal root ganglion cells (DRGs), but they stated that it did not cause growth cone collapse of chick retinal ganglion cells (RGCs). We have found preliminary evidence that Sema3A does cause growth cone collapse of embryonic chick retinal ganglion cells, which is inconsistent with the Luo *et al.* (1993) finding. We are investigating this inconsistency; one hypothesis is that the treatment times in the previous study were not optimal. We are further testing the effect of Sema3A on RGCs using time-lapse microscopy to examine growth cone responses to Sema3A. Furthermore, we are employing a quantitative growth cone collapse assay to investigate the concentration dependence as well as treatment times to verify and extend our preliminary data.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Eric Birgbauer, Ph.D.*

*CAS – Department of Biology*

## Investigation of NFL Fan Perception of Injury Protocol

**Student: Tyler Koch**

In the past five years, the National Football League (NFL) has experienced a significant revolt from fans due to the number of concussions that players have received and the perceived failure of the league to take concussion protocol seriously. The purpose of this research project was to better understand the fans' perceptions of injury protocol and how they impact spectator behavior. Data were collected using a survey that consists of twenty questions (e.g., demographics, fan perceptions of player injury, and spectator behavior). Data analysis indicated that a majority of fans who participated in the survey do not feel that they would decrease their viewing of the NFL. A conclusion was made from this research that if the current issues with player injury continue, sports practitioners will need to utilize this research to better evaluate fans' perceptions in the future. In addition, sport practitioners can adopt the findings from this research to develop better marketing strategies by understanding sports fans' perceptions.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinwook (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## Enantio- and Diastereoselective Preparation of $\beta$ -Hydroxycarbonyls Using *O*-Silyl Protected Cyanohydrins and Epoxides

**Student: Sean Wechsler**

A  $\beta$ -hydroxycarbonyl is formed as a product in the aldol addition, a carbon-carbon bond-forming reaction of great importance. In the aldol reaction, an enolized carbonyl reacts with a ketone or aldehyde. The reaction can potentially create as many as two new chiral centers, and enantio- and diastereoselective control of the reaction is often critical. Useful stereoselective variants of the aldol addition have been developed, each with its own set of drawbacks and limitations. We have developed a new alternative method for the formation of  $\beta$ -hydroxycarbonyls via the reaction of *O*-silylated cyanohydrins with epoxides. Previous research on the project consisted of optimizing the reaction conditions for aryl-substituted cyanohydrins (R = Ar) and determining the scope of the reaction with respect to epoxide and cyanohydrin. Current research has been focused on reacting alkyl-substituted cyanohydrins (R = alkyl). Reaction conditions with an alkyl substituent were optimized to avoid an undesired cyclization of product and retro-Brook rearrangement. A subsurface quenching technique was used alongside 0 °C reaction conditions to discourage formation of the undesired by-products. Silicon protecting groups such as *tert*-butyldimethylsilyl and triisopropylsilyl were explored to examine the effect of the steric bulk of the protecting group on suppressing the undesired side-reactions. After successful epoxide attack on the cyanohydrin, the silicon protecting group was removed using TBAF to yield a  $\beta$ -hydroxycarbonyl.

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an REU grant from the South Carolina EPSCoR/IDEA Program*

*Faculty Mentor: Aaron M. Hartel, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## Romantic Piano Techniques in Franz Liszt's *Liebestraum, 3 Nottornos für das Pianoforte No. 3*

**Student: Donavon Frazier Haskins**

Composer Franz Liszt was born in Raiding, Austria, in 1811. While conducting the Court Orchestra at Weimar in 1850, Liszt transcribed many of his songs and choral works for piano. Shortly after composing a collection of three songs titled *Liebestraum, 3 Nottornos*, he transcribed the songs for piano, showcasing his virtuosic dexterity and extended harmonic vocabulary. The third selection, "O lieb" (O love), is the most adored from the collection to this day, with most admirers using the collection's title, *Liebestraum* (Love Dream), to refer to the third song alone. This study examines how "O love" captures the emotions of a lover's daydreams with the piano alone. The selection includes several cadenza-like motifs in unmeasured rhythm that emulate dancers cascading down romantically. The entire range of the piano is used as the texture quickly shifts from five-octave chords to floating melodies, which represents the full range of emotions one experiences while in love. Liszt also implements extended harmonic progressions to blur the tonic, resulting in a murky, dreamlike sound. These virtuosic techniques come together in "O love" to portray profound emotions that have captured audiences since the transcription's premiere.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Ian Pearson, Ph.D.*

*CVPA – Department of Music*

*(MUST 564 – Pearson)*

## Post-Fire Carbon Assimilation Rates and Specific Leaf Area of Species with Different Post-Fire Recovery Strategies

**Student: Jesse Martin**

Plant species can recover after fire by seed recruitment or resprouting. Top-killed species resprout by redistributing carbon from below-ground reserves to above-ground shoots. We investigated carbon assimilation rates of species with different post-fire recovery strategies and hypothesized that species that recover only by resprouting, and depend solely on their below-ground carbon reserves to persist after fire, would have higher carbon assimilation rates than species that recover by resprouting and/or seed germination. We measured photosynthesis of post-fire resprouts of 11 species in scrubby flatwoods shrublands in Florida. We measured carbon assimilation rates and specific leaf area (SLA) of five to eight individuals of each species in sites approximately 11 months post-fire. We also measured total leaf area of six species (four shrubs and two palmettos). We found a significant difference in carbon assimilation rates among species when measured on a leaf area basis, but differences were not related to post-fire recovery strategy, and carbon assimilation rates were not higher in resprouters. When scaled to total plant leaf area, carbon assimilation rates did not differ between palmetto species, but did differ among shrub species due to differences in leaf area. SLA differed among species, and mean photosynthetic rates were positively correlated with mean SLA across species. Our results suggest that species that depend solely on below-ground carbon to support post-fire recovery do not require greater post-fire carbon assimilation to persist in fire-prone habitats than species that can recover via seed germination and/or that photosynthetic rates may be constrained by leaf-level traits.

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, October 2018; South Carolina Academy of Science Annual Meeting, Florence, South Carolina, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a grant from the Winthrop University Research Council*

*Faculty Mentor: Jennifer Schafer, Ph.D.*

*CAS – Department of Biology*

## SOMOS

**Student: Catalina Zavala Olvera**

In recent years, there have been several pressing political issues, one of which being immigration. From Syrian refugees to the migrant caravan seeking asylum, those affected are from all walks of life; yet they are grouped into a single entity rather than individuals with a story to tell. *Immigrant, migrant, alien, undocumented, illegal* are derogatory and non-derogatory terms used to describe those who come from other places; my work invites the viewer to understand that there is a narrative behind each individual. In a series of posters, I will show the aggressive environment that many immigrants have to endure, the pride of where they came from, and their attitudes in response to hateful comments towards them. Often we aren't able to know what they go through because they do not speak the same language, they're scared; or frankly, they are silenced. It is important that we start to listen and recognize the experience of immigrants.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; Jesse Weser, M.A.; Hannah Maschoff, B.A.; Sydney Wickstorm, B.F.A.; and Sadie Redwing, M.A., University of Redlands*

*CVPA – Department of Design*

*(VCOM 486, 487 – Tselentis)*

## Mapping Mutagen-Sensitivity of *mus111* in *Drosophila melanogaster*

**Student: Miller Barksdale**

*Drosophila melanogaster* is an ideal genetic model organism that has orthologs of roughly 75% of human disease-causing genes. In this experiment I am using MMS, a DNA-damaging agent, to map hypersensitivity using a mutagen-sensitivity assay. I am using this assay in an attempt to locate the mutagen-sensitivity gene *mus111* in *Drosophila melanogaster*. To accomplish this, I will use three different deletion stocks to cross with *mus111* mutant flies. If a deletion uncovers the *mus111* gene, mutagen sensitivity will occur. I will set up 30 vials containing four virgined females carrying one of three deletions and five males carrying the *mus111* allele. From these vials, I will create two broods, one of which will be treated with water and the other with MMS. I will then perform a biological replicate by repeating the experiment before collecting my results to determine if mutagen-sensitivity occurred in any of the three deletions. Results from these experiments will be presented.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Kathryn Kohl, Ph.D.*

*CAS – Department of Biology*

*(BIOL 471 – Kohl)*

## The Legacy of Redlining: Patterns of Contemporary Housing Discrimination

**Student: Joseph Morganti**

Discrimination in the real estate market has been present throughout history. One of the most notable forms of real estate discrimination is the historical practice of redlining. Redlining was a practice used in the 1930s to determine where lenders would loan money for home purchases. Any areas that were within the redlines were deemed to be high-risk areas they would not lend to, creating a pocket of real estate with lower value. Not all the areas of redlining were based on income; some were focused on minority population. The use of redlining has had a lasting effect on the shape and structure of all major cities. It was not until the fair housing act of 1968 that redlining was outlawed. Since then, many programs have been put into practice to create safe and affordable housing. Though many initiatives have been taken to prevent modern discrimination or segregation, minorities still struggle to create social and economic change in these areas that were previously affected by the practice of redlining. Studies have shown that, even eighty years later, these same redlined districts are still worth less in value and underdeveloped compared to the preferred lending areas, some undervalued by 10 times the amount found in those preferred areas. Many areas have further segregated by creating school district zones along these redlined districts, limiting the amount of integration between races.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

## Genomic Annotation of *Microbacterium foliorum* Bacteriophages Rhysand and MonChoix

**Students: Carlos E. Escoto-Diaz, Christine M. Dunn, Erin C. Emiroglu, Amanda J. Foster, Braylan L. Jackson, Nathaniel C. Kidd, Ellery S. McNeill, Savannah A. Scott, Jared T. Small, Allison T. Smith, Allison M. Stanek, and Bethany M. Wise**

In conjunction with the HHMI Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) Program, two novel bacteriophages, Rhysand and MonChoix, were isolated and characterized using the host bacterium *Microbacterium foliorum*.

DNA samples of high titer lysate were sent to the University of Pittsburgh for sequencing. The genome annotation was performed at Winthrop University, Rock Hill, South Carolina. The probable start site of each open reading frame was evaluated using coding potential data and ribosomal binding scores computed using an algorithm implemented in DNAMaster. We conducted homology comparisons using several programs, including Phamerator, BLASTp and HHPred, in order to determine gene function. Rhysand is a member of the EE cluster and contains 25 open reading frames. Its genome is 17,453 base pairs in length with a GC content equal to 68.7%. We identified a -1 frameshift in the tail assembly chaperone proteins, which is characteristic of all other annotated members of the EE cluster. MonChoix is a member of the EA cluster, and a member of the EA1 sub-cluster. MonChoix has 63 open reading frames and is 41,670 base pairs in length, with a GC content equal to 63.4%. Members of the EA1 sub-cluster are not known to contain frameshifts in the tail assembly chaperone proteins, in contrast to other members of the EA cluster. This research contributes to the expanding knowledge of phage evolution, genetic characterization and host interaction that has potential for use in the field of infectious disease control, including phage therapy.

*Southeastern Undergraduate Science Symposium, Charlotte, North Carolina, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Kristi Westover, Ph.D., and Victoria Frost, Ph.D.*

*CAS – Department of Biology*



## The Relationship Between Exercise and Migraines: A Comprehensive Review

**Student: Mikaila Kennedy**

Millions of people are plagued by migraines on a daily basis. Research has been conducted for decades on the invisible disease, but due to their complexity, very little has been found on what exactly causes and treats migraines. Migraine patients often look for holistic and alternative ways to treat their migraines, as opposed to taking daily prescriptions that sometimes show very little to no improvement in their symptoms. Exercise can often be used as a medicine; patients and professionals just have to know how to properly use it. This comprehensive review of literature examines various studies that have been conducted and reports the benefits that have been shown in the relationship between exercise and migraines versus the conventional treatments for migraines. The purpose of this literature review is to show migraine sufferers, physicians, and personal trainers how to reduce the intensity and frequency of migraines through means of exercise.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

## Spheroid Culture of Human Adipose Derived Stem Cells to Alter Regenerative Potential

**Student: Sophia J. Stefanov**

Adipose Derived Stem Cells (ADSCs) are multipotent mesenchymal stem cells that reside in the microvasculature of adipose tissue. While they are partially defined by their ability to differentiate into multiple cell lineages, their directed differentiation into many lineages of interest remains inefficient. Our lab is specifically interested in the ability of ADSCs to differentiate into skeletal myocytes. The goal of this project is to differentiate ADSCs into skeletal myocytes more efficiently, by first moving the cells to a more developmentally potent state. Multiple factors have shown promise in enhancing cells' regenerative potential. Specifically, three-dimensional spheroid culture is known for its ability to enhance cells' differentiation potential. We hypothesized that ADSC spheroids generated using micropore well inserts would show changes in global gene expression indicative of a more developmentally potent state, and that the addition of 5-azacytidine, a DNA methylation-blocking analogue of cytidine, would provide a synergistic enhancement of the effects of spheroid culture. To test our hypothesis, we generated ADSC spheroids and compared the transcriptomes of spheroid-cultured ADSCs to ADSCs cultured using the traditional two-dimensional method with or without the addition of 5-azacytidine. RNA sequencing results showed differences in the gene expression profiles of all of the experimental and control groups. The expression profile of the plated spheroids was more similar to two-dimensionally cultured cells than to three-dimensional spheroids. The large amount of data generated requires further analysis to determine the relevance of differentially expressed genes to developmental potency and directed differentiation into skeletal myocytes.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by SC INBRE and INBRE Developmental Research Project grants from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Matthew Stern, Ph.D.*

*CAS – Department of Biology*

## Characterization of *Microbacterium foliorum* Bacteriophages isolated from the North Catawba River Region

**Students:** Ann M. Cannon, Carlos E. Escoto-Diaz, Justice T. Dixon, Katelyn E. Driggers, Christine M. Dunn, Erin C. Emiroglu, Amanda J. Foster, Braylan L. Jackson, Erin E. Kelly, Nathaniel C. Kidd, Ellery S. McNeill, Savannah A. Scott, Jared T. Small, and Allison T. Smith

This is the third year that Winthrop University has offered a two-semester undergraduate research course as part of the SEA-PHAGES (Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science) program sponsored by the HHMI Science Education Alliance. There are thought to be approximately  $10^{31}$  phage particles in existence. A mere 3000 phages have so far been isolated and characterized as part of this discovery program. During the Fall 2018 semester, students focused on isolating and identifying unique bacteriophages using *Microbacterium foliorum* as the bacterial host. The bacterium is present in the phyllosphere of vegetation and thrives in humid environments, growing best at 30 °C. All samples were isolated from the North Catawba River Region. Phage DNA was isolated and cut using restriction enzymes in tandem with a Phage Enzyme Tool (PET). DNA gel electrophoresis was used to display the DNA fingerprints of the individual phages; their patterns were then uploaded onto the PET program to predict the cluster of a phage. Once the individual phages were isolated, they were imaged using transmission electron microscopy to determine morphology and approximate size. Two phages with high titer lysates and unique restriction digest patterns, Rhysand and MonChoix, were sent to the University of Pittsburgh for DNA sequencing. The complete genomes were incorporated into the second part of the SEA-PHAGES research project: bioinformatics.

*Southeastern Undergraduate Science Symposium, Charlotte, North Carolina, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Kristi Westover, Ph.D., and Victoria Frost, Ph.D.*

*CAS – Department of Biology*

## Cultural Knowledge within the Student Population at Winthrop University

**Student:** Molly O'Day

As we grow as a society, the more aware others become of the existence and possible discrimination against other cultures and people groups, even at institutions that try to embrace diversity on their properties. This can unintentionally lead to other voices being quieted simply because their numbers are not as high, but it does not mean those voices are less worthy of being heard. That unintended discrimination raises the possible question of how much does Winthrop's student population know about the different cultural groups that are present; or, do they know of them at all? Answers were sought through a survey which asks demographics, includes a self-assessment on cultural knowledge, and the accuracy, or lack thereof, of stereotypes. These were then analyzed to see where the university is culturally knowledgeable, as well as where it may lack cultural knowledge, and how Winthrop can engage with all diversity groups present on campus.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jessica Yang, Ph.D.*

*CAS – Department of Social Work*

## Influence of Athletic Identity on Well-Being among Collegiate Student-Athletes

**Student:** Jayma Goodwin

Well-being is a multidimensional construct encompassing emotional and psychological functioning. High levels of well-being can help athletes perform in high-pressure environments, overcome obstacles, and enjoy fulfilling careers. Athletic identity affects factors related to well-being, such as commitment, injury recovery, and career transition. This study explored the relationship between athletic identity (i.e., social identity, exclusivity, negative affectivity) and emotional and psychological well-being among NCAA student-athletes. Participants ( $n = 97$ ) from NCAA Division I ( $n = 53$ ) and II ( $n = 44$ ) institutions completed an online survey consisting of the Athletic Identity Measurement Scale, the Psychological WellBeing Scale, and the Positive and Negative Affect Schedule. Regression analyses controlled for gender, division, scholarship status, and year in school. Psychological well-being had the following positive associations with athletic identity: autonomy with social-identity ( $p < 0.01$ ,  $r^2 = 0.19$ ), exclusivity ( $p < 0.01$ ,  $r^2 = 0.18$ ), and negative affectivity ( $p < 0.02$ ,  $r^2 = 0.17$ ); environmental mastery with exclusivity ( $p < 0.01$ ,  $r^2 = 0.20$ ) and negative affectivity ( $p < 0.05$ ,  $r^2 = 0.14$ ); personal growth with exclusivity ( $p < 0.01$ ,  $r^2 = 0.22$ ) and negative affectivity ( $p < 0.04$ ,  $r^2 = 0.20$ ); self-acceptance with social-identity ( $p < 0.03$ ,  $r^2 = 0.18$ ) and exclusivity ( $p < 0.03$ ,  $r^2 = 0.18$ ); and purpose in life with social identity ( $p < 0.04$ ,  $r^2 = 0.18$ ) and exclusivity ( $p < 0.01$ ,  $r^2 = 0.21$ ). For emotional well-being, negative affect had a positive association with exclusivity ( $p < 0.01$ ,  $r^2 = 0.21$ ). Results suggest that a stronger athletic identity may increase psychological well-being, with limited impact on emotional well-being. Further research is needed to determine the extent to which athletic identity influences well-being.

*Association for Applied Sport Psychology Annual Conference, Portland, Oregon, October 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: David Schary, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 408 – Schary)*



## Ambrosia, Pomegranate, and the Purpose of Prayer: Food as a Bridge Between Worlds in Ancient Greek Myth

**Student: R. Grey Atkins**

Food has always been a point of contact between human beings, a way of bridging the distance between us as individuals and as distinct cultures. To share a meal with someone, something so commonplace and yet so incredibly intimate, is an act that transcends all boundaries: gender, socioeconomic status, race, religion, language group—we all eat. In ancient Greek myth, an anthro-centric tradition of gods with exaggerated human characteristics, the transcendent power of food receives a similar amplification. Beyond just the power to unite human beings, the Greeks empowered food to unite entire realms, specifically the realms of the dead, the living, and the divine. By examining the rape of Persephone, Book 11 of *The Odyssey*, and the story of Cupid and Psyche, I will demonstrate the transitional property of food to bind realms. Among the three realms, there are four possible traversals: (1) from the divine to the mortal, (2) from the mortal to the divine, (3) from the mortal to the underworld, and (4) from the underworld to the mortal. There are no significant crossings between the divine and underworld—Hades himself, lord of the underworld, was banned from Mount Olympus. Most significantly, I will prove that the primary purpose of sacrifice to the gods was to create a bridge from the divine realm to the mortal realm, to bind the gods to the supplicant.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Amanda Campbell, M.A.*

*CAS – Department of English  
(ENGL 208 – Campbell)*

## Welcome to the Kitchen; Come Eat at My Table: An Exploration into the Intimacy of Sharing Food and of the Kitchen as a Sacred Space

**Student: Danielle Altringer**

This essay explores how the relationships between the culture of the American South and the tenderness of sharing food create intimacy in the kitchen and at the table. By examining the Southern tradition of sharing food and the intimate relationship between the table and kitchen, I posit that food is binding, and the act of sharing food cultivates intimacy and comfort within the kitchen and at the table. Food is culture, and it brings people together in the most intimate of settings. We as a Southern society find our identity in our food; it is the commonality between all people, and when food is shared, culture and identity are only further perpetuated. The kitchen is the primary social intersect of the home, and the kitchen as a common place only further supports a food-as-culture claim. The table is a place of comfort and sacredness. To sit down at the table—to share food—is an intimate setting of love and sharing, where all who join in are giving of themselves in the same way that they are receiving of those around them. There is identity in Southern food, thus creating identity for all who participate in eating. The kitchen is where the food is prepared, and the table is where it is consumed; and by establishing the intimacy in sharing food, the sacredness of the kitchen and table is further substantiated.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Casey Cothran, Ph.D., and Amanda Campbell, M.A.*

*CAS – Department of English*

## Food as Worth in Chaucer's *General Prologue to The Canterbury Tales*

**Student: Scarlett Black**

In this paper, the correlation between food, class, and worth in Chaucer's *General Prologue to The Canterbury Tales* is explored. To answer this question, I researched using the theoretical method, where I began with the theory that class, food, and worth were all related in the *General Prologue* and worked to find scholarly, peer-reviewed journals that addressed these subjects. This essay's findings will add value to the scholarly discussion about the role of food and worth in the characterization of Chaucer's pilgrims, class systems, and the role of food in the *General Prologue*. The paper consists of three parts which end in the discussion of food and worth in the *General Prologue*. The first part defines the estate system of social organization used in the Middle Ages and how one's place in this system decided his or her relationship to food in society. The second part discusses the class differences in gender expectations and how food was intertwined with this. The final part considers how Chaucer defined the peasants in terms of food and explores the connection between food production and the worth this creates. The finding of this paper follows: The closer people were to the production of food, the less valuable and the lower in class status they were. Thus, a clear connection is found between food, class, and worth in Chaucer's pilgrims.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019*

*Faculty Mentor: Amanda Campbell, M.A.*

*CAS – Department of English  
(ENGL 208 – Campbell)*

## Barriers to Higher Education: Stories from Former Foster Youth

**Student: Sarah Bechtold**

Young adults who emancipate from foster care or "foster care alumni" face many challenges and are substantially disadvantaged compared to their peers who were not involved in foster care. The vast majority of the research about the educational needs of foster alumni focuses on the struggles that they experience once they have started college; however, this study explored the barriers to entering higher education for alumni who never made it to college or who had to postpone their education. This study was a secondary data analysis of one conducted by Yang (2017). The present study used a phenomenological approach to explore the unique lived experiences of alumni as they pertained to higher education and the barriers alumni encountered. Key findings from this study were that lack of mentorship, lack of education about college and the process, and lack of information related to financial support were key barriers. These findings illuminate ways in which agencies can make resources more available to promote higher education for foster alumni by removing barriers, improving mentorship and support for alumni, and overall reducing the stigma associated with the foster care label so that alumni feel more empowered to identify themselves and seek help during their journeys.

*National Conference on Undergraduate Research (NCUR), Kennesaw State University, Georgia, April 2019*

*Faculty Mentor: Jessica Yang, Ph.D.*

*CAS – Department of Social Work  
(SCWK 330H – Yang)*

## Visible-Light-Induced Alkylation of Aryl Aldimines with Potassium Organotrifluoroborates Enabled by an Organic Photocatalyst

**Students: Evan H. Thibodeaux, Brittney E. Ciesa, and Madison A. Merrill**

Recently, the use of visible light combined with a suitable photocatalyst to promote key bond-forming steps in organic synthesis has emerged as a viable strategy to achieve a number of important synthetic transformations. The photocatalyst involved is often a ruthenium or iridium polypyridyl complex, which absorbs light in the visible range to give a relatively long-lived excited state, which may engage organic substrates in a series of single-electron-transfer (SET) events. The organic radicals thus generated participate in downstream reactions leading to the final product(s). Our group has previously employed this strategy for the alkylation of aldimines with potassium organotrifluoroborates using transition-metal photocatalysts. However, because of the much lower cost of organic photocatalysts (~\$50/mmol for acridinium-based catalysts vs ~\$1000/mmol for Ir-based catalysts), we desired to explore the use of organic photocatalysts in this transformation. Several organic photocatalysts and solvents were screened; the optimum conditions were found to require the photocatalyst 9-mesityl-10-methylacridinium tetrafluoroborate (**Mes-Acr-Me**) in dichloromethane solvent. Thus, a dichloromethane solution of potassium isopropyltrifluoroborate and variously substituted benzanilines, when irradiated with blue LEDs in the presence of **Mes-Acr-Me** under argon, resulted in good yields of the desired  $\alpha$ -arylamine adducts.

*Southeast Regional Meeting of the American Chemical Society (SERMACS), Augusta, Georgia, November, 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by the Donors of the American Chemical Society Petroleum Research Fund and by an SC-INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: James M. Hanna Jr., Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## Urbanization of Dhaka, Bangladesh, and the Implications

**Student: Heidi Hearne**

Dhaka, Bangladesh, has seen immense amounts of rural-to-urban migration in recent decades. Citizens seeking job opportunities and more stable lifestyles are finding that Dhaka is ill-equipped to handle the sudden influx. The growing population causes environmental and social problems that are exacerbated by a lack of policy. Furthermore, the growing threat of climate change poses an enormous hazard to the city in the form of erratic rainfall, flooding, and heat stress. Using geographic information systems to generate models of land cover over time helps to illustrate exactly how much vegetation has been lost and the amount of urbanization that has taken place. Through remote sensing and geospatial analysis, the correlation between a large, impoverished population and increased adverse climate change impacts can be better quantified to help mitigate the coming catastrophes in Dhaka.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Bryan McFadden*

*CAS – Department of Interdisciplinary Studies*

*(GEOG 471 – McFadden)*

## Correlation Between GNI and Environmental Sustainability

**Students: Catalina Harmon and Austin Spencer**

This study examines factors of environmental sustainability. In particular, it tests countries' progress toward the Sustainable Development Goals (SDGs) with the strength of their governments in comparison to countries' GNI per capita; a panel data analysis is performed on the dataset consisting of all countries between 2002 and 2014. The main independent variable measures each country's GNI per capita, and the main dependent variables measure CO<sub>2</sub> emissions and government effectiveness. The study finds that, on average, when countries increase their GNI per capita by one dollar, they emit 0.000899 metric tons per capita more CO<sub>2</sub> and have 0.00003913 z-score more effective governments. Both results have statistical significance, with 10.215 and 17.14 as *t*-value results, respectively, which represents a 95% confidence level. The implications of the study may be that countries with a higher GNI per capita have stronger governments and are, therefore, in a better position to care about their environmental impact; however, another major implication is shown from the downtrend in slope coefficients between 2002 and 2014, which indicates that GNI per capita is slowly becoming less relevant toward progress to the SDGs and strength of government.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 350 – Kim)*

## Designing Mindsets

**Student: Jordan Farrell**

Design and emotions are more closely related to each other than most people would think. What we feel influences how we interpret art and design in every way. This is a creative exploration of emotions and design, and how design can affect the way we feel. For my thesis, I am creating collateral that is inspired by emotions and intends to represent those emotions in some way. Emotions are so extremely complex, and we all experience them in unique ways. What makes one person sad may not do the same to another; what makes you happy doesn't make me happy. My intent is not to make everyone feel the same way; it is more to make them feel any sort of strong emotion toward what I create. In simple terms, I am creating packaging for products that will take traditionally "happy" items and design them in a way that makes them "sad," or vice versa. These may be items that make most people happy, that look happy, or intend to bring buyers happiness. What will happen when people see somber and sad designs on a product that is supposed to bring them happiness and joy, or the reverse of that, "happy" designs on traditionally "sad" products? Will it make them feel sad? Will it make them feel intrigued or bring them some twisted sense of happiness? That is the intent here: to explore those ideas and concepts.

*Winthrop University Department of Design Senior Showcase, Charlotte, North Carolina, April 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; Jesse Weser, M.A.; and Darren Ritzer, Ph.D.*

*CVPA – Department of Design*

*(VCOM 487 – Tselentis)*

## Injury Prevention Intervention Programming Effects on Various Sport Communities

### Student: Ronnesha Thompson

The purpose of this review of literature is to investigate the effectiveness of exercise for injury prevention in different sport populations. As sports become more popular, sport-related injuries are becoming more prevalent. This is concerning because these injuries could negatively affect the athletes later on in life. An injury intervention program's main purpose is to help individuals better identify risky situations and teach them appropriate ways to fix and correct these problems before the injury even has a chance to occur. These programs usually include enhancing flexibility, strength, and agility. This research is inclusive, encompassing disabled athletes, adolescent athletes, and individuals dealing with pain due to the overuse of a particular muscle. Past studies show that injury prevention programs are an effective way of minimizing injury risk, enhancing an individual's performance, and promoting quicker recovery from injury. Through conducting this review, it was determined that general injury prevention programs were not as effective as assumed, in that not all athletes' risk categories were the same. Personalized injury prevention programs are shown to be more effective in moving individuals from a higher risk category to a lower risk category. This review of literature is significant because it allows sports programs to lower their athletes' chances of receiving a life-altering injury simply by allowing them to conduct personalized warm-ups that target athletes' areas of risk. This allows sports programs to ensure greater student safety and lower the statistics on the number of athletes injured each year.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## Juega Word

### Student: Kamrie Owens

My thesis focuses on illustrating several cards based on common Spanish idioms and jokes. One side will feature an illustration with the original Spanish phrase, and the back side will provide more information, such as the literal translation, any English equivalents, and interesting facts. These cards would be beneficial for a target audience of students in high school and college who have strong foundations in Spanish and English. The purpose of this project is to increase the metalinguistic, the ability to consciously think about oral and written language and how it is used, a vital skill in language learning. Additionally, as Farough Abed describes in "Visual Puns as Interactive Illustrations: Their Effects on Recognition Memory," introducing humor into a subject increases classroom engagement and knowledge retention of that subject. Using humor in the classroom lowers the effect filter of the student, which is the invisible, psychological filter that either aids or deters the process of language acquisition. The lower this filter is, the more successful overall understanding is.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: G. David Brown, M.A.*

*CVPA – Department of Design*

*(VCOM 487 – Tselentis)*

## Skeletal Muscle Tissue Engineering and Regenerative Medicine with Decellularized Scaffolds and Adipose Derived Stem Cells

### Students: Sha'Deja M. Johnson and Caroline G. Hammond

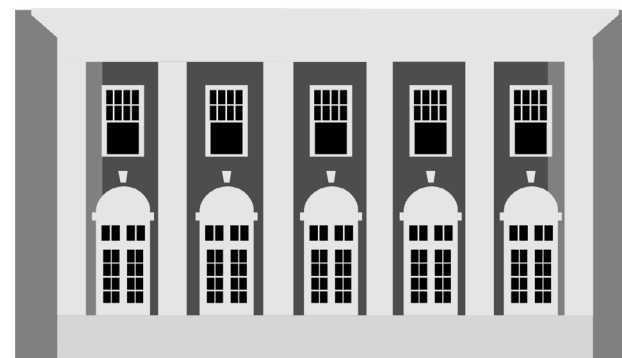
Regenerative medicine and tissue engineering could potentially provide a solution to help patients suffering from volumetric muscle loss and could also serve as a model for better understanding muscle regeneration. The process of regenerative medicine relies primarily on inducing a patient's own cells to heal a tissue or organ, while the process of tissue engineering uses a biomaterial scaffold as a template for engineering viable and functional tissue. Our goal was to further optimize the production of porcine acellular muscle matrix (PAMM), a biomaterial derived from slices of pig skeletal muscle, for use in regenerative medicine and/or tissue engineering applications. We hypothesized that the hybridization of two previously implemented methods of decellularization that rely on 1) actin depolymerization and osmotic shock and 2) treatment with detergent would result in consistent and effective decellularization as measured by removal of cells/nuclei and retention of the structure of the extracellular matrix (ECM). Our results indicate that we were able to successfully decellularize 2-mm thick slices of porcine muscle, giving us an effective 33% increase in scaffold thickness from previous experiments. We were also able to control the orientation of ECM elements within our scaffolds. In addition, we showed that PAMM scaffolds can be successfully recellularized with human adipose derived stem cells (ADSCs). Our results show that it is possible to decellularize 2-mm thick porcine skeletal muscle slices and recellularize PAMM scaffolds using ADSCs. Future research will focus on inducing myogenesis within ADSC-seeded PAMM scaffolds through mechanical stimulation of the constructs.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by SC INBRE and INBRE Developmental Research Project grants from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Matthew Stern, Ph.D.*

*CAS – Department of Biology*





## “All of My Peaches Are Ruined”: Christina Rossetti, Lana Del Rey, and the Feminine Comfort in Fruit and Floral Aesthetics

**Student: Carson Pender**

The purpose of this presentation is to analyze the expression of feminine angst, the aesthetic of fruit, and the metaphorical use of the female body as a vessel for consumption in Christina Rossetti's poetry and Lana Del Rey's song "Cherry." Specifically, these works use fruit as a symbol of female sexuality. The kinds of fruit that Rossetti mentions, particularly in "Goblin Market," are exotic, yonic in appearance, and abundant. The exotic nature of fruits, such as peaches, cherries, and apples, heightens the metaphor of the female body being a ground for masculine interest. I examine how Rossetti's poetic choices showcase the ways in which female sexuality is simultaneously regulated and admired. The yonic appearance of the fruit is representative of female genitalia and sometimes homoerotic affections. Furthermore, the connection between fruit as a metaphor for sex and the use of fruit to maintain (or regain) feminine comfort is clear in modern works. Exploring Lana Del Rey's "Cherry," I will compare how the metaphors signify ruination, betrayal, and social scorn. This is significant in comparison to Rossetti's works in which women fall victim to masculine betrayal and social scorn. This presentation emphasizes how Christina Rossetti and Lana Del Rey make use of the feminine aesthetic by employing fruit as a metaphor for the female body and aim to create a visual rhetoric in which women have often been used specifically for male consumption.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Casey Cothran, Ph.D*

*CAS – Department of English*

*(ENGL 503 – Cothran)*

## Civil Conflict and Rainfall in Sub-Saharan Africa

**Students: Emma Harris, Sydney McCall, and Ferrell Holland**

The scholarship on civil conflicts has actively debated the link between rainfall and conflict onset over the last 15 years, since the 2004 publication of a seminal paper by Miguel, Satyanath and Sergenti. Despite the large volume of research, no consensus was found in the following two areas: (1) whether rainfall and the likelihood of conflict have a positive, negative, or non-linear relationship, and (2) the causal mechanism of how rainfall can affect conflict proneness or conflict intensity other than through economic growth. We make progress in both of these areas. First, we use flexible functional form models and generalized additive models to explore the relationship between the rainfall and conflict onset and conflict intensity, using various social conflicts beyond civil wars. Second, based on the detailed description of each conflict episode in the Armed Conflict Location & Event Data Project (ACLED) data, we coded various motivations of conflicts by different types. In particular, we coded whether a conflict was motivated by (a) citizens' frustration due to water scarcity, (b) flood, (c) price instabilities, or (d) its severe effects on the main consumers of water for living, such as farmers and pastoralists. We examined through which of these channels rainfall affects conflict onset and intensity in Sub-Saharan Africa.

*Midwest Political Science Association Annual Meeting, Chicago, Illinois, April 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Hye-Sung Kim, Ph.D*

*CAS – Department of Political Science*

*(PLSC 510/510H – Kim)*

## Familial and Community Influences on the Sports Socialization of Black Boys: A Case Study

**Student: Timothy Smith, McNair Scholar**

From an early age, many children are engaged in or connected to various sporting activities. In a recent study, the Aspen Institute (2018) reported that 61.1% of males between the ages of six and 12 had played a team sport at least one day in 2016. Statistical data on racial differences and child involvement in sport activities is sparse. However, while the research on black sports socialization is limited, Stodolska, Shinew, Floyd, and Walker (2014) were able to link black sport involvement to cultural and gendered forms of socialization, which are often perpetuated through interpersonal relationships and interactions. Despite the prevalence of black boys participating in sports, the research on their sport socialization is limited. The purpose of this study is twofold: (1) to examine the nuances of how parents and community agents integrate racial socialization and gendered socialization during interactions with young black boys, and (2) to investigate how that socialization influences young black boys' perceptions of the importance of playing sports. To investigate these questions, black boys, their parents, and community agents were interviewed to see what external influences in a black boy's life played a role in his sport socialization. Literature shows that interpersonal relationships can influence physical activity by providing social support and establishing social norms that constrain or enable health-promoting behaviors.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Adrienne Edwards, Ph.D.*

*COE – Department of Counseling, Leadership, and Educational Studies and CAS – Department of Social Work*



## The Impact of Long-Term Travel on the Socio-Political Consciousness of South Carolina Students

**Student: Sierra Davis, McNair Scholar**

This pilot study's driving force is to contribute to the student travel/study abroad literature using a new framework to gauge the effect travel has on knowledge of global issues. The United Nations created a list of sustainable development goals meant to rectify pressing issues in the United States and abroad. The goals have been separated into the categories of ending poverty, ensuring prosperity for all, and protecting the planet. Using them as the framework for a quantitative study, data were collected from college-level students around South Carolina.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; World of Food Interdisciplinary Conference, Winthrop University, February 2019; National Environmental Justice Conference, Washington, D.C., March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Wendy Sellers, Ph.D.*

*CAS – Department of Social Work*

## Determinants of Vaccine Refusal

**Student: Emilee Roberts**

Trends in MMR vaccinations in the United States declined below herd immunity after the publication of the controversial and invalid study published by Andrew Wakefield in 1998. The MMR vaccination prevalence rates varied by distinct socio-demographic markers. This article explores the determinants of MMR vaccination for children under age three. I analyze data from the public use data file of the National Immunization Survey 2016, distributed by the Centers for Disease Control (CDC). I study variations across socioeconomic status by focusing on three main variables: parental educational attainment, income, and access to health care. I also control for other variables that have effects on vaccination prevalence, such as family structure, race, rural/urban, and state of residence. I use nested logistic regression models to model the effects of educational attainment, income, and access to health care on the probability of having vaccinated a family member between the 19 and 36 months of age. I compare the predicted probabilities of having vaccinated a child against MMR with predicted probabilities of vaccination against polio (with a prevalence of 91%) and vaccination against flu as recommended by the CDC (with a prevalence of 60%). More educated mothers had a significantly higher probability of vaccinating their children than mothers with lower levels of education. However, the relation between income and the probability of MMR vaccination shows an inverted U pattern: families with low and high incomes are likely to have low probabilities of MMR vaccination while people in the middle of the income range show higher probability of vaccination.

*Southern Sociological Society (SSS) Conference, Atlanta, Georgia, April 2019*

*Faculty Mentor: Maria Aysa-Lastra, Ph.D.*

*CAS – Department of Sociology, Criminology, and Anthropology*

*(SOCL 516 – Aysa-Lastra)*

## Effect of Social Media News on Mood and Group Identification

**Students: Veronica Worthington, Douglas Johnson, and Alexis Rudnik**

This study applies the findings of terror management theory and uncertainty-identity theory to social media. Terror management theory has shown that awareness of death or threat produces anxiety. People combat this anxiety by identifying with a group, which increases secure feelings in the self. Uncertainty-identity theory is similar, showing that feelings of uncertainty are uncomfortable, which motivates people to reduce that uncertainty by identifying with a group. These findings come from face-to-face situations, but little research has explored whether they apply to online situations. This study investigated the effects of social media images on mood and group identification in 40 undergraduate students. Participants completed an online study consisting of four brief news headlines (either all negative or all neutral) followed by mood and group identification measures. Negative images produced significantly higher negative mood than neutral images. Negative mood caused by negative images did not cause stronger group identification. These findings partially extend previous work from terror management theory and uncertainty-identity theory to social media. Negative mood can be produced from very brief exposure to a negative stimulus, but that exposure may not produce group identification as a defense mechanism. The brief exposure to negative media raises questions about how increased and continuous exposure to negative images and headlines affects the daily lives of the millions of people who use media every day.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, March 2019*

*Faculty Mentor: Matthew Hayes, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Hayes)*

## Goat Farming in Rural Nicaragua

**Student: Mary Ellen Grosskopf**

There have been many different initiatives and projects aimed at developing goat farming to help developing communities and countries around the world. Dr. Williams, a professor here at Winthrop University, started working with and bringing students to a rural community in 2007. Ever since then, there have been multiple different initiatives and development projects to help the community. Through service learning projects, Dr. Williams and her students are trying to implement projects that will sustain communities in the long run. This paper and research will look at the effect of goat farming on two rural communities in Nicaragua. Using the disciplines of economics and anthropology, the research will look at past goat farming projects in various parts of the world and study the current state of the communities. The research shows that it is important to define cultural challenges and barriers and to implement data research, an experimental design, and a cost and benefits analysis, so that the causality of the goats will be better understood for the development of the communities.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Ginger Williams, Ph.D.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490 – Williams)*

## La Nouvelle Vague and Postmodern Dance

**Student: Sarah Golzari**

The mid-twentieth century was a time of rebellion, creativity, and experimentation in the fine arts in contrast to past traditions. In cinema, this transition toward a more progressive form of filmmaking became prevalent with the rise of the French “Nouvelle Vague,” or New Wave. For dance—an entirely different genre of art—this same transition was implemented with the development of postmodern dance. In both art forms, the performers and creators sought to rebel against previously set standards for what could and could not be accepted as art within its given field—standards reflecting the media’s (and audience’s) perceptions of beauty, classism, and codified technique. For this project, I will create a film featuring these two art forms at work synergistically: dancers performing in a way that reflects the spirit of the postmodern era of dance and inspired by the work and philosophy of the late dancer and choreographer Merce Cunningham, with improvisational movement, non-traditional dancers or non-dancers, and dance performed in unconventional spaces, in conjunction with a “New Wave” recording style, inspired by the French New Wave filmmaker and artist Agnès Varda, including spontaneous dialogue, unusual angles, and camera shots inspired by famous artwork. By exposing the viewers to two exceptionally non-traditional styles of art within their given fields, I hope to allow the audience to make connections between unconventional portrayals of popular art forms, and ultimately have a greater appreciation for abstract art as seen in both dance and film.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Anna Igou, Ph.D.*

*CAS – Department of World Languages and Cultures*

*(FREN 360 – Igou and Burnmeister)*

## The Tokyo Trials: What Makes a Fair Trial?

**Student: Tyler Griffin**

The second World War raged on from 1937 (1939 in Europe) until the surrender of the Japanese in September 1945. This global conflict saw two large powers, Germany and Japan, act in brutal ways that caught the attention of the international community. To the Allied forces, the Holocaust and the atrocities committed by Japan in China were examples of the evil man is capable of. For this reason, the Allies conducted two trials, Nuremberg and Tokyo, to punish those they deemed responsible for the brutality. This paper will focus on the latter. To analyze the objectivity of the trial, the conduct of the Tokyo trials, seen through its records, will be compared to a document entitled “What is a Fair Trial?”. Drafted by the Lawyers Committee for Human Rights in 2000, the document presents guidelines for how each aspect of a trial should be conducted in a fair way. By comparing the trials to an objective document, its true nature will be found, which runs contrary to the fair process its proponents argued for. Although many aspects of the pre-trial were fair, the subsequent components were designed in a way to punish the Japanese far beyond the scope of their country alone. This ultimately created a show trial that put Japan on the world stage and made it an example for what stepping out of line in the new world order looked like.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Catherine Chang, Ph.D.*

*CAS – Department of History*

*(HIST 335 – Chang)*

## The Conservative White Feminine: A Sociopolitical Bargain with Patriarchy

**Student: Michelle Tuel**

White women are an important component to conservative culture that often goes overlooked, with media focus often falling upon the extreme right-wing white male. Their involvement in conservative politics and doctrine, however, may seem baffling to some. The sociopolitical choices of white, conservative women in their vote and ideology may superficially appear to be contrary to their objective interests. In the areas of reproductive rights, healthcare, gun control, and other such highly divisively partisan issues, white women stand to benefit from change-based policies which are considered liberal.

Much like the anti-suffragettes who rallied against their own right to vote, contemporary conservative white women take action to oppose such policies. In doing so, these women choose to align themselves with their racial rather than gender identity. I argue that white women play a crucial role in the conservative sociopolitical culture, exemplified by the conservative backlash observed in and after the 2016 election, due to their desire to maintain the current power structures in which they hold racial privilege.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Maria Aysa-Lastra, Ph.D.*

*CAS – Department of Sociology, Criminology, and Anthropology and Department of Political Science*

*(SOCL 516 – Aysa-Lastra; PLSC 490 – Disney and Lipscomb)*

## Fantasy versus Recovery: The Twin Fates of The Narrator and Billy Pilgrim in Kurt Vonnegut’s *Slaughterhouse-Five*

**Student: Lauren Leonard**

Using elements of both the antiwar and science fiction genres, Kurt Vonnegut examines the brutality of warfare on post-World War II American society in his 1969 novel *Slaughterhouse-Five* through the book’s two most significant characters, the war veteran Billy Pilgrim and the fictionalized “author” who creates Billy’s story. In doing so, Vonnegut showcases how two different individuals who experience the same events—the violence of World War II battles, suffering in prisoner-of-war camps, and the firebombing of Dresden—may cope with the trauma of their experiences differently. While Vonnegut writes Billy Pilgrim as a sympathetic figure, Billy is so psychologically broken by his wartime experiences that he can do nothing to cope with his emotional trauma except to create an alien universe that protects him from the bitter reality of the postwar world, while “the author” is similarly traumatized from the war but ultimately gains a sense of reconciliation by writing an antiwar book that reflects both his and Vonnegut’s distaste for war and its consequences for humanity. The purpose of this paper is to explore how, throughout the traumas and triumphant moments for both of these characters, Vonnegut is able to make a larger statement about how individuals are affected by and respond to wartime violence and psychological devastation.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Kelly Richardson, Ph.D.*

*CAS – Department of English*

*(ENGL 324H – Richardson)*

## The Impact of Generalized Anxiety Disorder on Academic Performance in Undergraduate Students Following a Brief Guided Meditation

**Student:** Ali Maclay, *McNair Scholar*

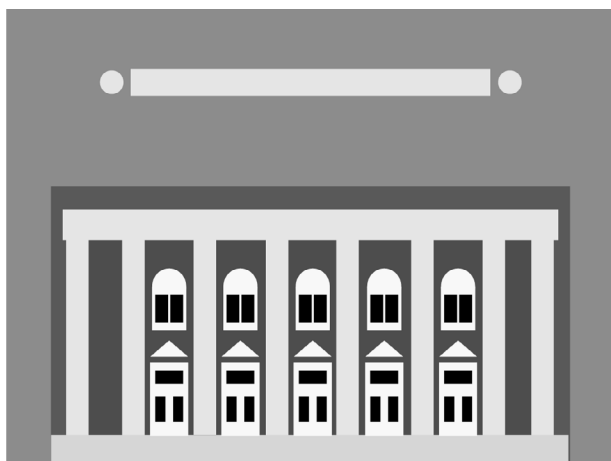
Many undergraduate college students report high levels of anxiety, which can negatively impact their academic performance. Meditation is currently being explored as a method to reduce anxiety, with the duration and frequency under investigation to optimize outcomes. Therefore, this pilot study examined whether the severity of generalized anxiety disorder affected the influence of a brief, one-time, guided meditation on undergraduate academic performance. This study also investigated student perceptions of meditation and test anxiety. Students completed the GAD-7 to assess levels of anxiety, participated in a brief meditation, completed a lab quiz, and evaluated their meditation experiences through a post-survey. We hypothesized that students with high GAD scores would perform similarly to those with low GAD scores on a quiz following a brief meditation. We also hypothesized that students with a more positive view of meditation would score higher on the quiz compared to those who did not find the meditation to be helpful. There was no significant difference in quiz scores based on anxiety level. Students who reported that the meditation reduced test anxiety and students who reported that they do not experience test anxiety tended to score better on the lab quiz. Even though there was not a statistically significant correlation between lab quiz scores and GAD-7 scores, there does appear to be a strong trend: as GAD-7 scores increase (higher anxiety), lab quiz scores decrease. This pilot study provides the foundation for future research exploring brief meditation on test anxiety in undergraduate students.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Courtney Guenther, Ph.D.*

*CAS – Department of Biology*



## The Cryptid Journal

**Student:** Mouskudah G. Murray

For my project, I have constructed a faux field journal for my senior thesis. The journal depicts the journey of a fictional cultural anthropologist as he travels through East Asia; however, he encounters eight cryptids – mythological and unsubstantiated beings – that corrupt his sanity. The story begins in the Philippines and continues through Vietnam, Cambodia, Thailand, Laos, and China, ending in Mongolia. The purpose of the project was to promote my interest in originality by creating a horror story using cryptids. My research centered on cryptids that inhabited or were witnessed in Southeast and Northeast Asia. The cryptids were selected based on the environment in order to prevent a sub-theme of similarity in their habitats. For the building process, I constructed the book from a modern, leather-bound journal that I made to appear old and worn by bathing it in a large jar containing concentrated coffee and mud. I used an oven and lighter to apply burn marks and crisp edges to the journal's covers and pages; blades to produce deep cuts and touch-ups; and standard loose ink and pencil for writing and illustrating. For the story, the deterioration of the character's mentality was shown through word crowding, displacement, and the darkening of the illustrations as the story progressed.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; G. David Brown, M.A.; Seth Rouser, M.F.A.; and Laura Gardner, Ph.D.*

*CVPA – Department of Design*

*(VCOM 486, 487 – Tselentis)*

## Optimization of the FRESH Method of 3D Bioprinting

**Students:** Chandler E. Burt and Tierra D. Collins

Advancements in 3D printing and 3D bioprinting are enabling exciting new types of biomedical research and development. These technologies hold great promise for the manufacturing of highly customizable bioengineered products. We introduced the freeform reversible embedding of suspended hydrogels (FRESH) method of 3D bioprinting to our lab. The FRESH method relies on a gelatin slurry to temporarily support soft biomaterials until they can be crosslinked into a product capable of holding its own shape. We aimed to optimize production of the gelatin slurry to ensure that it would allow precise 3D bioprinting and support complex structures. Many variables in the two-day protocol required optimization; these included the timing of several steps, the temperature during key steps, and the speed of the blender blade. An optimal gelatin slurry can self-heal when a printing needle passes through it and is capable of supporting the bio-ink of interest until it can be crosslinked. We produced and used a sodium alginate bio-ink for testing in these experiments, and we qualitatively assessed each batch of gelatin slurry based on the criteria described above. After optimization of the slurry was completed, we built upon our knowledge of the 3D printing software Pronterface to use our newly acquired R3bel Mini bioprinter, which provides our lab with a second bioprinting system. The next step in our research is to consistently print using the FRESH method on both the R3bel Mini and the Allevi 2 bioprinters with multiple bio-inks and cell types.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS) and by grants from the Winthrop University Research Council*

*Faculty Mentor: Matthew Stern, Ph.D.*

*CAS – Department of Biology*

## Expression and Purification of a Novel Calcium-Binding Protein, EfhX, Necessary for Phytopathogenesis in Xanthomonas Strains

### Student: Juliana Quay

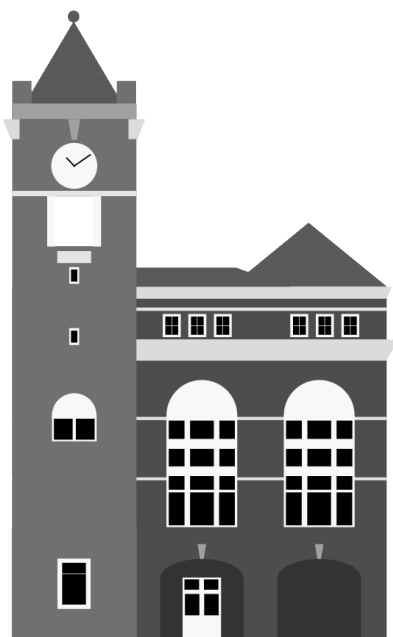
We have identified a gene in several strains of *Xanthomonas* that, when expressed, can elicit a hypersensitive response (hr) in tomato plants. Hr elicitation is normally limited to specific bacterial-host pairings, but introduction and expression of this gene by bacterial species that do not normally infect tomato serves to elicit hr, indicating that the encoded protein is crucial to the infectious process. Bioinformatic analysis of the protein, which we have named EfhX (EF-Hand containing protein from *Xanthomonas*) reveals that the protein is predicted to contain a single transmembrane alpha-helix, spanning amino acids 60 to 81, and two calcium binding domains, termed EF-Hands, in the carboxy-terminal domain of the protein. In order to better understand the function of this novel protein, we have cloned the EfhX gene from *Xanthomonas aurantifolia* and expressed it in *Escherichia coli* so that we can obtain quantities of the protein sufficient to grow protein crystals and determine the structure of the protein via X-ray diffraction. We have successfully purified the protein to homogeneity as determined by SDS-PAGE and anti-hexahistidine Western Blot.

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS), and by a Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education*

*Faculty Mentor: Jason Hurlbert, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*



## Effects of Trophy Hunting on Endangered Species

### Student: Christine Shannon

This investigative report looks into the positive and negative effects of trophy hunting on endangered and threatened animal species. In particular, this report examines the reasoning behind and demystifies the process surrounding trophy hunting. Endangered animal species are government protected species; however, through the process of specific trophy-hunting routines, killing these animals is legal. I looked into the social dynamic of trophy hunting endangered species by analyzing primary and secondary sources, including in-depth interviews, previous reporting, documents requested through FOIA, open records, and government documents. The research and in-depth interviews from this investigative report show that trophy hunting endangered species is often conducted to help preserve the species. A hunter can obtain a trophy-hunting permit by completing an application and paying a fee. The hunting that is permitted for an endangered species is specifically calculated, to ensure that only the targeted animals will be removed, limiting harm to the species as a whole. The financial reward of trophy hunting an endangered species is speculated to be given by hunters to local native tribes that live near the hunting preserves to help them preserve the animals that live there. By providing insight into both the positive and negative effects of trophy hunting on endangered species, I hope to bring clarity to the process.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: William Schulte, Ph.D.*

*CAS – Department of Mass Communication*

*(MCOM 441 – Schulte)*

## Examining the Impact of Artificial Intelligence in the NFL amongst College Students

### Student: Jared Garrett

Artificial Intelligence (AI) is relevant to sports in many ways that could potentially shape the future of sport business as a whole. NFL Commissioner Roger Goodell targets the league's annual revenue to reach \$25 billion by 2027. Relating continued growth with the technological revolution of the 21st century, the purpose of this study is to examine how the NFL is currently using artificial intelligence to reshape the many aspects of fan interaction. AI in sports allows participants, managers, and spectators to establish connections with each other, which can be extremely beneficial to business. The data analysis in this study links the relationship between fantasy football and Amazon Web Services software, NFL Next Gen Stats. Data were collected from college students through an online survey to examine how fans interact with NFL media content, their fantasy football participation, and overall knowledge of AI present in the NFL. AI plays a huge role in the future of our society, specifically in sports. Not only will we have to make a reality of what we once thought AI was, but also we have to plan, analyze, and operate the new reality in which we currently live.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinwook (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## Shoulder Injury Prevention in Adolescent Baseball Players through Ballistic Training

**Student: Melody Bryden**

The purpose of this review of literature is to examine the prevalence of and preventative measures for shoulder injuries in baseball pitchers. Approximately 5,000,000 Americans between 6 and 17 years of age play baseball, and despite pitching guidelines from the American Sports Medicine Institute (ASMI), rates of shoulder injuries and surgeries in youth pitchers are high. Throughout this review, multiple shoulder injury prevention methods are discussed. Several studies have shown that individuals who follow the guidelines and limit their pitching volumes are at lower risk for shoulder injuries including impingements, tears, and tendonitis. Others have demonstrated that, by implementing a strength-training program with a focus on shoulder strength, overhead athletes, including baseball pitchers, will decrease their risks of injury. A final study discussed the possibility of implementing a plyometric-based program to increase supraspinatus strength and decrease injury risk. The results suggested that this would be an effective way to increase the shoulder strength of high school baseball pitchers and lower their chances of shoulder injury. However, the results of this study were based on a very small sample size and must be tested further before plyometric training for shoulder strength can be recommended and implemented. This review of literature is significant because it introduces a possible new method of injury prevention for baseball pitchers and can possibly help reduce injury and surgery rates among youth players.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## A Comprehensive Fitness Plan for Obstructive Sleep Apnea Patients

**Student: Alaina Girani**

The purpose of this literature review is to evaluate the benefits of exercise for obstructive sleep apnea (OSA) patients. OSA affects nearly two to four percent of the adult population. More specifically, it is found in populations that are obese, have Type 2 diabetes, congestive heart failure, and pulmonary hypertension. The most effective strategy for treating OSA thus far is weight loss. Weight loss in patients with OSA has been shown to improve sleep and quality of life, and to decrease reliance on other means to help treat OSA, such as continuous positive airway compress. Studies in this review conclude that exercise can help reduce daytime fatigue and can have the same positive effects that a 10% body weight loss can. Exercise can be used as an aid to both help treat OSA independently, as well as an aid in weight loss. The results from the research articles suggest that exercise should be considered an effective prescription, in addition to weight loss, to cure OSA. An effective exercise program includes aerobic activity five times a week for 30-60 minutes, in addition to resistance training two to three times a week.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

## The South Carolina-Designated “Scenic” Catawba River: Using Satellite Data to Determine the Effects of Suburban Development on the River’s Riparian Zones

**Student: Jordan Hamrick**

This project will use satellite datasets in order to display changes in vegetation health over the past 20-30 years in the area of the Catawba River designated as “scenic” by state legislation in 2008. As suburban development has increased in York and Lancaster counties, development adjacent to the Catawba River is becoming a cause for environmental concern because of clear-cutting, increased stormwater runoff, erosion, and overall increased recreational activity in and around the area. Riparian zones, which are considered to be the forested areas within 50 feet of the banks of fresh bodies of water, provide a number of ecological and environmental benefits, including wildlife habitat, erosion control, pollution filtration, and shade. The shade provided by trees growing along the riverbanks acts to decrease water temperatures—a plus for aquatic life, as this boosts dissolved oxygen levels in the water. The satellite data that are gathered, interpreted, and classified will, as a result of this project, aid in drawing conclusions about the current state of riparian zones “hugging” this section of the Catawba River. It is my hypothesis that the recent increase in suburban development along this portion of the South Carolina-designated “scenic” section of the Catawba River has not only served to reduce the scenic value of this area but has also negatively impacted the ecological integrity of a significant portion of the sensitive areas known as riparian zones.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(GEOG 320 – McFadden)*

## Marketing to an Expanding Arts Audience

**Student: Savannah Hollis**

Arts marketing is the oddity of both marketing and arts management, as it can be considered a subdiscipline for both fields. This project, inspired by courses taken throughout my Individualized program of study, combines the discipline of marketing and the field of arts management to understand how marketing can help to capture and cultivate arts fans, both new and old. By understanding why the arts market has become stagnant over the years, my research explains the best ways to utilize current marketing tactics and take advantage of technology changes, as well as consumers’ cravings for new experiences, in order to grow the arts market. A change in the definition of the arts allows for a more expansive target audience to be reached, including all those who have sparked a small interest in the arts, even if they do not consider themselves arts enthusiasts. My research explores issues such as marketing techniques, audience development, for-profit and not-for-profit marketing, and the effects of changes in culture, and how these each contribute toward audience participation.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Ginger Williams, Ph.D.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490 – Williams)*

## Effects of Athletic Coaching Styles on Athletes

### Student: Keeley Leising

The purpose of this review is to understand the effects that coaches have on their athletes and how they can benefit their athletes the most. Research shows that there are two predominant types of coaching styles: autocratic and democratic. While an autocratic style is more control focused, a democratic style is more support focused. There are situations when both styles may be needed, but the effects they have on athletes are very important. The studies in this review of literature discuss the various ways these styles affect athletes in terms of motivation, performance, and social development. The methods reported in this review were questionnaires, Likert scales, surveys, and the Leadership Scale for Sport. These methods gave clear indications of which styles athletes preferred and in what ways and how severely they were being affected by these coaching styles. The results showed that, regardless of age, race, gender, or experience, many athletes preferred to be coached using a more democratic coaching style. Participants reported a positive correlation between increased intrinsic motivation, social responsibility, confidence, prosocial behavior, and prolonged success with democratic coaching. This review can be used to implement characteristics of a democratic style and to help educate coaches on the effects of different coaching styles and the preferences of athletes.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## Generating a *Drosophila melanogaster mus109* Rescue Construct

### Student: Desiree Hood

DNA is constantly being repaired *in vivo*, but this repair process can only occur through the action of DNA repair pathways. Previous studies in our lab have molecularly mapped the *Drosophila melanogaster* gene *mus109*. To confirm that we have located the correct gene, we need to conduct a rescue experiment. This inserts a wild-type version of the gene of interest into the mutant genome of *Drosophila melanogaster* to see if it reverses the mutant phenotype. Therefore, the goal of this project was to create the necessary rescue construct. To do this we used the Gateway cloning system (Invitrogen), a method based on the lambda phage recombination system, to insert the candidate gene's cDNA into two destination vectors. One of the destination vectors contains the gene's stop codon, while the other does not. The former construct was designed to produce an HA-tagged C-terminal fusion protein. Both constructs were verified by restriction enzyme digest and Sanger sequencing and are currently being purified from bacteria. Upon reaching the proper concentration, the DNA for both vectors will be injected into fly embryos. If inserting a wild-type copy of the candidate gene into the *mus109* mutant background allows those flies to repair damaged DNA—unlike *mus109* mutants—then we will have confirmed that our candidate gene is indeed *mus109*.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Kathryn Kohl, Ph.D.*

*CAS – Department of Biology*

*(BIOL 471, 472 – Kohl)*

## More than a Devil and an Angel on the Shoulders: a Look at Internal Struggle Through Faust and Job

### Student: Jacob Stiling

Can literature teach us how to live in our digital society? How can it counsel us in our struggle between natural instincts and morality? While it may seem unrealistic to look for advice in literature, there are two great examples that can teach us the consequences of following our natural instincts or our moral compass. The first example is Faust, who was highly intelligent (practically omniscient) and sought to satisfy himself by giving his soul to Lucifer in order to gain more knowledge. This story exemplifies the dangers of greed, even if unrelated to money or other material possessions. This message is especially relevant because many of us digital natives, like Faust, have access to nearly infinite knowledge through our technology. Furthermore, many are faced with the dissatisfaction that technology is known to create. The second story I will discuss is that of Job, who faced severe trials by loss of possessions, his children dying, and physical ailments. However, Job, unlike Faust, found peace through trusting God. His story is relatable because we, like him, have faced different trials. In these trials, we can learn to find some sort of peace. In addition to examining these two stories' significance in our societal context, my paper will analyze the internal struggles of both characters, in order to show that moral struggles are often more complex than choosing between an angel and demon on our shoulders.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Scott Shinabargar, Ph.D.*

*CAS – Department of World Languages and Cultures*

## United States Tennis Open Championships, 2016-2018: Examination of Media Gender Gap

### Student: Sara McGuire

The purpose of this research was to identify the inequality between men's and women's tennis coverage during the United States Tennis Open Championships from 2016 to 2018. In addition, this research focuses on how coverage has changed between 2016 and 2018. The researcher collected data from the United States Tennis Open Championships' official website (i.e., number of male and female headlines each day during the tournament). Each tournament lasted fourteen days total. Content analysis was conducted to analyze the data. The research findings indicate that there were larger amounts of men's coverage compared to women's coverage each year. The margin between males and females was the largest in 2017. The number of male articles spiked from 2017 to 2018 from 173 articles to 209 articles. The number of female articles spiked from 2017 to 2018 from 137 articles to 181 articles, due to a controversial female singles championship game. Based on the analysis, trends over the three separate years included major controversy in the women's game in 2018 that resulted in a 44-article increase. Over the three years, the increase in articles focused on females' appearance and personal lives was evident, while men's articles continuously focused on their actual performances.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinwook (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## Understanding Growth in York County: Using Geospatial Technologies to Understand Lake Wylie's Rapid Growth

### Student: Ke'on Barber

The purpose of this project is to conduct research on the rapid growth that is happening in Lake Wylie, South Carolina, which is in an unincorporated area of York County, using geospatial technologies. Lake Wylie is seeing tremendous growth, and there are several questions that I have about Lake Wylie and what is causing the growth. Some of these questions that I wanted to research are why is there so much traffic in the Lake Wylie area? What is the population of Lake Wylie, and how significantly has it changed within the last 10 years? Is the growth that Lake Wylie is seeing positive or negative to the community? Are more jobs being added in the Lake Wylie area? Is the growth that is happening in Lake Wylie the kind of growth that York County foresees in its comprehensive plan? Using geospatial technologies and geographic information systems to get data, such as vector data collected by York County and remotely sensed data from the United States Geological Survey in the unincorporated areas, we can see that growth is happening in Lake Wylie and the landscape is changing very quickly. These geospatial technologies can tell us things such as where vegetation is declining because of new houses and businesses, etc., and also how supportive or unsupportive the infrastructure is in the Lake Wylie area. We can compare all of these data to the York County comprehensive land use plan to see if the vision for Lake Wylie is becoming a reality.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Bryan McFadden, M.S.*

*CAS – Department of Interdisciplinary Studies*

*(GEOG 471 – McFadden)*

## Effects of Political Polarization on Government Efficacy

### Students: Tess Norman, David Truesdale, and Ravyn Cunningham

This study examines the factor of governmental efficacy. In particular, it tests whether the political polarization that exists within a country has a negative or positive correlation with the efficiency and productivity of the government by analyzing a panel dataset consisting of 214 countries covering the years 1975 to 2012. The dependent variable, government efficacy, is measured by analyzing perceptions of public service, policy formulation/implementation, and government credibility. This measure uses percentile rank from 0 to 100, with 100 being the highest possible rank. The independent variable, political polarization, is measured by the maximum difference in political orientation among government parties and this measure ranges from 0 to 2 — 0 meaning no polarization and 2 meaning highly polarized. This study finds that the correlation between these two variables is 0.399, and therefore, we have failed to reject our null hypothesis that polarization has a negative impact on efficiency. The findings of this study may imply that there is a statistically significant positive correlation between political polarization and government efficiency; however, there are many potential confounders for which to control during further study.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 350 – Kim)*

## The Overlooked Crime Robbing the Nation

### Student: Cori Erwin

This investigative report on white-collar crime examined the dynamic using government documents, open records, research articles, and an in-depth interview with an expert in criminology. I found that, although white-collar crimes plague a majority of Americans, many people perceive them as less serious than violent crimes. However, research shows that trillions of dollars are lost and approximately 300,000 lives are taken annually due to white-collar crimes. Both the financial and physical harms that come with these types of crimes outweigh those of violent crimes. In addition to the consequences of white-collar crimes, my research focused on preventive measures people can take to avoid being victims of these types of crimes. These can include not giving out personal information, putting fraud alerts on different accounts, and freezing accounts that individuals believe to have been hacked.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: William Schulte, Ph.D.*

*CAS – Department of Mass Communication*

*(MCOM 441 – Schulte)*

## Derivative Design and Synthesis of Sphingosine Kinase 1 Inhibitors to Increase Bioavailability: *In Vitro* Analysis Using a Bioassay

### Student: Tiffany Dwyer

One of the ways to target cancer therapy is to focus on the pathways by which it exploits the body. This project is focused on the metastasis of cancer through the sphingolipid metabolism pathway. More specifically, this project is focused on the enzyme sphingosine kinase-1 (SK-1). Sphingomyelin is broken down into ceramide, which is a signaling molecule for apoptosis. Ceramide is then converted to sphingosine, and through the catalysis of the enzyme sphingosine kinase-1, sphingosine is converted to sphingosine-1-phosphate (S1P), a signaling molecule for proliferation, which is produced by the transfer of a phosphate group from ATP to sphingosine. In cancer patients, overexpression of SK-1 causes metastasis due to the increased concentration of S1P formed. This project is centered around the design and synthesis of derivatives of an SK-1 inhibitor, sphingosine kinase inhibitor-1 (SKI-1), which was found to be much more effective *in vitro* than *in vivo*. The goal of this project was to ultimately increase bioavailability and effectiveness of SKI-1 *in vivo* by designing and synthesizing derivatives with different features in one zone of the molecule (Zone 1). The derivatives were designed and then analyzed for characteristics related to bioavailability such as the Log *P* value. (For SKI-1, Log *P* = 5.6, which is too high). Starting from the parent molecule, SKI-1, several derivatives were synthesized through a pre-determined reaction sequence and confirmed with <sup>1</sup>H NMR. The SKI-1 derivatives were then tested for effectiveness *in vitro* with a bioassay that measured the amount of unreacted ATP using luminescence. In this project, we were able to synthesize a complete set of derivatives of SKI-1 with lower Log *P* values, thus increasing potential bioavailability of the derivatives that were synthesized compared to SKI-1. In the future, we hope to find the most effective derivatization for each of the four zones of SKI-1 and combine these features into one molecule.

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, October 2018*

*Supported by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Christian Grattan, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*



## BSW Voices: Exploration of Student Experience

### Student: Dorothy Huther

Program evaluation is a complex research process that aims to identify the aspects of a program that are effective in meeting stated goals, those that are not, and ways to improve service delivery overall. As a research methodology, program evaluation is often focused on understanding the performance of businesses and non-profits; however, it can provide invaluable insight into the functioning of higher education, as well. One key aspect of program evaluation is understanding the perspective of service users with regard to the agency and the services provided. Therefore, this study used focus groups and a semi-structured protocol to understand the perspectives and experiences of current students in the Bachelor of Social Work program at Winthrop University. All declared majors were eligible to participate in the study to share their unique lived experiences. Data collection is still underway; however, current trends indicate that, overall, participants are satisfied with the program, but they would like to make certain changes. Such changes include having opportunities for hands-on experience (through field placement or simulation labs) earlier in the program, increased variety of class times and elective options, increased screening of new faculty with a focus on hiring professors who are invested in students overall wellbeing, and social work specific scholarships. Once data collection is complete, findings will be shared with key stakeholders along with an action plan to uphold the key values of social work (such as advocacy and social justice) and the best practice principles for robust program evaluations.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jessica Yang, Ph.D.*

*CAS – Department of Social Work*

## The Relationship Between Exercise and Depression

### Student: Allee Campbell

The purpose of this review of literature is to examine how the symptoms of depression are impacted by exercise. Research shows that mental health issues are growing across the board; and within this, the number of those suffering from depression is increasing, as well. It is known that about 300 million people around the world suffer from depression, and approximately 15% of adults will experience at least one depressive episode in their lives. Women are twice as likely as men to experience depression. Additionally, patients who have suffered from other diseases or medical conditions are more likely to experience depression than those who have not. Major depressive disorder (MDD) is a highly prevalent issue with low remission rates. MDD is predicted to be the second leading cause of disability worldwide by the year 2020. This review examines multiple studies that explore the efficacy of exercise as a treatment method for depression. These studies suggest that exercise provides the same results as the selective serotonin reuptake inhibitor sertraline and may be more cost effective and available for patients. In addition, exercise provides a number of other benefits to the body, such as more energy and cardioprotection. The results provided in this review of literature suggest that exercise can work as a preventative measure for depressive symptoms, can work as treatment for depression, and can result in response and remission in patients with depressive disorders.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## The Effect of Ankle Dorsiflexion Range of Motion on Injury Prevention and Sport Performance

### Student: Bryce Boeke

The purpose of this review of literature is to examine the importance of increasing ankle dorsiflexion range of motion (ADROM) for safety and performance in athletes. This review examines studies that demonstrate common static stretching times for increasing ADROM are ineffective and can even decrease athletic performance. Due to the fact that static stretching has no effect on ADROM, athletes with limited ADROM are left vulnerable to injury. It was found that limited ADROM can be a direct cause of patellofemoral pain. Additionally, limited ADROM was found to place the knee in vulnerable positions during a squat that could increase chance of injury. Many strength coaches have tried to correct this problem in training with Olympic weightlifting shoes. While Olympic weightlifting shoes can compensate for limited ADROM by elevating the heel and therefore decreasing risk of injury in training, these shoes are not worn in competition and consequently leave an athlete vulnerable to injury. A new method of increasing ADROM, floss bands, have been shown to significantly increase ankle ADROM and even jump height in athletes. Continued research into floss bands and new techniques such as body tempering devices should be investigated as new soft tissue mobilization and joint range of motion tools

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(EXSC 381 – Boyd)*

## Application of Assisted Jump Training Methodology on Improving Peak Vertical Jump Height: A Comprehensive Review

### Student: Megan Kauffman

Jump training has become an invaluable tool for strength coaches across all disciplines and sports as a means of increasing power and explosiveness in their athletes. This review is focused on assisted jump training (negative load jump training), particularly its methodology and technique, as a novel method of training that needs further exploration. Assisted jump training utilizes what is known as the overspeed concept, which allows athletes to increase their limb speed beyond their own maximal speed to ultimately increase power output. This approach has appeared in past literature for increasing sprint speed and can be translated into the vertical dimension to increase total velocity and jump height. The limited research that currently exists on assisted jump training has shown significant increases in counter-movement jump height and peak power output compared to normal jump training. These improvements suggest that assisted jump training is a new avenue to improve jump performance that is relatively unexplored. This review seeks to analyze current research and present the need for standardization of assisted jump training methodology as it relates to the variables of frequency, intensity, volume, and rest.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Jenny)*

## The Islamic State in Iraq and Syria: The Foundation and the Defeat of the Most Well Known Terrorist Organization

### Student: Ian Baird

Terrorist organizations such as the Islamic State in Iraq and Syria have cost countries billions of dollars in damages, terrorized people from around the world, and installed a fear which is seemingly endless. Throughout the years, terrorist organizations have learned to adapt and have grown unlike anything we have seen in recent years as new technology, globalization, and social media connect hundreds of millions of people into single platforms. In order to formulate new and improved ideas of how to successfully bring down terrorist organizations like ISIS, we must first have a full understanding of their operations. For my research, I will examine the foundation, ideology, goals, funding, recruitment, lessons learned from the U.S. and other nations, as well as the defeat of ISIS. It would be irresponsible to suggest plans for the defeat of the Islamic State without first having an idea of how and why they do what they do. It is no secret that in order to bring down a terrorist organization we must first defeat an ideology, but how can you destroy an ideology? The answer is you can't. What we can do is implement certain policies which will be essential to alter, slow down, or even stop terrorist organizations from sprouting up to begin with. Instead of learning how to counter terrorism, it is essential for developed countries such as the United States to leave behind their bureaucratic style of fighting terrorism and develop strategies which will stop terrorism before it even starts. For my research, I will be exploring ways to counterbalance the Islamic State and ideas on how to move on from this point forward.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jennifer Disney, Ph.D., and Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

## Creating A More Inclusive Gaming Community

### Student: Dartanyan Ball

Digital gaming is a massive part of popular culture. Videogame characters like the Master Chief and Mario are as well-known as characters like Darth Vader. You can find games on almost anything these days, from calculators to high-end desktop computers. People who enjoy puzzles could load up something like *Monument Valley* on their phones. People who like board games could toss virtual dice in a digital game of *Monopoly*. There are even games that allow players to build the cities of their dreams, managing transportation and sewer systems in an exercise of efficiency and creative solutions. The sheer variety of games and ways to play makes gaming an extraordinarily accessible hobby. The gaming audience is a massive collection of people with extremely varied interests, representing different age groups from all over the world. Yet, the popular culture image of the gamer has not evolved too far beyond a stereotype of the straight, white, male nerd. This research is concerned with working to change that perception. It is about expanding the definition of who a gamer is. That means looking at how the community formed, who gets to be included in the gaming community, who is excluded, and the ways to change that for the better. Gaming is not enjoyed solely by one demographic group, and it should not be portrayed that way. Changing the perception of who plays games and creating a more inclusive gaming culture should be an industry goal.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Ginger Williams, Ph.D.*

*CAS – Department of Interdisciplinary Studies*

*(IDVS 490 – Williams)*

## Gut Content Analysis of Aquatic Macroinvertebrates using DNA-Based Methods

### Student: Phillip Evans Dressler

With the great deal of complexity associated with aquatic food webs, many questions regarding species interactions remain unanswered. One such question of importance is: Who is eating whom? This is a question that morphologically based analysis techniques have failed to answer with great accuracy. However, with the advent of DNA-based analysis methods, this question can be answered. DNA-based analysis methods allow for greater certainty in taxonomic identification, because specific gene regions can be targeted using group-specific primers as a means for DNA detection. This approach was used to analyze dragonfly (Odonata, Anisoptera) gut contents using group-specific primers for midges (Chironomidae) and mosquitoes (Culicidae) as potential prey groups. Specimens were collected in Big Dutchman Creek and Winthrop Lake in Rock Hill, South Carolina. DNA was extracted from gut contents of collected specimens. A polymerase chain reaction was performed on each of the extracted samples in order to amplify DNA concentrations. Gel electrophoresis was used as a presence-absence test for DNA from target prey groups. We found that one individual of the genus *Progomphus* contained DNA from the family Chironomidae, but not Culicidae. A second *Progomphus* individual tested negative for both families, illustrating individual variation in feeding. These refined methods will allow for testing of more *Progomphus* individuals and potential prey groups as well as other aquatic macroinvertebrate predators.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Cynthia Tant, Ph.D.*

*CAS – Department of Biology*



## Grief Perceptions and Educational Analysis

### Student: Shelby Anderson

Grief is one of the most universal experiences we share. Yet, it is often misunderstood and even avoided. For many helping professionals, having knowledge and skills to help those who are grieving is critical. Even though grief is prevalent in our lives, previous studies suggest that there is a lack of grief education within predominant helping professions. These studies also emphasize the need for core curriculum in these fields to incorporate grief and loss education. This study examines the educational preparation for grief management in core curriculum courses for undergraduate social work, exercise science, and health care management majors. Specifically, this study compares students' definitions of grief, their exposure to content on grief in their major core curricula, and their perceptions of the importance of having a knowledge base of understanding in their professional roles. This study also offers considerations to faculty for inclusion of grief content in social work, exercise science, and healthcare management programs. Data were collected from 73 undergraduate students at Winthrop University in Rock Hill, South Carolina. This survey consists of 12 questions that question students regarding definitions of grief and preparation regarding grief education. Results from the survey supported the hypothesis that most participants are receiving content on grief, but what they are receiving is not enough. Of the participants, 90.2% either agreed or strongly agreed that their future professional work could benefit from grief educational content. Participants knew what grief was, but some said they wanted more information about it because they did not know a lot about it. The participants also mainly defined grief as being not just a death, but a loss of something or someone.

*National Conference on Undergraduate Research (NCUR), Kennesaw State University, Georgia, April 2019*

*Faculty Mentor: Cynthia Forrest, Ph.D.*

*CAS – Department of Social Work (SCWK 473 – Forrest)*

## Responding to Crises in Health Care and the Criminal Justice System in the African-American Community

### Student: Casey Brooks

The mass incarceration of African Americans for what can be deemed petty crimes and unjust criminal procedures needs to be evaluated and approached from a different ideology other than capitalist-democracy. Similarly, the capitalist-democratic approach to healthcare has been a disaster for African Americans. This paper explores whether the ideology of socialism offers important resources for reconsidering the practices of our criminal justice system and our health care system. My paper will examine the history of African-American socialist advocacy in order to clarify the ways in which such approaches can invigorate discussions of how to best improve the lives of African Americans.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jennifer Disney, Ph.D.*

*CAS – Department of Political Science*

## Exploring a Possible Moonlighting Role for Global Phosphatase in *S. pneumonia*

### Student: Hunter G. Sellers

Iron is essential to an overwhelming majority of life on Earth; however, in aerobic conditions, it can take on multiple oxidation states and create harmful oxidative species that must be regulated to maintain the health of the cell. Many bacteria use one of the common metal regulatory proteins (e.g., Fur) to maintain safe levels of iron in the cell, but genome analysis of *S. pneumonia* indicates that it lacks any of the standard sensors. Interestingly, the presence of extracellular iron triggers an intracellular uptake response; this process involves three proteins: StkP (membranous kinase), RitR (transcription factor), and PhpP (phosphatase). It is likely that the intracellular iron sensor is linked to this uptake system; in fact, we hypothesize that the intracellular sensor is built directly into this system. Noting that PhpP is a magnesium-dependent enzyme, we hypothesize that perhaps PhpP is activated by intracellular iron in *S. pneumonia*, thus providing the intracellular iron sensor that it needs. Using a combination of UV-visible and fluorescence spectroscopic methods, we tested this hypothesis. Using para-nitrophenylphosphate assays (PNPP, a surrogate for phosphorylated RitR) along with manganese as an aerobic-friendly surrogate, we demonstrated that PhpP is activated by manganese. Using fluorescence competition experiments with the metal binding fluorophore Mag-Fura-2, we quantified the affinity of PhpP for manganese ( $K_d = 2.16 \mu\text{M}$ ) and magnesium ( $K_d = 185.1 \mu\text{M}$ ). Comparison of  $\text{Mn}^{2+}$  and  $\text{Fe}^{2+}$  activation of PhpP yielded values that suggest a decrease in affinity for PNPP; however, it shows a 6-fold increase in rate.

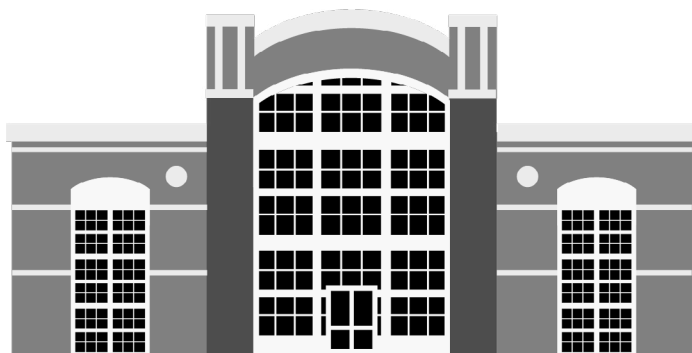
*American Chemical Society (ACS) National Meeting and Exposition, Boston, Massachusetts, August 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an REU grant from the South Carolina EPSCoR/IDeA Program, and by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Nicholas Grosseohme, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552 – Hanna)*



## Effects of Mental Health Socialization in Undergraduate Students

**Students: Kelly Sharpe, Rochell Couture, Samantha Lee, and Katy Osborne**

An estimated 50% of undergraduate students meet the criteria for some mental illness, a factor that has been shown to significantly affect college retention rates. Most research has focused on proximal factors (e.g., parental emotional response and coping skills in childhood); there is a lack of research on distal factors, such as parental socialization about mental illness during childhood, on coping skills in early adulthood. We hypothesize that negative parental beliefs about mental illness will have an effect on student coping skills, and that parental beliefs about mental illness will be similar to student beliefs about mental illness. Undergraduate students from Winthrop University ( $N = 111$ ) completed a survey examining their coping skills, their attitudes about mental illness, and their parents' attitudes about mental illness. The coping skills were examined using factor analysis and revealed approach and avoidance factors. Parent attitudes were related to student coping skills; however, student attitudes were not related to their coping skills. In general, students whose parents have more negative beliefs about mental illness are more likely to cope by distancing themselves from their problems, and students whose parents have more positive beliefs about mental illness are more likely to cope by confronting their problems and using support. These results suggest that parental influence extends well into early adulthood and calls into question current mental health interventions that rely solely on student attitudes.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Matthew Hayes, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 302 – Hayes)*

## My Name is 0000: A Visual Look at Perception versus Reality

**Student: Kai Mills**

My project is the creation of several visual illustrations primarily using Adobe Photoshop to bring awareness to five different topics of normalized animal abuses that are too often overlooked in industrial age society. These five topics include cosmetic animal testing of rabbits, orca shows, circus elephants, fox fur farming, and down feather production. The focus is solely on “luxury” items and services that are *not* necessary for consumers, because this leaves zero excuses or justifications for the maltreatment that these animals have to endure. The images will be shared via an Instagram page dedicated to raising awareness to the above issues. Each post will include a brief description of the topic at hand as well as ways viewers can learn more or help if they would like. The goal of this project is primarily to evoke empathy in viewers, but also to challenge them consider their roles in these industries that they may not have been aware of. Since the goal is to have people want to learn more, the images are not going to be overly gruesome/shocking but rather intriguing or thought-provoking to hopefully invite questions and open dialogue among viewers. I want people to walk away having learned something new and thinking about a topic that they may not have paid much attention to previously.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Jason Tselentis, M.F.A.; G. David Brown, M.A.; and Jim Arendt, M.F.A., Coastal Carolina University*

*CVPA – Department of Design*

*(VCOM 487 – Tselentis)*

## Adhesive Organs in Turbellaria: Results from Freshwater Species

**Student: Charlie Wolfe**

Meiofauna comprise animals living in aquatic sediments that are small enough to move between sediment grains. Marine forms often possess duo-gland adhesive organs, in which one gland cell (viscid gland) secretes a glue, and the second gland cell (releasing gland) purportedly secretes a releasing substance. Duo-gland organs allow the animal to attach reversibly to sediment grains and are clearly necessary for organisms that constantly are exposed to wave and current action. In the past decade, substantial progress has been made in identifying and characterizing viscid secretions at the molecular/genetic level in marine flatworms and formulating a functional hypothesis for attachment and release. Additionally, it has been demonstrated that the lectin Peanut Agglutinin (PNA) specifically labels viscid gland secretions in the marine flatworm *Macrostomum lignano*. Duo-gland adhesive organs are common in marine species; however, less is known about adhesion in freshwater flatworms. A putative duo-gland adhesive system has been identified by transmission electron microscopy in a member of the genus *Prorhynchus*, and lectin-staining results have been reported for the marginal adhesive glands in *Schmidtea mediterranea*. Here, we report on fluorescent lectin staining of putative adhesive glands in three species of freshwater flatworms (*Prorhynchus sp.*, *Procotyla cf. typhlops*, and *Ascophora cf. elegantissima*).

*Association of Southeastern Biologists Annual Meeting, Memphis, Tennessee, April 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentors: Julian Smith III, Ph.D., and Kathryn Kohl, Ph.D.*

*CAS – Department of Biology*

*(BIOL 300 – Kohl)*

## Taxation of E-Commerce in the United States

**Student: Jennalee Moore**

E-commerce accounts for nearly a quarter of all retail sales and is projected to quickly increase in the next ten years. For the younger generations, e-commerce is the most popular form of shopping, with over half preferring e-commerce to traditional stores. With the rise of e-commerce, the question of how to best tax these products and services becomes essential. E-commerce has not existed for many years and as such, the taxation laws surrounding e-commerce are all relatively new and adjustments are frequent as the internet is ever changing. E-commerce taxation is made more difficult by the differences in tax laws between the states as well as the differences between the various levels of government. The taxation of e-commerce will always exist, and the solution to these issues lies in implementing tax laws with a balance between fairness and efficiency.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Laura Ullrich, Ph.D.*

*CBA – Department of Accounting, Finance, and Economics*

*(ECON 495 – Ullrich)*

## Racism in Disguise

### Student: Zaria McBride

The work I will be showcasing is research on the similarities of direct and apparent racism during the Jim Crow Era and recognizing its correlation to twenty-first century institutional racism, which New York Times best-seller author Michelle Alexander called the New Jim Crow. It will focus on the relationship between poor education in predominantly African American public schools and the high mass incarceration rate among African American males. I recognize the progress African Americans have made since the end of Reconstruction and the Civil Rights Movement; however, I reveal the new methods white supremacy has created through policies, laws, and lack of funding for institutions to maintain their power and keep the African American race oppressed. These new methods are social barriers and “traps” within the African American community that are hard to identify and avoid if unconscious and ignorant. Since slavery, white supremacists understood the power of education and individuals knowing who they are, which is why it was illegal for slaves to know how to read and write. This mindset is still prevalent today. One who is uneducated and ignorant to one’s identity can be vulnerable and manipulated to institutional racism. My analysis to support this argument includes statistical evidence, personal experiences, and references from human rights activists such as Malcolm X, W. E. B. DuBois, and Michelle Alexander to affirm that the condition of most African Americans in the New Jim Crow era is parallel to their condition during the original Jim Crow Era.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(AAMS 551 – Lipscomb)*

## Understanding the Relationship Between Flexibility and Distance Running Performance

### Student: William Manning

Distance runners are known for having tight, stiff leg muscles. In many cases, this lack of flexibility spurs causes for concern from coaches and athletes alike. While poor maintenance of flexibility can lead to muscle imbalances, increased delayed onset muscle soreness (DOMS), and injury risk, the end goal of a flexibility program should not be to increase a runner’s flexibility. The purpose of this review of literature is to demonstrate the role of flexibility in endurance running performance. The compiled research suggests that lower flexibility correlates positively with running economy in both elite and untrained populations. Running economy is defined as steady state oxygen consumption at a set submaximal velocity and is a strong performance indicator for runners with similar maximum  $VO_2$  values. Current theories suggest that muscles stiffen with chronic endurance running in order to utilize elastic energy throughout the gait cycle. Ultimately, the relationship between flexibility and endurance running suggests a fine line between performance and injury risk. Future research could evaluate the effects of a flexibility program geared toward the maintenance of bilateral flexibility and prevention of imbalances without inhibiting natural muscle stiffening long-term.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

## Understanding the Relationship between Multiple Sclerosis and Exercise

### Student: Alexis Brown

The purpose of this literature review is to understand exercise and its effect on those diagnosed with Multiple Sclerosis (MS). Multiple Sclerosis is a disease that affects the immune system, the brain, spine and optic nerves due to the loss of myelin sheath. Studies show that the challenge of the disease often prevents the individual from pursuing an active lifestyle, believing that the disabling effects of MS cannot be changed or improved. Conversely, literature findings suggest that daily physical activity for someone with MS could decrease muscle weakness, increase mobility, and improve overall quality of life while preventing the formation of other secondary disorders. This review of publications aims to address how exercise promotes a healthier lifestyle and better quality of life for MS patients.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentors: Joni Boyd, Ph.D., and Kristen Kull, M.S.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(EXSC 481 – Boyd)*

## The Effects of Allophane on Carbon Sequestration and Nutrient Availability in Compost Derived from Food Waste

### Student: Dakota Shope

In America, 21% of all material in landfills is derived from food waste. Nearly all carbon contained in that waste will be converted to methane under anaerobic decomposition pathways. However, food waste that is composted rather than entering the waste stream contains 35-55% carbon, which can be utilized as soil amendments and fertilizer. Allophane, an aluminosilicate clay derived from weathered volcanic ash, is known to create complexed compounds and stabilize the organic carbon in natural environments for longer periods of time. The purpose of this experiment is to determine whether allophane affects the carbon loss from food-waste-derived compost and whether it modifies any of the nitrogen or phosphorus cycling in the compost. Five sets of three pots with a compost/topsoil mixture and increasing amounts of allophane ranging from 0-50% by mass were established, and samples were analyzed. Overall, the carbon content of all the compost decreased over time. While the total amount of available nitrogen decreased over time, the compost with higher amounts of allophane had more available nitrogen in the forms of ammonia and nitrate. Ammonium availability in the compost showed a constant decrease over time, while nitrate showed a large spike followed by a nitrate depression period. The total phosphorus availability increased with increasing allophane and spiked during the nitrate depression period. Overall, the increasing amounts of allophane reduce the levels of greenhouse gas emissions from the compost, but also depress the nutrient cycling in the compost.

*American Geophysical Union (AGU) Fall Meeting, Washington, D.C., December 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a grant from the Winthrop University Research Council*

*Faculty Mentor: Scott Werts, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## The Effect of Social Media on Academic Performance with Relation to Anxiety

**Students: Kayla Elizabeth Newsome and Andrew Constantine**

With approximately 90% of young adults between the ages of 18 and 29 using some form of social media, the effect that social media has on many facets of life, including academics, is incredibly important for understanding this demographic. Lau (2016) found that non-academic social media use negatively predicts GPA among undergraduate students. While this research indicates that social media use has the potential to have negative effects on academic performance, it doesn't explore why this negative correlation exists. This study examined whether social media withdrawal relates to academic performance and anxiety. Participants were 31 Winthrop University students. Participants were assigned to either the "with phone" or the "without phone" condition and were asked to post an image of themselves on a social media site of their choosing. The reading comprehension section of SAT Practice Test 8 was used to measure academic performance, and a self-report scale was used to measure feelings of anxiety during the experiment. Contrary to prediction, there were no significant differences between the "with phone" and the "without phone" groups, indicating that withdrawal from social media usage does not cause worsened academic performance or more feelings of anxiety. These results can help teachers and parents to make informed decisions about separating their students from technology, knowing that there are not any negative effects on academic performance when students are separated from their social media.

*Southeastern Psychological Association (SEPA) Annual Meeting, Jacksonville, Florida, March 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Matthew Hayes, Ph.D.*

*CAS – Department of Psychology (PSYC 302 – Hayes)*

## Synthesis and Antimicrobial Activity of Pyrazole Rings with Varying Substitution

**Student: Resa Allen**

Antimicrobial drugs are widely known for being able to cure infections caused by microbes. An antimicrobial drug's main method of attack is to break up the synthesis of structural elements in a microbial infection, and to modify metabolic functions unique to the cells. The problem is antimicrobial resistance, which is present in every country around the world. Antimicrobial resistance is when microorganisms slowly build up a defense to drugs that were previously effective. When this happens, it increases the cost of healthcare, because it takes more time and effort to treat the disease. Defense against antimicrobial drugs also means riskier medical procedures. My research involved the synthesis of pyrazole rings, which are commonly found in the structure of some antimicrobial drugs, with variation in the placement of  $CF_3$ - and naphthyl groups on the rings. This was followed by analysis of the compounds for microbial inhibition to tell how effective they are. Specifically, I found that 3-(2-naphthyl)pyrazole and 3,5-bis(trifluoromethyl)pyrazole had promising zones of inhibition.

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, October 2018*

*Supported by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Christian Grattan, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## The Impact of Teaching Growth Mindset in an Eighth Grade Special Education Classroom Setting

**Student: Virginia Blake Nichols**

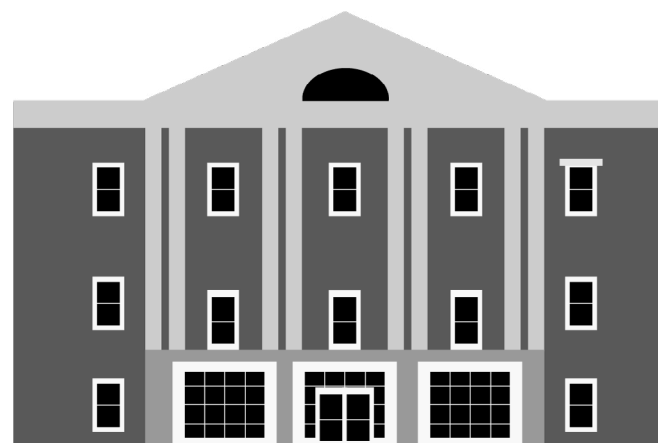
A student's belief in his or her abilities and talents greatly affects motivation and achievement. Growth mindset allows students to recognize their motivational levels and move to higher stages of achievement in all areas of life. Children in elementary school often have a growth mindset, understanding that success requires effort and hard work. Once students enter middle school, the notion of growth mindset seems to drop and students lose interest and lack motivation. In addition, a fixed mindset is common among students with learning disabilities. This action research study seeks to determine the impact of teaching growth mindset in an eighth grade Special Education classroom. Teaching growth mindset strategies in the classroom and students' perceptions of these strategies will be included in the research. Research questions focus on these areas: What level of awareness do students have of their own attitudes toward fixed versus growth mindset? How do the students' disabilities affect their growth mindset? Teacher interviews and observations will be conducted. Particular attention will be given to student attitudes and behaviors of having a fixed versus growth mindset. Behaviors and attitudes include staying on task, being respectful of others, and working well with others. The study will also consider the aspect of the teacher/student relationship and how this relationship facilitates a growth mindset. Teacher strategies include giving positive feedback and encouragement and relationship building.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Tammy Burnham, Ph.D.*

*COE – Department of the Education Core*

*(EDCO 200H – Burnham)*



## Hydrothermal Methods for the Discovery of New Optical Compounds

### Student: Kameron Johnson

This project investigated aqueous modeling coupled with hydrothermal methods in order to discover new compounds. Novel materials for optical applications, such as luminescent scintillators, are desired for improvement of properties. Using OLI Systems aqueous speciation software, yield diagrams were developed in the quaternary K-La-Zr-O system, aiming toward discovery of new rare earth optical compounds. Chemical systems such as this one will readily form highly stable thermodynamic binary compounds, notably zirconia ( $ZrO_2$ ) and lanthanum hydroxide ( $La(OH)_3$ ). Within the yield diagrams, where metal concentrations are plotted against pH, areas just outside of stability regions for  $La(OH)_3$  and  $ZrO_2$  were targeted for Zr:La ratios of 1:1 and 4:1. In hydrothermal autoclaves heated to 200 °C at 16 atm, aqueous mixtures of zirconyl (II) chloride, acetylacetonate, lanthanum (III) chloride, ethylenediamine-tetraacetate and potassium hydroxide produced X-ray powder patterns containing products with unknown, possibly new stoichiometries. Scanning electron microscopy (SEM) with energy-dispersive X-ray (EDS) analysis revealed polycrystalline morphology with some single crystals (50 microns) of hexagonal geometry; the crystals contain significant amounts of lanthanum, zirconium, and oxygen with trace levels of alkali metals, leading us to tentatively conclude that they are of a lanthanum zirconate compound.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a grant from the National Science Foundation EPSCoR Program (MADE in SC)*

*Faculty Mentor: Maria Gelabert, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## Studies and Prevention of Medial Tibial Stress Syndrome

### Student: Taylor Brown

The purpose of this review was to better understand how to prevent and treat medial tibial stress syndrome (MTSS). Research shows that MTSS is caused by a bone stress reaction that is located on the tibial cortex. With the constant use of our legs, it is not uncommon to see athletes develop MTSS. The studies in this review of literature examine multiple ways that can help prevent MTSS from occurring. The methods in these studies include running programs that indicate how the individual runs from a biomechanical side, exercises such as lunges, Q-stretch, and a few others that help indicate how MTSS is occurring. These methods showed the root from how MTSS is occurring, which will help lead to the problem of how to prevent it. The methods on how to prevent MTSS included a variety of orthotics placed in runners' shoes. In addition, the decrease in leg girth will help minimize the development of MTSS. These methods were shown to prevent stress fractures from occurring, and to treat MTSS if the individual is already affected. Participants have shown a positive response to the prevention techniques. In conclusion, this review can be important for runners to help decrease the risk of MTSS developing, an occurrence that could affect their daily lives. Lastly, this review can help individuals gain a better understanding of how MTSS occurs and learn techniques to treat this syndrome.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## Optimization of a Method of Nucleic Acid Extraction from Three-Dimensional Hydrogel Cultures

### Student: Noel M. Messick

The ability to provide a 3D structure for cellular growth is important for tissue engineering. Previous studies conducted by our collaborators have found that essentially any type of non-cancerous cell will form a toroidal structure within 24 hours of being placed on top of a collagen hydrogel. However, when the cells are mixed into the collagen hydrogel prior to gelation, they remain as a more diffuse network of cells 24 hours later. In contrast, all types of cancerous cells tested fail to form toroids when plated on top of a collagen hydrogel. We are interested in identifying the molecular mechanisms that contribute to the toroidal organization of normal cells and which component(s) are lacking and/or misregulated in cancer cells. One major challenge the project has faced is the inability to obtain sufficient amounts of nucleic acids (both RNA and DNA) from the toroids and gels. Our goal for this part of the project was to optimize methodology for extracting RNA from the different experimental set-ups. High quality RNA is required for real time PCR analyses of genes suspected to be involved in the organization of cells and for prospective identification of differences in gene expression between normal and cancerous cells via RNA sequencing and/or microarray. We show that a hybridized method of RNA extraction yields workable quantities of high purity RNA that can be used in the desired downstream applications.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a grant from the National Science Foundation and the South Carolina EPSCoR/IDeA Program*

*Faculty Mentor: Matthew Stern, Ph.D.*

*CAS – Department of Biology*

## Assessment of Professionals' Knowledge and Attitudes of Grief

### Student: Shelby Anderson

Helping professionals have a unique responsibility to meet the needs of people who are vulnerable and to improve their well-being. Among the vulnerable people in society are those who are experiencing grief and loss. Helping professionals, regardless of their focus on grief and loss, interface with such individuals in different practice settings. Yet they may not always have the expertise, training, and knowledge to provide support. Further, many service workers may feel that they do not need to have basic information on grief and loss because they are not working at a counseling agency. This study seeks to explore the attitudes and knowledge that social service workers have on grief and loss. The attitudes and knowledge that these workers have about the content can affect the quality of service to their clients. The study is a cross-sectional research survey. Nearly 50 participants were drawn from different service agencies. Professionals were recruited by email from local agencies. The results from this study hold significant implications for how students are prepared during the social work program and the kinds of professional development training that service workers receive.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Monique Constance-Huggins, Ph.D.*

*CAS – Department of Social Work*

*(SCWK 471 – Constance-Huggins)*

## Health Behaviors and Their Motivators in College Students: A Literature Review

### Student: Caitlin Pierson

The purpose of this literature review was to investigate the physical activity habits of college students and the particular motivators that lead them to engage in physical activity. Research shows that engagement in physical activity declines over time, with the largest decline happening during adolescent years; unfortunately, coinciding with this decline is an obesity epidemic affecting people of all ages in the United States. The studies in this literature review examine the current physical activity engagement of students at colleges across the United States and show that the majority of students are not meeting the recommendations for adequate physical activity minutes, with some students even reporting no engagement in physical activity. Likewise, more than 20% of students are overweight and obese, and a large number report gaining weight throughout college. In terms of motivators toward engaging in a physical activity routine, these studies showed that, when first starting exercise, students rely on the main extrinsic motivator of physical appearance; however, over time, the intrinsic motivators of enjoyment and fulfillment become the driving forces for maintaining regular physical activity habits. The findings in these studies call on health professionals and professors to implement programs and interventions on college campuses that assist students in increasing their time spent in physical activity, possibly through requiring physical activity classes prior to graduating. Additionally, this review stresses the importance of educating college students on the importance of ingraining physical activity habits with intrinsic motivators in order to create lifestyle habits.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*

## Socioeconomic Factors and Violent Crime

### Students: Casey Brooks and Daniel E. Johnson

The focus of this paper is the effect of social and economic factors on the crime rate from 1960-2014. From 1991-2014, a significant drop in crime of all varieties was observed. There have been many competing explanations as to why this is, both social and economic. This paper measures the effects of unemployment, GDP growth, inflation, and abortion rates against the violent crime rate. It measures these variables in a series of simple and multiple regressions. In terms of violent crime, the abortion rates maintain the highest level of statistical significance with a value of 11.07. It gains significance even controlled for other social and economic variables. This is consistent with our initial hypothesis that the liberalization of abortion rights is a significant causal factor to the decrease in crime starting in the early 1990s.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 350 – Kim)*

## The Consumption of Power and Friendship: Son Goku, Harry Potter, and the Generation Influenced by Their Journeys

### Student: Sarah Costner

My paper is a study of the power of positive and negative consumption in the worlds of the *Harry Potter* and *Dragon Ball* series, and how the series relate to the current generation of college students who grew up reading or watching them. In this essay, I examine the effects of positive attention paid by securing basic sustenance needs for the main protagonists, the negative effects of how undernourishment can affect the development of a hero and his or her journey. I also explore the ways consuming food in the series can lead to friends and problem-solving capabilities, the ways consuming power can corrupt and bring about despair, and the long-lasting effects the main protagonists and antagonists gain from their actions and their consequences, as well as why they are important to the morale of college students today.

*World of Food Interdisciplinary Conference, Winthrop University, February 2019; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Leslie Bickford, Ph.D.*

*CAS – Department of English*

*(ENGL 200 – Bickford)*

## Cognitive Training as a Sharpening Tool for Athletic Performance

### Student: Rhamy Kamel

The purpose of this review is to assess the plausibility of utilizing cognitive training as part of athlete training regimens. The physical aspect of sport is the most often thought-of element pertaining to athletics. How fast? How strong? How high? These questions seem to be the most significant topics of discussion in terms of sport. This is because the physical aspect is typically associated with athletic prowess. However, a key element that is often not mentioned enough in sport is cognition. Sports demand a multitude of different cognitive functions in order for the physical training to be fully manifested. A soccer player who is a great passer must assess the field and find the options quickly, highlighting the role of cognition. Studies examining the impact of cognitive training on different populations, including elderly with and without degenerative brain disease, adults, and children, have all noted significant increases in cognition as a result of cognitive training. The findings in these populations all signify that cognitive training is indeed a plausible method for increasing mental acuity. In terms of athletics, these findings may provide promising new ways of advancing sports training. Mental exercises may be implemented and designed into training programs to maximize both physical and mental outputs of athletes. As a result, athletes may be able to get open quicker, analyze the field more efficiently, and significantly improve their reaction speeds and timing.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*



## Small-Diameter Blood Vessel Tissue Engineering

**Students: Nicholle E. Lewis and Sydney E. Frazier**

Approximately 600,000 damaged blood vessels are replaced annually, and while there are effective methods for large-diameter blood vessel repair, the current methods for small-diameter blood vessel replacement are less effective. Thus, there is a need for new methods of small-diameter blood vessel replacement. Blood vessel tissue engineering involves creating a functional blood vessel *in vitro* that can later be implanted into a patient. For this project, decellularized porcine internal thoracic arteries (PITA) are used as the scaffolds due to their similarity to human thoracic arteries. We used scanning electron microscopy (SEM) to characterize the ultrastructure of both the outer and luminal surfaces of each scaffold. In addition, two cell types crucial to vessel function, 1) smooth muscle cells and 2) endothelial cells, were isolated from PITA and independently cultured to identify optimal conditions for expansion prior to seeding the cells into scaffolds. For each cell type, we compared growth in two different culture media and on several different extracellular matrix (ECM) proteins/components. The AlamarBlue assay was used as an indirect measure of cell viability and numbers. Our results suggest that both cell types experienced higher rates of proliferation in one of the media types tested. In addition, smooth muscle cells showed increased growth on a collagen-coated substrate. Future experiments will focus on seeding cultured smooth muscle and endothelial cells into decellularized PITA scaffolds in the hopes that they will successfully repopulate the scaffolds and confer the functionality needed to later implant the engineered vessels into living organisms.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by a grant from the South Carolina EPSCoR/IDeA Stimulus Research Program*

*Faculty Mentor: Matthew Stern, Ph.D.*

*CAS – Department of Biology*

## Premier League or Major League Soccer: Comparing Spectator Behavior amongst Soccer Fans

**Student: Jordan Walshaw**

Major League Soccer (MLS) has expanded rapidly since its inception, growing from 10 teams in 1996 to 28 teams in 2018. In comparison, the Premier League is one of the wealthiest leagues in the world and currently holds 20 teams. The Premier league has been aired in the U.S. since the 2000s. The purpose of this research was to investigate why the Premier League is more popular in the U.S. compared to the MLS. Several factors were examined to understand why the Premier League is more exciting and more attractive to watch compared to the MLS, including the quality of the league, the athleticism of the league, and the individual players in the league. In order to analyze the data, *t*-tests were conducted. Results indicated that the Premier League was popular in all areas compared to the MLS, and that fans preferred to watch the Premier League compared to the MLS. Using the outcome of this research, sport managers in the MLS can implement effective marketing strategies by benchmarking the Premier League.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Jinowk (Jason) Chung, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(SPMA 390 – Chung)*

## Implications for Successful Aging in Jamaica

**Student: Kali Smith**

Since the 1960s, Jamaica's population has been "greying," or trending toward an increase in life expectancy and a decrease in fertility. This is a mainly a result of two factors: reduced fertility, and reduced mortality as a result of advances in medicine and public health. It is projected that in 2015, nearly a quarter of the Caribbean's population will be over sixty years old, and as of today the Jamaican life expectancy is at nearly seventy-six. Because of this phenomenon, the overall quality of life should be greatly considered for this population. One of the ways in which this can be measured is by using the factors that result in successful aging: absence of disease and disability, engagement with life, and high cognitive and physical function. When these factors are evaluated, then it can become easier to answer this question: how can the quality of life of the Jamaican population over sixty be improved so that successful aging can take place?

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Merry Sleight, Ph.D.*

*CAS – Department of Psychology*

*(PSYC 471, 472 – Sleight)*

## Standard Dilution Analysis Applied to DART-MS: Determination of Caffeine

**Student: Brittney E. Ciesa**

Caffeine is the most-used stimulant in America, with 90% of Americans consuming some form on a daily basis. Caffeine has been shown to have some health benefits, such as improving weight loss, increasing attention and brain function, and reducing the risk of Alzheimer's and Parkinson's diseases. There are, however, several reasons why limiting caffeine consumption could be beneficial. One way to limit intake is to know how much caffeine is in the beverages consumed, information often not printed on the container or label. Direct Analysis in Real Time Mass Spectrometry (DART-MS) is an ionization technique, in which ions are formed at atmospheric pressure, and mass spectra are produced in real time. A wide array of samples can be analyzed directly in this manner, eliminating most, if not all, sample preparation. DART-MS allows for fast and simple identification of compounds, but is not ideal for quantitative analysis due to fluctuations in ion formation. Using Standard Dilution Analysis (SDA) is one potential method to correct for these fluctuations. SDA is a relatively new calibration technique which combines the principles of standard addition and internal standardization. In this method, a series of dilutions allows for the analyte concentration of a sample to be determined using the mathematic relationship between internal standard and analyte signals. This work aims to enhance the quantitative capabilities of DART-MS, by applying SDA/DART-MS to determination of caffeine in commercial beverage samples. Additionally, this work aims to illuminate the advantages of SDA/DART-MS over other more traditional methods.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Cliff Calloway, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552 – Hanna)*

## Differences in Depressive Symptoms by Sociodemographic Characteristics in Cancer Survivors Residing in Central Pennsylvania

### Student: Kellie Cooper

The purpose of this study was to identify the prevalence of depressive symptoms in cancer survivors residing in central Pennsylvania, a largely rural, medically underserved area, and to explore differences in depressive symptoms by sociodemographic characteristics. Cancer survivors were recruited to the Partnering to Prevent and Control Cancer (PPCC) study through the Pennsylvania State Cancer Registry, cancer support groups, churches, and other community organizations. Participants ( $N = 262$ ) completed questionnaires assessing sociodemographic characteristics and completed the Center for Epidemiologic Studies Depression (CES-D) scale to assess depressive symptoms. One-way ANOVA and Tukey post-hoc tests were used to explore differences in CES-D scores by income, race, educational attainment, employment status, marital status, and cancer type. Overall, 19.1% of cancer survivors reported significantly elevated levels of depressive symptoms. Depressive symptoms were statistically significantly different by annual household income ( $F(2, 184) = 8.597, p = 0.000$ ) and employment status ( $F(2, 189) = 14.512, p = 0.000$ ). Cancer survivors who reported an annual household income less than \$40,000 (95% CI: 9.34, 15.94) and were unemployed (95% CI: 11.46, 23.28) reported significantly higher levels of depressive symptoms. These findings suggest that financial strain due to low income and unemployment negatively impact mental health in cancer survivors residing in medically underserved areas in Pennsylvania. Interventions seeking to promote psychological well-being in cancer survivors are needed and should be tailored to those of lower socioeconomic status in an effort to improve cancer survivorship and promote health equity in rural, medically underserved populations.

*Penn State Summer Research Symposium, University Park, Pennsylvania, July 2018; Annual Biomedical Research Conference for Minority Students (ABRCMS), Indianapolis, Indiana, November 2018; Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Supported by the Tobacco CURE Program from the Pennsylvania Department of Health, and by the Summer Research Opportunities Program (SROP) at Penn State University*

*Faculty Mentor: Scherezade K. Mama, DrPH, Pennsylvania State University*

*COE – Department of Physical Education, Sport, and Human Performance*

## Developmental Effects of Inclusion and Integration of Children with Disabilities into Group Physical Activity

### Student: Natalie Royaards

There are key physical, mental, and emotional milestones for children in their developing years. Children with special needs or disabilities often have delays in these developmental progressions. Society plays a large role in this, as there is a general discomfort and stigma around those with disabilities. The purpose of this review of literature is to assess the developmental benefits to children with disabilities of participating in group physical activity with typically developing peers. The studies in this review of literature looked at the social/emotional and physical needs of children with disabilities compared to their typically developing peers, as well as the best methods of encouraging inclusion through sports. The primary methods used were surveys, interviews, and questionnaires. Results suggest that group physical activity inclusion positively affects both physical and social/emotional development in children with disabilities. These studies indicate that inclusion in sports and physical activity settings met children's social and physical needs in areas such as overall physical health, social inclusion, bonds with peers, and many others. These results can be used to implement group interaction between typically developing peers and children with disabilities within settings such as recess, school team sports, club sports, and group fitness. Implementing interactions such as these early in childhood development could inspire peer connections, which would in turn encourage equal participation and inclusion in physical activity, which would boost the overall physical and mental health of children with disabilities.

*Fifth Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2019*

*Faculty Mentor: Joni Boyd, Ph.D.*

*COE – Department of Physical Education, Sport, and Human Performance*

*(PESH 381 – Boyd)*



# 31ST ANNUAL UNDERGRADUATE JURIED EXHIBITION

Each spring, current Winthrop University students are eligible to submit their recent work to the Undergraduate Juried Exhibition. It is an opportunity to have their work chosen by a prominent regional juror to exhibit in a professional gallery setting. Open to students in the Department of Fine Arts and the Department of Design, this annual exhibition showcases Winthrop's brightest talent in areas such as painting, sculpture, jewelry/metals, printmaking, interior design, illustration, and photography. The following list is the selection of artwork in the 31st Annual Undergraduate Juried Exhibition, made by juror Michael Manes, director of Blue Spiral 1 in Asheville, North Carolina. The exhibition will be on display April 8 – June 28, 2019 (reopening August 12 – August 27, 2019) in the Rutledge Gallery.

## **Karen Derksen, M.A.**

*Director, Winthrop University Galleries*

## **Artist**

## **Title**

<b>Amanda Campbell</b>	<i>Primary Connections</i>	<b>Jason Lindsay</b>	<i>Take Care, Take Caution</i>
<b>Amari Brazel</b>	<i>Split</i>	<b>Jason Lindsay</b>	<i>Hair Spoon</i>
<b>Amber Wade</b>	<i>Untitled</i>	<b>Jason Lindsay</b>	<i>Spiral</i>
<b>Ann McLean</b>	<i>I Was Walking Down the Sidewalk the Other Day and Something Made Me Trip and My Last Piece of Bubblegum Fell Out of My Mouth</i>	<b>Jewel Edwards</b>	<i>Brown Paper Bag Test</i>
<b>Ann McLean</b>	<i>Emmy</i>	<b>Jonathan Bolton</b>	<i>Without the Other</i>
<b>Antonio Washington</b>	<i>You Said Everything Was Gonna Be Okay</i>	<b>Jonathan Bolton</b>	<i>Promise of Efficiency</i>
<b>Brenna Golden</b>	<i>Grieving By Proxy</i>	<b>Kai Griffin</b>	<i>Untitled II</i>
<b>Carson Carroll</b>	<i>Beach Butts</i>	<b>Kaitlyn Rogers</b>	<i>Respiration</i>
<b>Clay Rollins</b>	<i>Cobalt</i>	<b>Kaitlyn Rogers</b>	<i>The Hunt</i>
<b>Courtney Nicole Ares</b>	<i>Vase Series 1</i>	<b>Kasey Sears</b>	<i>The Photo was Black and White, but I Knew His Eyes Were Blue</i>
<b>Courtney Nicole Ares</b>	<i>Vase Series 2</i>	<b>Kasey Sears</b>	<i>The Most Beautiful Voice in the World</i>
<b>Edie Estes</b>	<i>La Lune</i>	<b>Kasey Sears</b>	<i>The Worst Dinner Ever</i>
<b>Elizabeth DeLong</b>	<i>Yes the Flowers are Wilting but Please Ignore Them</i>	<b>Katie Karban</b>	<i>Incandescent</i>
<b>Emily Shelton</b>	<i>Jean</i>	<b>Kim Le</b>	<i>Bear My Burdens</i>
<b>Frances Hardaway</b>	<i>The Tube</i>	<b>Kim Le</b>	<i>Now I Know Why They're Called Crackers</i>
<b>Griffin Cordell</b>	<i>Consumer Tendencies</i>	<b>Kim Le</b>	<i>Perfect Statement Piece for a Cocktail Party</i>
<b>Griffin Cordell</b>	<i>Self-Portrait</i>	<b>Kim Le</b>	<i>Cheeto Drops</i>
		<b>Lauren Baechel</b>	<i>Oh Dear!</i>
		<b>Lauren Baechel</b>	<i>Outside</i>
		<b>Lauren Baechel</b>	<i>Inside</i>
		<b>Lena Pregonzer</b>	<i>Mapping Floriography</i>
		<b>Lena Pregonzer</b>	<i>Deer Head Resting on Box</i>
		<b>Madeleine Parker</b>	<i>Patience</i>
		<b>Madeleine Parker</b>	<i>Eerie Traveler</i>
		<b>Madeleine Parker</b>	<i>Little Jester</i>
		<b>Madeleine Parker</b>	<i>Fish Bowl</i>
		<b>Madison Burger</b>	<i>Ryan, I Love You Most</i>
		<b>Madison Burger</b>	<i>Bug Book</i>
		<b>Maggie Claytor</b>	<i>Disposable Thoughts</i>
		<b>Maggie Claytor</b>	<i>A Paperweight Rock Took A Personality Test</i>
		<b>Montana Marsh</b>	<i>In the Garden</i>
		<b>Montana Marsh</b>	<i>Fall Leaves</i>
		<b>Montana Marsh</b>	<i>A Symbol of Hope</i>
		<b>Peyton Tolley</b>	<i>Love</i>
		<b>Rachel Goldie</b>	<i>CONSUMING</i>
		<b>Rachel Goldie</b>	<i>Teddi</i>
		<b>Rachel Goldie</b>	<i>Empty Worship</i>
		<b>Rihanna Rausch</b>	<i>Blue Bird</i>
		<b>Samantha Ross</b>	<i>Deadlines</i>
		<b>Tessa Benoit</b>	<i>BATHE</i>
		<b>Will Lattman</b>	<i>The Light is Coming</i>



**Tessa Benoit, *BATHE***  
Dalton 2<sup>nd</sup> Place



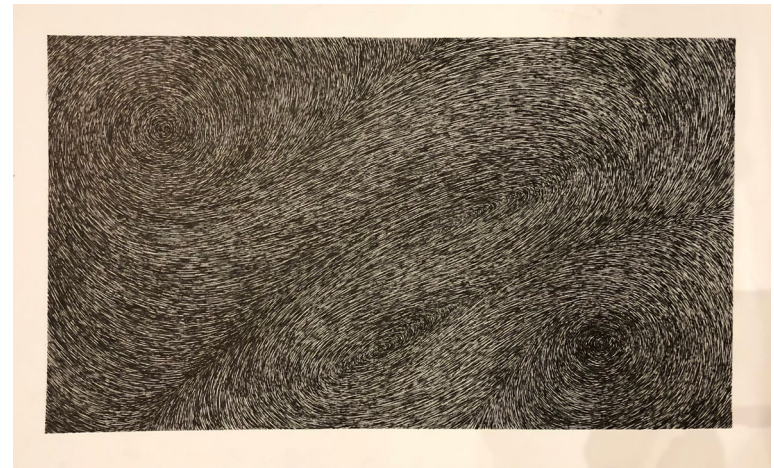
**Jonathan Bolton, *Without the Other***  
Juror's Honorable Mention  
Sponsored by Jeannine Heath



**Jewel Edwards, *Brown Paper Bag Test***  
Dalton 3<sup>rd</sup> Place



**Brenna Golden, *Grieving By Proxy***  
Juror's Honorable Mention  
Sponsored by Springs Creative



**Jason Lindsay, *Spiral***  
Lewandowski Merit Award



**Carson Carroll, *Beach Butts***  
Lewandowski Merit Award



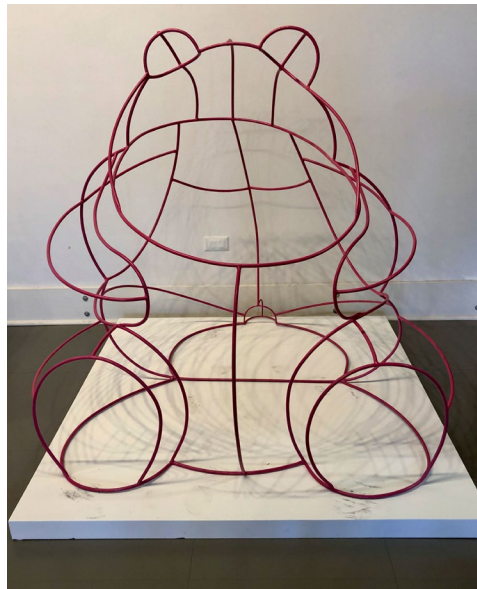
**Griffin Cordell, *Self-Portrait***  
Juror's Honorable Mention  
Sponsored by Springs Creative



**Madison Burger, *Ryan, I Love You Most***  
Dalton 1<sup>st</sup> Place



**Rachel Goldie, *CONSUMING***  
Juror's Honorable Mention  
Sponsored by Founders Federal Credit Union



**Kim Le, *Bear My Burdens***  
Dalton Best In Show



**Kasey Sears, *The Most Beautiful Voice in the World***  
Juror's Honorable Mention  
Sponsored by Springs Creative

# DEPARTMENT OF DESIGN INTERIOR DESIGN SENIOR PORTFOLIO SHOW

## Designer Statements

### Megan E. Butler

"Locally inspired, technology driven." Creating an environment inspired by the beauty of Colorado paired with the ever-advancing world of technology is what NEXT is all about. This commercial firm will boost the morale of those who inhabit it by creating an atmosphere that is modern and calming, yet makes a bold impact on the senses. The goal of NEXT is to create a working environment that moves away from traditional office hierarchies by creating nomadic work zones accessible to all.

### Kailey M. Cox

Duende is a high-end fusion style restaurant based in Charlotte, North Carolina. The restaurant encompasses a sense of emotion and passion which was completely inspired by the past traditions of bull-fighting in Spain. The whole concept of Duende is placed around the bull, in the fact that it stands for strength, passion, and fulfillment.

### Anna M. Geilfuss

NEXT requested that this space be inspired by the local region. This space was inspired by how Denver and its economy became what they are today, through mining. The curves and angles create a relaxing yet modern space. The curves also allude to the water from the creeks where miners would find gold and other minerals. The neutral colors represent how the outdoors is a large component in Denver. Water features are also placed in the space to create white noise, but also to create a creek-like essence.

### Holli R. Hinds

Wattaue's is a high-end French restaurant that is decorated in Rococo décor. The style is known for its high ornamentation, light colors, and elegant appearances. Wattaue's guests will dine feeling like high-class French royalty. The restaurant is also decorated with some of the most famous works of Wattaue, a well-known French Rococo painter, including *Pilgrimage to Cythera*, *The Feast of Love*, and *Mezzetino*.

### Morgan C. Soto

This residential home expresses a Spanish style using terracotta flooring, dark wooden beams, archways, and beige stucco ceilings in the kitchen and throughout the home.

### Ellianna M. McManis

Shuk, a fine dining restaurant in Charlotte, North Carolina, serves dishes that give an upscale twist to Israeli street food. The design inspiration comes from the flowers seen at the Israeli market and floral menswear, as Israel is one of the top floral exporters.

### Khadijah O. Odom

Next is a real estate and project management firm located in Denver, Colorado. The design is to create an environment that "supports how they work and how they may work in the future," by providing multiple areas within the facility that are designated for collaborating with coworkers. Most or all of the wall systems that are set in place are de-mountable and movable, if needed. To attract the younger demographic, modern design elements and technology have been implemented, including abstract forms with shapes, color, texture, open space, minimalistic elements, and straight lines.

### Tyara I. Olden

NEXT global is a commercial real estate and project management firm. The local Denver region is the inspiration for their new office. Minimal design is important, as employee wellness is essential to the company, NEXT wants to ensure their employees are happy and healthy, biophilic elements.

### Abigail E. Parisot

Stepping into the future of corporate design, the Next project elevates traditional work environments by creating collaborative, social, and nomadic zones that encourage teamwork and versatility. Bold colors paired with natural light and biophilic design create the sense of a calm, focused workplace.

### Victoria Waddington

Scale is a high-end accessory store located in Toronto, Canada, and inspired by the Cloud Gardens. Scale showcases the materials and fabrics used in their pieces using the golden ratio, allowing the consumer to appreciate the final product and the pieces that make it up.

### Kylie Worman

Next is a global commercial real-estate and project management firm that has expanded to Denver, Colorado. The overall design for the new office reflects a sleek, modern space with bold character and a sense of history embodied by the converted industrial loft. Exposed brick walls, rugged wood, and enormous steel windows create a sense of laid-back cool. The furniture used possesses a sturdy, utilitarian look combined with a touch of retro. That, along with strategic choices in lighting and accessories, hones in on an urban industrial vibe.



**Megan E. Butler, NEXT**



**Anna M. Geilfuss, NEXT Commercial Office Space**



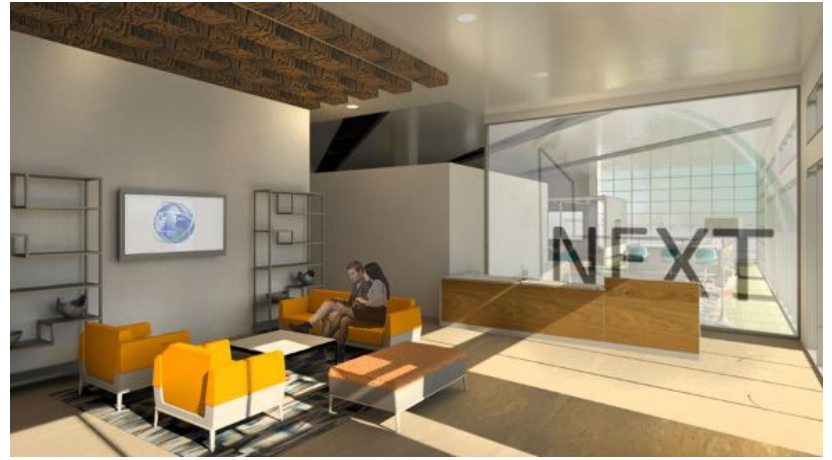
**Kailey M. Cox, Duende High-End Fusion Style Restaurant**



**Holli R. Hinds, Wattaeu's**



**Morgan C. Soto, Residential Home**



**Khadijah O. Odom, NEXT**



**Ellianna M. McManis, Shuk**



**Tyara I. Olden, NEXT Real Estate Office**





**Abigail E. Parisot, NEXT**



**Victoria Waddington, Scale High-End Retail Space**



**Kylie Worman, NEXT**

# DEPARTMENT OF FINE ARTS EXHIBITION

## **Mapping Our Identity**

34.9249° N, 81.0251° W

Although most commonly used to depict geography, a map may represent any space, real or imagined, with or without regard to context or scale. A map tells a story; it can be described as a visual representation or documentation of a physical, spiritual, real, or metaphorical place/location, area, emotion, or time. Maps can be symbolic depictions highlighting relationships between people or elements of space, such as objects, regions, and themes. They can also augment metaphoric associations related to exploration and documentation, along with experience and memory.

*Mapping our Identity*, 34.9249° N, 81.0251° W metaphorically maps the individual journeys of the artists in the ART 205 2D Media course. The geographical coordinates 34.9249° N, 81.0251° W, mark the location where this work is being made by the artists, in Rock Hill, South Carolina.

The resultant works are a collaborative atlas containing personal maps, illustrations, graphic analyses, tables, charts, and plates that systematically illustrate a particular subject related to mapping and documentation from within each artist's desired exploration.

### **Karen Oremus, M.F.A.**

*Chair, Department of Fine Arts  
College of Visual and Performing Arts*

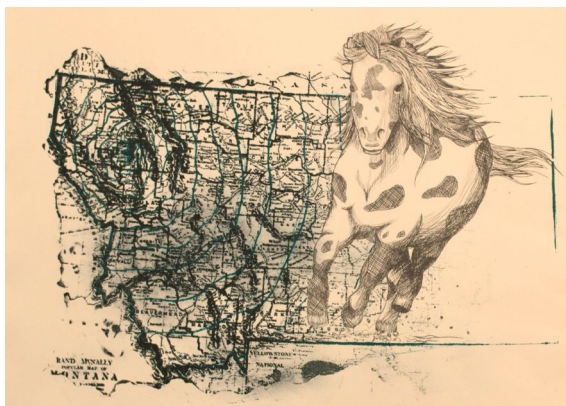
The works in this exhibition are a mixed media exploration of drawing and printmaking from the two-dimensional media studies courses of Karen Oremus and Anna Dean.



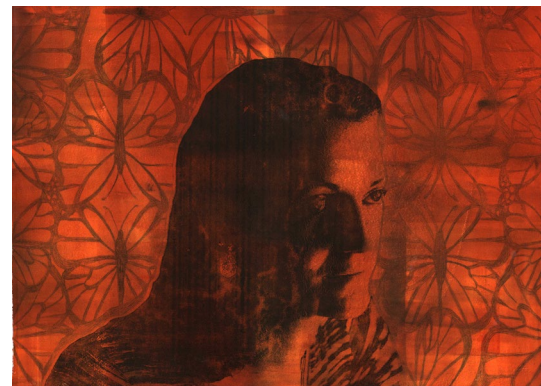
**Bretta Rowan, *Motherhood***



**Jade Solch, *CIRCLE OF LIFE***



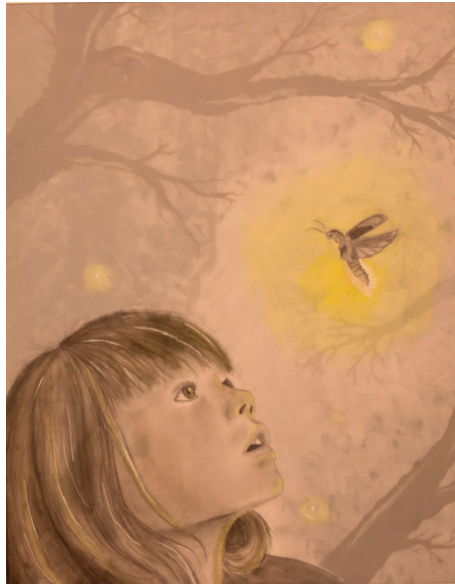
**Bretta Rowan, *Flathead Lake Native***



**Jamie Rankin, *Dawn***



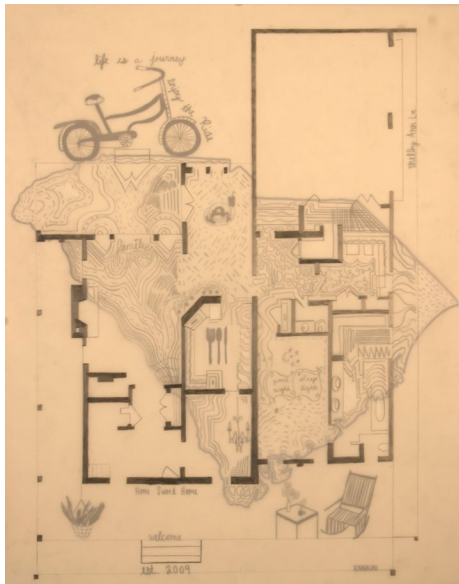
**Erin Betfort**, *Mapping Home*



**Montana Marsh**, *Untitled*



**John Drake**, *Remembrance 2*



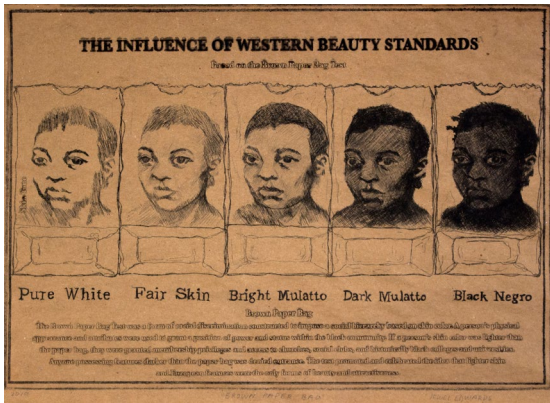
**Jamie Rankin**, *ShelbyAnn*



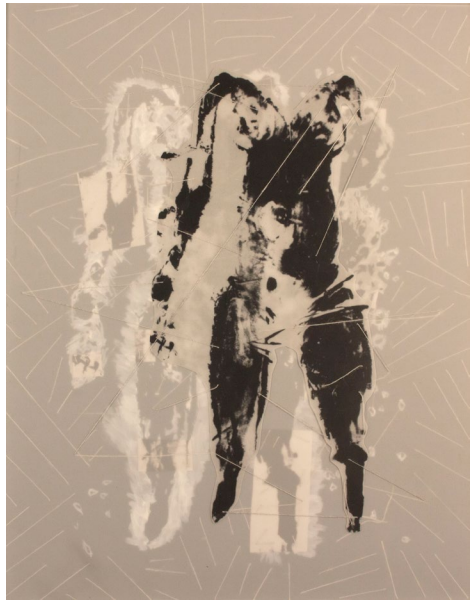
**John Drake**, *Tranquility*



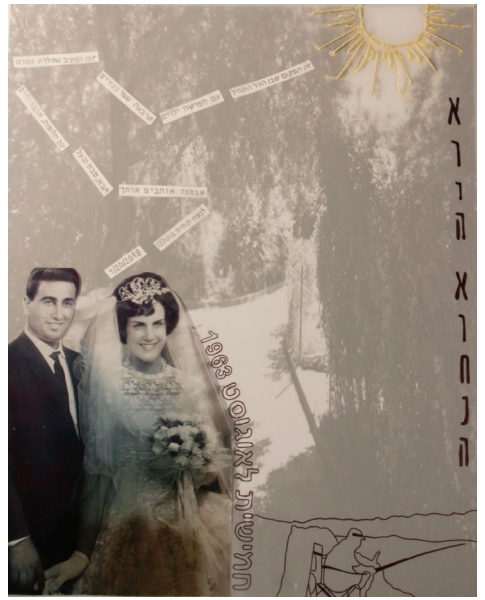
**Kennedy Passman**, *Higherbeing*



**Jewel Edwards, *Brown Paper Bag Test***



**Lauren Baechel, *Inside***



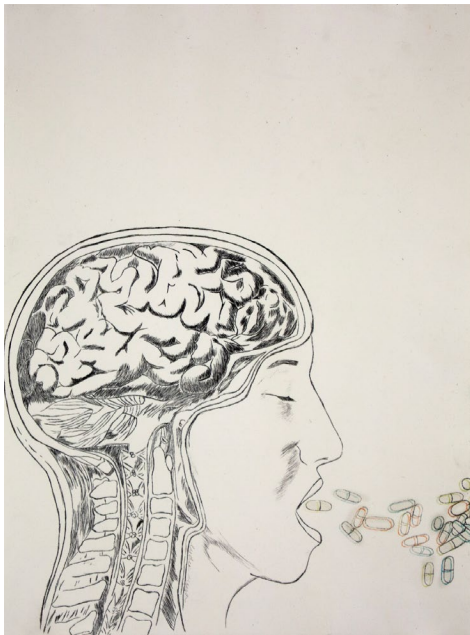
**Tal Tamir, *August 5<sup>th</sup> 1963***



**Lauren Baechel, *Mapping Self***



**Lauren Blakely, *SuperStorm***



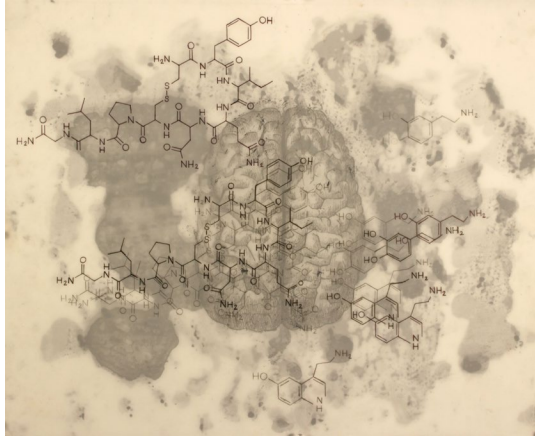
**Lydia Reynolds, *Untitled***



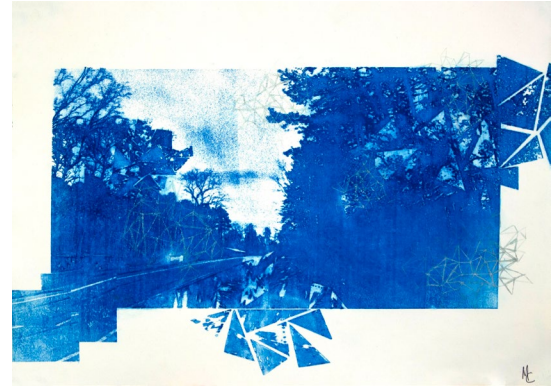
**Shadae Tompkins, *Shade***



**Peyton Tolley, *Mapping Home***



**Riley O'Rourke, *Untitled***



**Madi Carranza, *Print***



**Shadae Tompkins, *SHADAE***



**Shannon Ratchford, *Print***



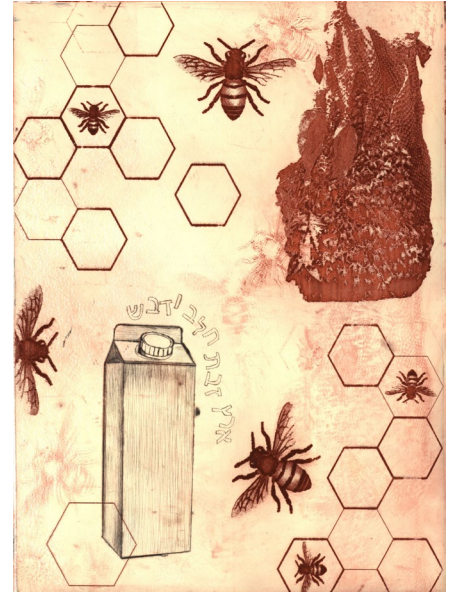
**Lena Pregoner, *Mapping Floriography***



**Rachel Hunnicut, Etching**



**Montana Marsh, Those Who Give Hope**



**Tal Tamir, Land of Milk and Honey**



**Seth Shull, Mapping Paths**



**Riley O'Rourke, Day of the Dead**



**Peyton Tolley, Untitled**



# DEPARTMENT OF MUSIC UNDERGRADUATE RECITALS

## Student Recitalists

**Marissa Gunter**, clarinet

B.M.E., Performance focus  
Faculty Mentor: Deborah Loomer, D.M.A.

**Joseph Ritchie**, tuba

B.M.E., Performance focus  
Faculty Mentor: Douglas Black, D.M.A.

**Anna Gilreath**, clarinet

B.M.E., Instrumental  
Faculty Mentor: Deborah Loomer, D.M.A.

**Matthew Grant**, trombone

B.M.E., Instrumental  
Faculty Mentor: Justin Isenhour, D.M.A.

**Joseph Kindig**, horn

B.M.E., Instrumental  
Faculty Mentor: Robert Rydel

**Tyler Sebastian**, composition

B.M., Composition  
Faculty Mentor: Leonard Mark Lewis, D.M.A.

**Alex Dudek**, trumpet

B.M., Performance  
Faculty Mentor: Marisa Youngs, D.M.A.

**Brian McFadden**, tuba

B.M.E., Instrumental  
Faculty Mentor: Douglas Black, D.M.A.

**Matthew Grant**, bass trombone

B.A., Music  
Faculty Mentor: Justin Isenhour, D.M.A.

**Charles Faris**, baritone

B.M.E., Choral  
Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Ana Barkley**, soprano

B.M.E., Choral  
Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Amanda Mobley**, mezzo soprano

B.M.E., Choral  
Faculty Mentor: Kristen Wunderlich, D.M.A.

**Megan Calkins**, soprano

B.M.E., Choral  
Faculty Mentor: Kristen Wunderlich, D.M.A.

**Kaitlyn Hayward**, mezzo soprano

B.M.E., Choral  
Faculty Mentor: Kristen Wunderlich, D.M.A.

**Nicholas Willey**, piano

B.M., Performance  
Faculty Mentor: Matthew Manwarren, D.M.A.

**Branden Ebron**, percussion

B.M.E., Instrumental  
Faculty Mentor: Adam Snow, D.M.A.

**Mark Ewell**, percussion

B.M.E., Instrumental  
Faculty Mentor: Adam Snow, D.M.A.

**Lukas Ferrell**, saxophone

B.M., Performance  
Faculty Mentor: Tracy Patterson, D.M.A.

**Cheyenne Johnson**, saxophone

B.M., Performance  
Faculty Mentor: Tracy Patterson, D.M.A.

**Tyler Sebastian**, flute

B.M., Composition  
Faculty Mentor: Jill O'Neill, M.M.

**Danielle Holmes**, flute

B.M., Performance  
Faculty Mentor: Jill O'Neill, M.M.

**Kathryn Kesler**, flute

B.M., Performance  
Faculty Mentor: Jill O'Neill, M.M.

**Joshua Leyda**, composition

B.A., Music  
Faculty Mentor: Leonard Mark Lewis, D.M.A.

**Eric Roberts**, tenor

Non-Degree  
Faculty Mentor: Jeffrey McEvoy, D.M.A.

**Olivia Schumpert**, soprano

B.M., Performance  
Faculty Mentor: Kristen Wunderlich, D.M.A.

**Kayla Pemberton**, soprano

B.M., Performance  
Faculty Mentor: Kristen Wunderlich, D.M.A.

**Sydney Merck**, piano

B.M., Performance  
Faculty Mentor: Matthew Manwarren, D.M.A.

**Brittany Winans**, mezzo soprano

B.M., Performance  
Faculty Mentor: Corey Lovelace, M.M.

## Piano accompaniment provided by:

Jennifer Austin  
Kelly Bowker  
Janice Bradner  
Zinori Broñola  
Lannia Broñola-Dickert



# DEPARTMENT OF THEATRE AND DANCE FESTIVALS AND SHOWCASES

## Fall Student-Directed One-Act Festival, November 2018

*Jimmy the Antichrist* by Keith J. Powell, directed by **Stephanie Seabrooks**

*A lively, entertaining and eclectic mix of one-act plays directed by advanced theatre students*

*Counting to Three* by Joe Anson, directed by **Zay Vorderstrasse**

*Faculty Coordinator: Sarah Provencal*

*You Do Love Me, Don't You?* by Claire Demmer, directed by **Destiny Tyrone**

*Waiting on Trains* by D. M. Larson, directed by **Jenny Watson**

*Spitting Daisies* by Kerri Kochanski, directed by **Caroline Hunter**

*Any Body for Tea* by C. B. Gilford, directed by **Joy White**

## Spring Student-Directed One-Act Festival, April 2019

*Boys Will Be...* by Stephen Redmond Byrum, directed by **Kaitlyn Dillard**

*A lively, entertaining and eclectic mix of one-act plays directed by advanced theatre students*

*Screaming, Humming* by Hannah Manikowski, directed by **Makala Becker**

*Faculty Coordinator: Sarah Provencal*

*The Devil is in the Details* by Jill Elaine Hughes, directed by **Emma Townsend**

*Three Women and an Onion* by Ryan Bultrowicz, directed by **Cordasha Monroe**

*The Gift* by Simon Fill, directed by **Emily Angelou**

*'Dentity Crisis* by Christopher Durang, directed by **Thomas Cunningham**

*Heights* by Amy Fox, directed by **Aimee Grace Wilson**

## Senior Choreography Showcase, December 2018

*Angular Language*, choreographed by **Erika McLendon**

*This showcase of modern dance works features the choreographic talents of senior dance majors.*

*Centered*, choreographed by **Katelyn Arledge**

*Faculty Coordinator: Kelly Ozust*

*Finding Comfort with You*, choreographed by **Justin Johnson**

*They will never be...*, choreographed by **Kylie Smith**

*Gallows Hill*, choreographed by **Hannah Leonard**

*Moving Through*, choreographed by **Lauren Dunlap**

*Cracked Foundation*, choreographed by **Tiffany Moss**

## Student Choreography Showcase, April 2019

*Seasons*, choreographed by **Emily Bolinger**

*Enjoy modern dance works choreographed by advanced dance majors.*

*Mother's Scars*, choreographed by **Gabrielle Wehr**

*Faculty Coordinator: Julianna Hane*

*Faux*, choreographed by **Christal Ross**

*Order and Chaos*, choreographed by **Emmalee Bradley**

*Hey Sissy, I learned how to smile*, choreographed by **Katelyn Haney**

*Baggage Claim*, choreographed by **Kylah Gunter**



# ADDITIONAL PROJECTS

## Comparison of Erosion Control Measures along Trails in Two Parks

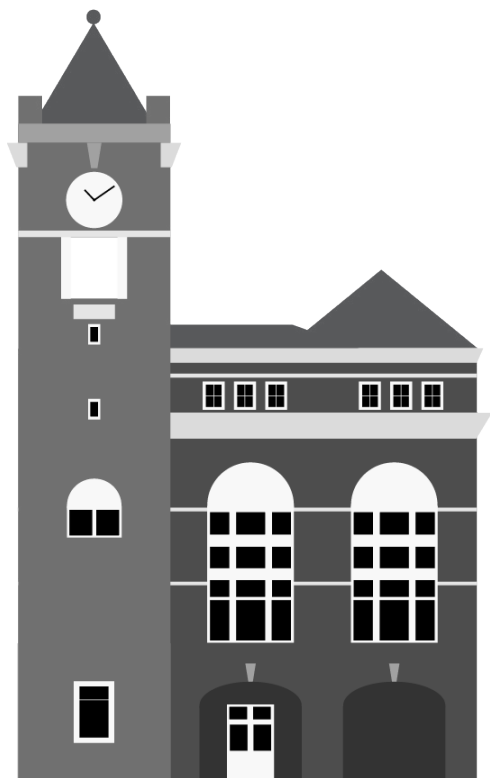
**Student: J. Devin Walker**

Selected conditions along hiking trails in Kings Mountain National Military Park were compared to those in neighboring Kings Mountain State Park (S.C.). Hiking trails included the Browns Mountain Trail and the Battlefield Trail within the national park, the Kings Mountain Nature Trail and the Living History Farm Trail within the state park, and the Kings Mountain Hiking Trail (or Park Loop trail) which passes through both the national park and the state park. Every quarter mile (shorter trails) or half mile (Park Loop Trail), trail width was measured, general trail conditions were observed, and the presence or absence of erosion-control measures was noted. On the natural surface trails, few differences were observed between trails within the same park and between parks. Both the national and state parks appear to manage their trails similarly. Further study should include more parks and multiple parks managed by the same agency.

*Faculty Mentor: Marsha Bollinger, Ph.D.*

*CAS – Department of Interdisciplinary Studies*

*(ENVS 495 – Bollinger)*



## Characterization of the Metal-Dependency of a Streptococcal Phosphatase

**Student: Kiera Alexander**

Protein phosphatase (PhpP) is a metal-dependent phosphatase that relies on metals to function and cause dephosphorylation. Specifically, in *Streptococcus pneumoniae*, there are three functional proteins within the system: the regulator of iron transport (Rit-R), serine-threonine kinase (StkP), and protein phosphatase (PhpP). In the system, StkP receives an extracellular signal and causes ATP to be converted to ADP, allowing for Rit-R to be phosphorylated. PhpP then prevents the creation of iron machinery by dephosphorylating Rit-R. Iron is necessary for the bacteria to be viable, but under high concentrations it is capable of causing oxidative stress through reactive oxygen intermediates (ROIs) and the production of hydroxyl radicals; these radicals are capable of attacking macromolecules within the cell and promoting tissue injury and cell death. Since iron plays such a critical role in the bacteria, the purpose of this study is to determine whether protein phosphatase is the metal sensor in *Streptococcus pneumoniae* bacteria. The initial steps in this study involved obtaining a reasonable and functional amount of PhpP with which to conduct kinetic assays. This process includes growth, harvesting, lysis, and purification through chromatography. We then conducted kinetic assays using *para*-nitrophenylphosphate (PNPP) and manganese as surrogates for Rit-R and iron. In this way, we were able to assess the rates at which the substrate binds to the enzyme and the number of times each enzyme converts substrate to product, known as the turnover number or  $k_{cat}$ . For manganese, we obtained an average  $k_{cat}$  value of  $6.241 \text{ min}^{-1}$ . This further allowed us to conduct other PNPP assays using iron under anaerobic conditions, which gave us a  $k_{cat}$  value of  $12.38 \text{ min}^{-1}$ . With these two data sets, we were able to compare the kinetic values and determine how much more efficient iron was at activating the enzyme in the experiment. With these findings, the lab anticipates creating more reproducible data, determining how tightly the substrate binds to the enzyme, and analyzing the affinity for iron under physiological conditions.

*Supported by an SC INBRE grant from the National Institute of General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Nicholas Grosseohme, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## A New Species of Platyhelminthes from the Beaches of North Carolina

**Student: Mikhail Anfinson**

The Platyhelminth fauna of the North American East Coast is under-described. For example, unpublished historical work by the late R. M. Rieger in the late 1960s and 1970s recorded approximately 10 members of the Order Proseriata and 40 members of the Order Kalyptorhynchia from the North Carolina coast. In the intervening nearly half-century, fewer than a dozen of these species have been described. Here we provide a description of *Antemonocelis andreasi* (Proseriata, Monocelididae). *P. andreasi* is interesting because molecular phylogeny (18S/28S) places it as the most primitive species in the family Monocelididae, and its suprataxon (Proseriata) currently occupies an uncertain position in transcriptomic phylogenies, rendering important informed selection of additional Proseriate species from which to obtain additional transcriptomes.

*Supported by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: Julian Smith III, Ph.D.*

*CAS – Department of Biology*

## Expression of Protein C Receptor in Prostate Cancer

**Students: Austin Brewington and Jessika Bonner**

Prostate cancer remains the second leading cause of cancer deaths in men in the United States. We investigated the expression of a transmembrane receptor, endothelial cell protein C receptor (EPCR), in a prostate cancer cell line.

EPCR is normally expressed by endothelial cells in blood vessels, where it functions as a member of the anti-coagulant protein C system. The localization and function of EPCR on endothelial cells is well documented. Our previous studies have shown that EPCR's endothelial cell coreceptor, thrombomodulin, is also expressed by prostate tumor cells *in vivo* and *in vitro*, where it regulates proliferation and invasion by these prostate tumor cells. Our goal was to also localize EPCR in the prostate tumor cell line PC-3. Western blotting of cell media and cell lysates from PC-3 cells demonstrated that EPCR is expressed by the prostate cancer epithelial cells, providing additional evidence that the anticoagulant protein C system, specifically thrombomodulin and EPCR, are involved in prostate cancer progression. We are currently quantifying EPCR expression in the PC-3 cell line using ELISA and determining what prostate cancer-associated growth factors affect EPCR expression in this cell line.

*Supported by the McKay Urology Endowment Fund*

*Faculty Mentor: Laura Glasscock, Ph.D.*

*CAS – Department of Biology*

## Synthesis of Sulfonamides using Visible Light Photoredox Catalysis

**Student: Madison A. Merrill**

Sulfonamides are commonly found in many pharmaceuticals. Comprised of sulfonyl and amine subgroups, sulfonamides are highly sought after in the medical field for the treatment of bacterial infections, among other applications. Previously synthesized using less robust techniques, our group was specifically interested in using visible light photoredox catalysis to promote the addition of potassium organotrifluoroborates to sulfonyl imines as a way to synthesize these compounds. The photocatalyst involved in this approach is often a ruthenium or iridium polypyridyl complex, which absorbs light in the visible range to give a relatively long-lived excited state, which can engage organic substrates in a series of single-electron-transfer (SET) events. The organic radicals thus generated participate in downstream reactions leading to the final product(s). The fact that these photocatalysts can function as both SET oxidants and reductants within the same cycle suggested the possibility of a selective, redox-neutral radical generation and addition strategy to achieve this goal. Initially, we found that a dichloromethane solution of potassium isopropyltrifluoroborate and *N*-benzylidinemethane-sulfonamide (**1**), when irradiated at room temperature with 450 nm LEDs in the presence of the photocatalyst Ir(dFCF<sub>3</sub>)<sub>2</sub>(bpy)PF<sub>6</sub>, resulted in a low yield of the desired adduct; optimization of solvent and catalyst revealed that 1,4-dioxane, along with Ir(dFCF<sub>3</sub>)<sub>2</sub>(bpy)PF<sub>6</sub> gave the highest yield of product. We therefore evaluated the reaction of other potassium alkyltrifluoroborates with **1** in dioxane in the presence of Ir(dFCF<sub>3</sub>)<sub>2</sub>(bpy)PF<sub>6</sub>, which led to a moderate yield of desired product in each case.

*Supported by the Donors of the American Chemical Society Petroleum Research Fund and by an SC INBRE grant from the National Institute for General Medical Sciences (NIH-NIGMS)*

*Faculty Mentor: James M. Hanna Jr., Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

## Exploring the Relationship between DNA-binding, Oxidation, and Phosphorylation of RitR in *Streptococcus pneumoniae*

**Student: Lucia Rodriguez**

*Streptococcus pneumoniae* (*S. pneumoniae*) is a pathogenic bacterium that can cause pneumonia, bronchitis, meningitis, and many other life-threatening diseases. This bacterium requires iron as an essential nutrient for survival, and it acquires it by internalizing it from outside the cell. Iron transport in *S. pneumoniae* is regulated by a two-component system composed of a response regulator, RitR (repressor of iron transport), and a sensor kinase, StkP (serine-threonine kinase). RitR binds to DNA to repress transcription of the *piu* (pneumococcal iron uptake) operon, preventing iron transport components from being expressed in the cell. According to the typical two-component regulatory mechanism, StkP phosphorylates RitR upon sensing extracellular iron, causing RitR to dissociate from DNA and allowing transcription of iron transport components. However, recent work suggests that RitR functions via an atypical regulatory mechanism by acting as a redox sensor. There is a single cysteine residue, Cys128, which acts as a redox sensor to control DNA binding and *piu* expression. The goal of this project was to provide a biophysical characterization of this redox-sensitive mechanism by measuring the DNA-binding properties of RitR and how they are affected by oxidation and phosphorylation of the protein. RitR was successfully expressed in *Escherichia coli* cells and purified by a combination of ion-exchange and gel filtration chromatography. Currently, methods are still being improved in order to obtain the fully oxidized and fully reduced forms of RitR. In the future, we would like to investigate differences in DNA-binding activity under different states of oxidation and phosphorylation.

*Faculty Mentor: Nicholas Grosseohme, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552 – Hanna)*

## Tissue Culture and Plant Regeneration of the Endangered Schweinitz's Sunflower (*Helianthus schweinitzii* Torr. & A. Gray)

**Student: Evelyn J. Abraham**

The objective of this study was to examine and optimize *in vitro* propagation methods of an endangered sunflower species, Schweinitz's sunflower. Excised stem segments of this sunflower were grown *in vitro* on MS nutrient media containing varying combinations of indole acetic acid, IAA (auxin), and/or benzyl amino purine, BAP (cytokinin) as growth factors. Stem-node pieces were grown on MS medium with three different concentrations of BAP: 0.1, 0.5, and 1.0 ppm. The preliminary results suggest that the number of shoots increases as the level of BAP increases, with the optimal concentration of 0.5 ppm. When the stem internode pieces were placed on the MS media containing varying combinations of BAP [0, 0.1, and 0.5 ppm] and IAA [0, 0.1, and 0.5 ppm], the media with both BAP and IAA promoted the internode segments to form callus, shoot, and root. The results indicate that the media with 0.5 ppm BAP and 0.1 ppm IAA provided the maximum yield of new plantlets forming both shoot and root. Plantlets with healthy shoots and roots were transplanted into a soil mixture and kept inside a mist-box in a controlled greenhouse. After 4 weeks following the transplantation, all the transplanted plants were healthy. These results confirm that the determined optimal amount of BAP and IAA could initiate callus and plantlet growth, indicating that *in vitro* techniques are useful for the species.

*Supported by a grant from the Winthrop University Research Council*

*Faculty Mentor: Kunsiri Grubbs, Ph.D.*

*CAS – Department of Biology*

## Examining whether a Novel Chicken mRNA Could Be an LPA Receptor

**Student: Aida Kelic**

*Faculty Mentor: Eric Birgbauer, Ph.D.*

*CAS – Department of Biology*

Lysophosphatidic acid (LPA) is a water-soluble phospholipid that can be found in vertebrate and nonvertebrate organisms, where it plays an important role in many biological mechanisms. Due to one of its functions, which is the ability to stimulate cell proliferation, LPA signaling has a significant role in medicine, especially cancer. LPA signals other cells by binding to the cell surface G-protein-coupled receptors. There are currently six known LPA receptors, LPAR1, LPAR2, LPAR3, LPAR4, LPAR5, and LPAR6. We have discovered a novel mRNA in chickens which, in part, is structurally identical to LPAR2. Due to this similarity with LPAR2, we are trying to determine if the discovered mRNA is an LPA receptor. We have previously cloned LPAR2 and the new mRNA into an expression vector and tagged them with red fluorescent protein on either the C- or N-terminus by transfecting the cloned DNA into B103 cells, which do not respond to LPA signaling without the presence of an LPA receptor. We have created three cell lines: LPAR2, mRNA, and a control cell line. After protein expression is validated, we will analyze the cells and observe whether cell rounding has occurred. This is an established functional assay for LPA receptors, as B103 cells expressing a known LPAR will round up upon treatment with LPA, while control B103 cells will not. If cell rounding occurs, we would conclude that the novel mRNA discovered in chickens is an LPA receptor.

## Why African Americans Do Not Vote as Much as Their Counterparts

**Student: Kriseanna Cotton**

*Faculty Mentors: Jennifer Disney, Ph.D., and Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

When we evaluate the numbers during election time, it is clear that there is a significant difference in voter participation. We often look at the demographics that include age, geographic location, or gender, which are all things that can be the deciding factor of the conclusion of an election. When African American voter participation is great, it can make history, as we have seen with the election of Barack Obama and many new African Americans in office. My research paper will explore the many elements that contribute to the low percentages of black voter turnout in America compared to their counterparts. Recently, there have been many studies that show how much of an impact the black vote can have, and it puzzles some as to why African Americans do not vote as much as they can. This paper will begin with the history of African Americans getting the right to vote, and then lead up to the factors that turn African American voters away from the polls. Some of these factors include issues in black communities, unequal representation, mass incarceration, and state laws that enable discrimination in voting polls. My research question is the following: What are the elements that turn African Americans away from the voting polls? My main argument is that African Americans do not vote as much as their counterparts because there are more obstacles built up against them than there are advancements for them in today's politics. My paper will use qualitative as well as quantitative data sources because this topic is not just about numbers; it is about the facts, feelings, opinions, and observations that contribute to lower voter turnouts in black communities. My sources will allow me to explore the data and statistics as well as testimonials and observations of African Americans during elections.

## Effects of Education on Intergenerational Poverty in America

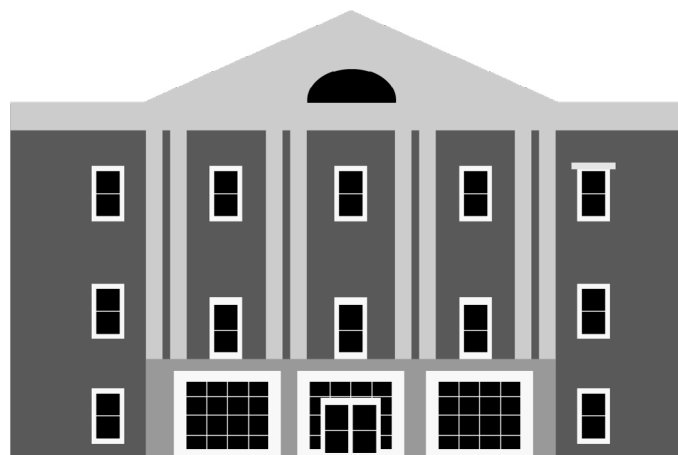
**Student: Zaire Dartis**

*Faculty Mentors: Jennifer Disney, Ph.D., and Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

Intergenerational poverty is a phenomenon interconnected to several components that afflict the lives of millions in America. It is unfeasible to pinpoint one specific reason for the existence of poverty, but one can hypothesize a main catalyst for poverty in America. The main catalyst I will be discussing in this paper is education and its effect on reducing intergenerational poverty in America. I will examine the relationship between intergenerational poverty, education, incarceration rates, race, gender, and economic development. I will mainly rely on scholarly sources and qualitative studies to form a conclusion about the effects of education on poverty. I also plan on incorporating an interpersonal component to this paper by integrating my own experience with a local non-profit, "A Place For Hope," which provides basic needs and educational services for impoverished Rock Hill residents. I believe that including this into my research paper will provide a more in-depth and personal scope on poverty in America. The intended goal of this paper is to provide a closer look at poverty and the effects education can have, with the hope that a solution can be provided in order to eradicate the continuing cycle of intergenerational poverty.



## An Intersectional Analysis of Choosing Parenthood through Alternative Methods

### Student: Schae Daly

This research looks at adoption, In Vitro Fertilization (IVF), and surrogacy as paths of “choosing” parenthood and identifies potential struggles that parents face when choosing these methods. The purpose is to analyze how different variables or factors impact prospective parents through an intersectional lens. The five variables that are the focus of this research are gender, class, sexuality, marital status, and disability. These are all factors that have, in some way or another, impacted a prospective parent’s ability to adopt a child. Along with identifying these variables and how they may impact parents’ ability to adopt a child, this information is then used to determine “to what extent” each of these variables impacts this process. There is no evidence that shows any one variable as the determining factor for eligibility; rather, each of these variables has differing effects on the adoption process. When examining these variables, some adoption agencies have displayed discriminatory practices within the adoption process. This research is intended to identify the extent of this discrimination and in which variables this is most prevalent.

*Faculty Mentor: Jennifer Disney, Ph.D.*

*CAS – Department of Political Science*

## How Socioeconomic Factors Affect Homicide Rates and Prison Populations

### Students: Kalah Mitchell and Miesha Richardson

This study examines the determinants of homicide rates and prison populations of five selected countries. In particular, it seeks to explore whether socioeconomic factors explain homicide rates and prison populations. This study uses panel data analyses on the United Nations dataset consisting of Brazil, Japan, Switzerland, the United States, and Venezuela for the period from 2010 through 2017. The independent variables that measure socioeconomic factors include unemployment rates, years of schooling, gross national income, and income inequality. This study finds that the income inequality and the unemployment rates are both positively associated with homicide rates, and this result is statistically significant at the 95% confidence level. On average, for every increase in percentage of the labor force that is unemployed, we expect to see a 5.422 per 100,000 people increase in homicide rates. Additionally, for a 1% increase in income inequality, we expect to see a 1.177 per 100,000 people increase in homicide rates on average. When analyzing prison populations as our dependent variable, however, only unemployment rates but no other socioeconomic factors are found to have statistically significant effects on prison populations. In particular, as unemployment rates increase by 1%, we expect to see an increase of 165,843 people in the prison population on average. Our findings imply that socioeconomic factors may have a higher explanatory power for countries’ homicide rates than for their prison populations.

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 350 – Kim)*

## Causes for Opioid Overdose

### Students: Antonio Santos, Daniel Branham, and Tim Cunningham

Every year, students around the world get to partake in one of the biggest online mathematical modeling competitions, the Mathematical Contest in Modeling (MCM) from COMAP, the Consortium for Mathematics and its Applications. The competition lasts from Thursday to Monday and requires students to analyze, model, and provide a written report on a real-world problem. For this year’s competition, our group chose to work on the problem that related most to data science. Using the data provided, we built a mathematical model to describe the spread and characteristics of the reported synthetic opioid and heroin incidents (cases) in and between the states of Ohio, Kentucky, West Virginia, Virginia, and Tennessee over time. Using the model, we not only identified possible locations where specific opioid use might have started in each of the five states, but we also were able to predict future trends of opioid cases. Using U.S. Census socio-economic data provided, we were able to identify use or trends-in-use associated with some of the features presented in the U.S. Census socio-economic data. Using everything collected, we were also able to come up with a possible strategy for countering the opioid crisis. Results of the competition will not be available until mid-April.

*Faculty Mentor: Zach Abernathy, Ph.D.*

*CAS – Department of Mathematics*

*(MATH 303 – Z. Abernathy)*

## Unequal and Unheard: Former Foster Care Youth Reflecting on their Education Opportunities and Barriers to Achieving Higher Education

### Student: Sarah Bechtold

Young people who age out of foster care face many obstacles, especially when compared to youth who were never involved in the foster care system. Across psychosocial domains of functioning, foster care alumni are disadvantaged, but this is especially prominent when examining their experiences in accessing higher education. State and federal policies are designed to promote foster care alumni obtaining higher education, yet many alumni report barriers in accessing educational systems. This study surveyed alumni who aged out of foster care from across the nation, using social media as the primary recruitment strategy. The purpose of this study was to explore their barriers to accessing higher education. Participants overwhelmingly indicated that their status as foster alumni made it more difficult to access higher education and, once accessed, impeded their ability to obtain degrees. Many alumni also reported that they felt as though they had been actively discouraged from obtaining higher education while still in high school. Data collection is still underway; however, current trends from the findings indicate that this study illuminates key levers that can be manipulated to make higher education more accessible for foster youth, including education about college, supportive conversations, and dismantling stereotypes.

*Faculty Mentor: Jessica Yang, Ph.D.*

*CAS – Department of Social Work*

*(330H – Yang)*

## Internet of Things and Magic Mirror

**Students: Antonio Santos and Daniel Branham**

A Magic Mirror is a wooden frame that holds together a 2-way mirror, a thin monitor, and a Raspberry Pi (a small, affordable computer).

With a Raspberry Pi connected, the Mirror has a highly customizable heads up display (HUD) that can display anything from the current time to charts of current cryptocurrency price trends. Building a Magic Mirror is a perfect weekend DIY project that you can show off and build off of in the future. Last summer, we went to fix up, complete, and add on to some Internet of Things devices that were developed and left at the Technology Incubator in downtown Rock Hill, South Carolina, after the Internet of Things Hackathon was hosted there in Spring 2018. The work I did there made me very familiar with how data flows through the devices and through the code. It made me think about how that could be useful for the Magic Mirror project. By collecting the data given by the IoT devices, the Mirror becomes a perfect display for the data. Not only that, but by using IoT devices, we can customize the mirror in more ways than ever with the feature of being able to detect users and receive data about the surrounding environment for module functionality.

*Faculty Mentors: Andrew Besmer, Ph.D., and Marguerite Doman, Ph.D.*

*CBA – Department of Computer Science and Quantitative Methods*

## The Effect of E.U. Membership on Economic Status

**Student: Thelonious Kahler**

This study examines the relationship between E.U. membership and the level of economic development. Specifically, it examines a variety of measures of economic development and examines whether E.U. status has a positive effect on the economic development of a country by conducting panel data analyses. The data used were compiled from the World Bank Database for the period from 2000-2017, comparing 4 non-E.U. countries and 10 countries that joined the E.U. in 2004. Our main independent variable is a binary indicator of E.U. status, while the main dependent variable that measures economic development is GDP per capita. Our bivariate regression result suggests that, on average, countries that are members of the E.U. are expected to have a GDP per capita that is \$5605.90 greater than countries that are not in the E.U.; this result is statistically significant at the 95% confidence level. Our preliminary data analysis is consistent with the hypothesis that E.U. membership is positively associated with economic condition. We also conducted further multiple regression analyses to control for country and time-fixed effects, as well as other confounders.

*Faculty Mentor: Hye-Sung Kim, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 350 – Kim)*

## The Obstacles and Opportunities of Black Women Running for Public Office

**Student: Renee King**

The purpose of this study is to analyze the lack of recognition of the double disadvantage that black women face due to the struggle in the position of their intersectionality. Examining both the feminist and African American revolutions as well as the political election process in past and present demonstrates both the obstacles and the opportunities that black women experience. This paper provides a combination of secondary data from books and articles researched on the obstacles and opportunities black women face, as well as interviews with three black women who all participated in running for office at various levels. All three women are mothers of both single and married backgrounds, ranging in age from their late 20s to 40s, with various levels of academic and economic achievements. The examination of both interviews and contextual data revealed the existing disadvantage black women face due to their intersectionality, which can be experienced primarily by those who exist within the stated intersectionality. Black women are not properly recognized or given credit for their fight toward advancements for both their race and gender.

*Faculty Mentors: Jennifer Disney, Ph.D., and Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

## A Reason for Party Change

**Student: Abigail Audette**

The United States has been consistently changing its political party ideologies, demographics of people that identify with the parties, and the regions where these demographics reside. This paper will focus on what causes these political realignments or dealignments within the state and the nation. Political alignment is when there is a major shift in the traditional party alignment that a state supports and then begins to adopt new ideas. It is common knowledge that people very rarely will change their party identification over their lifetime, but they are more likely to change their party identification when they are in their younger ages and more likely to be moving around for work. To understand how party alignment changes and how the parties have changed over time, I will conduct in-depth research on how major events that have occurred in history have had an effect on what each party has stood for. Then, I will conduct a comparison on how party realignment has affected three states today at the state and national level: New Hampshire, Virginia, and Florida.

*Faculty Mentors: Jennifer Disney, Ph.D., and Michael Lipscomb, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

## Violence Against and Within: An Analysis of the Non-White Transgender Community

**Student: Jacob Grice**

This paper observes the history of violence used against and within multi-marginalized communities, with a specific focus on transgender persons of color. While the public perception of these events has changed dramatically in recent years, little substantive change has occurred to protect these individuals from violence. As women like Sylvia Rivera and Marsha P. Johnson orchestrated the beginning of the gay rights movement at Stonewall, their identities were virtually erased from history. Events like Stonewall are often mischaracterized by media and, subsequently, the historical record as minority-led violence, when in reality, violence used by these groups is in response to the excessive force of the police state. In utter desperation, marginalized groups often must refer to a “kill or be killed” mentality in order to survive. I will assess the intersections of race, gender, and gender identity as they relate to experiences of oppressive and domestic violence in America. Furthermore, I will argue how minority stress alters perceptions of violence and its justification.

*Faculty Mentor: Jennifer Disney, Ph.D.*

*CAS – Department of Political Science*

*(PLSC 490 – Disney and Lipscomb)*

## Standard Dilution Analysis: Adding a Second Internal Standard to Reduce Uncertainty in the Initial Internal Standard Measurement

**Student: Alyssa Neiling**

A quick, effective, and efficient method for determining concentrations is crucial in the real world. Standard dilution analysis (SDA) is a new calibration method that combines two previous methods into one quick alternative. Standard dilution analysis is performed by making a single standard solution with known concentrations of an analyte of interest and an internal standard. The ratio of the analyte concentration to the internal standard concentration will be unchanged throughout the process. Two solutions are necessary to conduct SDA: Solution 1 contains 50% sample and 50% standard solution; and Solution 2 contains 50% sample and 50% solvent. Solution 1 is measured using an instrument that can simultaneously detect the analyte and internal standard in different regions. Next, a small amount of the Solution 2 replaces Solution 1, continuing until enough data are collected. With these data, a graph is made, and the slope and intercept are calculated. From the internal standard response in the standard solution and the concentration of the analyte in the standard solution, the unknown concentration can be calculated. This project will explore adding a second internal standard to the standard solution, such that the ratio of internal standard #1 and internal standard #2 will remain unchanged. Ratiomg the instrument responses for both internal standards will be constant and should reduce uncertainty, leading to better precision in the unknown concentration results. The determination of FD&C Blue 1 dye in commercial food projects will be used, with caffeine serving as the second internal standard.

*Faculty Mentor: Cliff Calloway, Ph.D.*

*CAS – Department of Chemistry, Physics, and Geology*

*(CHEM 551, 552 – Hanna)*





# EAGLE STEM SCHOLARS

Winthrop University's Eagle STEM Scholars Program merges the campus's commitment to undergraduate research and promoting the success of students from groups that have been historically underrepresented in the sciences. Bio-chemistry, biology, chemistry, mathematics, computer science, human nutrition, and environmental science majors receive the academic support and research training needed to pursue doctoral studies in either health professions or life sciences. Student support services are modeled after the nationally acclaimed Meyerhoff Scholars Program at the University of Maryland, Baltimore County and employ the nation's best practices in STEM training and student retention (e.g., an intensive summer bridge experience, rigorous curricula in science and mathematics, academic monitoring, intramural and extramural research experiences, and career guidance). Since its inception, the program has served 141 Winthrop students. Eagle STEM Scholars have successfully competed for top positions in graduate and medical programs, with Eagle STEM alumni at universities such as Alabama, Auburn, Clemson, Duke, Emory, Florida, Georgetown, Georgia, Marshall, Maryland, Nebraska, North Carolina, Notre Dame, Pennsylvania, Pittsburgh, South Carolina, Temple, Virginia Commonwealth, Virginia Tech, UCLA, UCSF, and the Medical University of South Carolina.

Eagle STEM Scholars are recruited to Winthrop based on their outstanding academic performance and potential to pursue doctoral degrees. Each year, the Eagle STEM Advisory Board selects the members of each cohort. These incoming freshmen take full advantage of the program and later distinguish themselves as winners of national awards.

We are grateful for the support of the Advisory Board, the research mentorship by Winthrop faculty, and the broader Winthrop community for its ongoing support of this excellent program.

## 2018 – 2019 Eagle STEM Advisory Board:

### **Cliff Harris, Ph.D.**

*Assistant Director, Eagle STEM Scholars Program and  
Assistant Professor of Chemistry*

### **Rachel Law, B.S.Ch.E.**

*Director, Eagle STEM Scholars Program*

### **Pat Owens, Ph.D.**

*Professor and Chair, Department of Chemistry, Physics,  
and Geology*

### **Julian Smith III, Ph.D.**

*Professor of Biology*

### **Kathie Snyder, Ph.D.**

*Assistant Professor of Chemistry*

### **Takita Sumter, Ph.D.**

*Vice Provost for Faculty Affairs and Professor of Chemistry*

### **Kristi Westover, Ph.D.**

*Professor of Biology*

### **Michael Whitney, Ph.D.**

*Director, Digital Information Design Program and Assistant  
Professor of Computer Science*

### **David Meeler, Ph.D.**

*Associate Professor of Philosophy; Legal Studies Program  
Director; Dalton Endowed Chair of Environmental Sciences  
and Environmental Studies*

The following Eagle STEM Scholars submitted abstracts on their work for inclusion in this compilation:

**Kiera Alexander**

**Resa Allen**

**Jessika Bonner**

**Ashley Cooper**

**Tiffany Dwyer**

**Carlos Escoto-Diaz**

**Sydney Frazier**

**Sydney McCall**

**Madison Merrill**

**Juliana Quay**

**Brittney Ramsey**

**Lucia Rodriguez**

**Antonio Santos**

**Hunter Sellers**

**Sophia Stefanov**

**Jessica Stevens**

**Evan Thibodeaux**

**Augustine Vinson**

**Sean Wechsler**

# McNAIR SCHOLARS

The Winthrop University McNair Scholars Program prepares outstanding first-generation, low-income, and underrepresented undergraduates to be successful in Ph.D. programs through research experience, workshops, GRE and graduate school application preparation, and travel to present research and explore graduate programs.

Winthrop's program is funded through 2023 by its third multi-year renewable TRIO grant from the U.S. Department of Education. \$242,136 in federal funding is provided each year for programming and materials that will help 30 eligible students prepare for graduate study. This represents 72% of program costs. Winthrop contributes the remaining 28% of the budget in cash and in-kind matches. For more information about the program, please visit <http://www.winthrop.edu/mcnair>.

Being a McNair Scholar is a prestigious, nationally recognized honor. Scholars are actively recruited by graduate schools across the country because of their high quality research experiences and preparation for graduate study. 84% of all graduates have enrolled in graduate programs and 57% of our graduates have earned at least one graduate or professional degree. Universities where our alumni are currently completing Ph.D.s include, but are not limited to Colorado State, Duke, Emory, Georgia Tech, Indiana, Northeastern, West Virginia and the Universities of Colorado, Illinois, Notre Dame, Florida, and South Carolina. As of this, our ninth year, at least eight Winthrop McNair alumni will have earned doctorates (4 Ph.D.s).

Each year, the twelve-member Winthrop McNair Advisory Board selects new Scholars through a highly competitive application and interview process. All McNair Scholars complete intensive summer research internships and several have earned awards for their work. See <http://digitalcommons.winthrop.edu/mcnair/> for some of our Scholars' work.

## **Winthrop McNair Staff and Mentors support the Scholars before, during, and after the summer research experience.**

Dr. Cheryl Fortner-Wood, *Director*  
Barb Yeager, *Executive Support Specialist*  
Kayla Tucker, *Graduate Associate*  
Alexis Davis, *Office Assistant*  
Dr. Matthew Hayes, *Statistics and Methods Coach*  
Stephanie Bartlett, *Head Writing Coach*  
Amanda Cavin, *Programming Assistant*  
Katrina Gainey, *Office Assistant*

## **2018 – 2019 Winthrop McNair Advisory Board:**

### **Adolphus Belk, Ph.D.**

*Professor of Political Science*

### **Tyrone Ceaser, Ph.D.**

*Assistant Professor of Exercise Science*

### **Victoria Frost, Ph.D.**

*Assistant Professor of Biology*

### **Cheryl Fortner-Wood, Ph.D.**

*McNair Director and Professor of Psychology (ex officio)*

### **Rose Gray, M.A.**

*TRIO Student Support Services (SSS) Director*

### **Wenonah Haire, D.M.D.**

*Executive Director, Catawba Cultural Preservation Project*

### **Gloria Jones, Ph.D.**

*Dean, University College (ex officio)*

### **Willis Lewis, Ph.D.**

*Associate Professor of Economics*

### **Karen Stock, Ph.D.**

*Professor of Fine Arts*

### **Takita Sumter, Ph.D.**

*Vice Provost for Faculty Affairs and Professor of Chemistry*

### **Will Thacker, Ph.D.**

*Professor of Computer Science (Fall 2009 – Fall 2018)*

### **Nicki Washington, Ph.D.**

*Associate Professor of Computer Science (joined the board Spring 2019)*

### **James White III**

*Graduating Scholar, Exercise Science*

### **Bradley Witzel, Ed.D.**

*Professor of Education*

The following McNair Scholars participated in the 2018 Winthrop McNair Summer Research Experience from May 14 – July 1, 2018. They presented their research at the Winthrop McNair Research Symposium on campus and at our national McNair/SSS Scholars conference hosted by the Southeastern Association for Equal Opportunity Program Personnel (SAEOPP). At SAEOPP, Winthrop's Scholars competed with students from institutions all over the country, including USC, Illinois at Urbana-Champaign, Florida, UC Santa Barbara, and Harvard. Ordinals listed in parentheses [e.g., (1st)] mark students whose presentations earned first-, second-, or third-place honors in their SAEOPP categories. \*\*Indicates Scholars who received honors for their presentations at other conferences. Three Scholars completed summer research elsewhere (Penn State: Kellie Cooper and Eva Owusu; Illinois at Urbana-Champaign: Ximena Perez-Velazco\*\*).

- Frances “Ana” Barkley**, Mentor: Dr. Sherrell Fuller  
Invisible Barriers: Experiences of First-Generation, Low-Income Students Navigating Academia (Oral, Education)
- Monejah Black**, Mentor: Dr. Nathaniel Frederick  
Shut Up and Dribble: How Twitter Users Attempt to Mute Athlete Opinion (Oral, Social Science)
- Caitlan Boudreaux**, Mentor: Dr. Darren Ritzer  
Prevalence of Academic Entitlement and Potential Transferability to Job Entitlement (Oral, Social Science)
- Sierra Davis**, Mentor: Dr. Wendy Sellers  
The Impact of Long-Term International Travel on the Socio-Political Consciousness of South Carolina Students (Poster)
- Jasmine Goode**, Mentor: Dr. Merry Sleight  
Knowledge, Personality, and Race Predict Perceptions of Gun Control and School Shootings (Poster)
- Olivia Greathouse**, Mentor: Dr. Kristen Abernathy  
A Mathematical Model of Controlling the Spread of Cholera through Disinfection, Vaccination, and Quarantine (Oral, Life Science)
- Ali Maclay**, Mentor: Dr. Courtney Guenther  
The Impact of Generalized Anxiety Disorder on Academic Performance in Undergraduate Students following a Brief Guided Meditation (Poster)
- Shemeika McCray**, Mentor: Dr. Joni Boyd  
Understanding the Perceptions of Dry Needling in NCAA Division I Athletes (Health)
- Marlin McKnight**, Mentor: Dr. Jason Hurlbert  
*Xanthomonas Cynarae* FK-506 Binding Protein (Oral, Life Science)

- Marissa McNeace**, Mentor: Dr. Donna Nelson  
Predictors of Frequency and Type of Social Support Seeking in Response to Stress (Poster)
- Chandani Mitchell (1st)**, Mentor: Dr. Kathryn Kohl  
Locating Mutagen-Sensitivity Gene *mus109* in the *Drosophila melanogaster* Genome Using Deficiency Mapping (Oral, Life Science)
- Juliana Quay**, Mentor: Dr. Jason Hurlbert  
Expression and Purification of a Novel Calcium-Binding Protein, EfhX, Necessary for Phytopathogenesis in *Xanthomonas* Strains (Oral, Life Science)
- Ta’Niss Robinson (1st)**, Mentor: Dr. Darren Ritzer  
A Look at Mentorship in a Structured Undergraduate Program (Oral, Social Science)
- Jessica Stevens\*\***, Mentor: Dr. Zach Abernathy  
A Mathematical Model for Tumor Growth and Treatment Using Virotherapy (Oral, Life Science)
- Timothy Smith**, Mentor: Dr. Adrienne Edwards  
Familial and Community Influences on the Sports Socialization of Black Boys: A Case Study (Poster)
- Destinee Waddy**, Mentor: Dr. Tyrone Ceaser  
The Relationship between Nature Connectedness and Physical Activity Patterns in a Sample of Collegiate Students and Staff (Health)
- James White III**, Mentor: Dr. Joni Boyd  
Effects of a Single Bout of Yoga on Self-Esteem, Self-Efficacy, and Happiness of Winthrop Students (Poster)
- Kalea Young-Gibson (1st)\*\***, Mentor: Dr. Merry Sleight  
Entitlement, Empathy, and Dark Triad Predict Political Attitudes and Knowledge (Oral, Social Science)

# OFFICE OF NATIONALLY COMPETITIVE AWARDS (ONCA)

Winthrop University's Office of Nationally Competitive Awards (ONCA) identifies and assists highly motivated and talented students in applying for nationally and internationally competitive awards, scholarships, fellowships, and unique opportunities, both at home and abroad. ONCA gathers and disseminates award information and deadlines across the campus community, and serves as a resource for students, faculty, and staff throughout the nationally competitive award nomination and application process.

The ONCA Celebration of Applicants is an annual event recognizing the difficult and rewarding challenge taken on by Winthrop University students to apply for some of the most prestigious scholarships in the nation and the world. Win or lose, the *process* of personal reflection required to complete the application for a nationally competitive award is often transformative in a student's life and can be as important as the outcome.

Scholars who applied for these prestigious awards spent countless hours writing and revising personal statements, policy and research proposals, essays, resumes, and answers to "short answer" questions on application forms (which are never short, and always challenging). In the process, I hope each student learned a little more about him- or herself and his or her goals. Scholars, I'd like to acknowledge and applaud your hard work and say how much I enjoyed getting to know each of you this year.

In addition to recognizing the work of each of our ONCA Scholars, I would like to thank each and every member of the Winthrop University community who has given a student an encouraging word, recommended a student for ONCA in person or through the online interim reporting system established by Dean Gloria Jones, brought an ONCA presentation into the classroom, participated in an award selection or mock interview committee, or served on the ONCA Advisory Board. I would especially like to thank members of Winthrop faculty and administration who have written letters of recommendation for our students this year: this is an arduous undertaking, often resulting in two- to three-page letters full of descriptive detail about our students, their capabilities, and their potential. For all of your time and effort, your students and I thank you.

## **Leslie Bickford, Ph.D.**

*Associate Professor of English  
Director, Office of Nationally Competitive Awards (ONCA)  
Winthrop University*

## **Award Nominees and Winners, 2018-2019:**

### **Amgen Scholars Program:**

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Every year, the Amgen Scholars U.S. Program provides hundreds of selected undergraduate students throughout the U.S. with the opportunity to engage in a hands-on research experience at one of the nation's premier educational institutions. Currently, thirteen institutions in the U.S. host the summer research program. The Amgen Foundation has committed \$74 million over sixteen years to this global initiative to make the opportunity possible for thousands of students.

Winthrop University Nominee: **Sean Wechsler (Pending)**

### **Ashley Soulé Conroy Study Abroad Award:**

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Ashley's Foundation first began in 2006 as a way of honoring the life of Ashley Soulé Conroy and as a way for Ashley's family and friends to heal in the wake of her passing. With a love of travel being one of Ashley's core traits, they envisioned a small foundation, something that could perhaps someday offer financial assistance to a few deserving university students who dreamt of studying in the far-flung corners of the globe that Ashley herself had once dreamed of visiting someday.

Winthrop University Nominee: **Hunter Dickerson**

Winthrop University Nominee: **Norah Mendoza**

### **Barry Goldwater Scholarship:**

---

By providing scholarships to college sophomores and juniors who intend to pursue research careers in the natural sciences, mathematics, and engineering, the Goldwater Foundation is helping ensure that the U.S. is producing the number of highly qualified professionals the nation needs in these critical fields.

Winthrop University Nominee: **Sean Wechsler (Pending)**

### **Benjamin A. Gilman International Scholarship Program:**

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The Gilman Program awards 2,300 scholarships of up to \$5,000 per academic year for U.S. citizen undergraduate students of limited financial means to pursue academic studies abroad. Such international study is intended to prepare U.S. students to assume significant roles in an increasingly global economy and interdependent world.

Winthrop University Nominee: **Ebony Anderson (Pending)**

Winthrop University Nominee: **Hunter Dickerson**

Winthrop University Nominee: **Dazcha Johnson (Pending)**

Winthrop University Nominee: **Vlad Markarov**

Winthrop University Nominee: **Norah Mendoza (WINNER)**

Winthrop University Nominee: **Rachel Muschett**

Winthrop University Nominee: **Faith Rush**

### **Benjamin A. Gilman Critical Need Language Award:**

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Gilman applicants who are studying a critical need language while abroad in a country in which the language is predominantly spoken have the option to be considered for the Critical Need Language Award of up to \$8,000. In addition to receiving the highly competitive award, recipients of the Critical Need Language Award will be offered the opportunity to evaluate and certify their language skills acquired during their programs through a recognized oral proficiency language test.

Winthrop University Nominee: **Dazcha Johnson (Pending)**

Winthrop University Nominee: **Vlad Markarov**

### **BHW Women in STEM Scholarship:**

---

Women who are pursuing an undergraduate or master's degree and are majoring in science, technology, engineering, or mathematics are eligible to apply for the Women in STEM scholarship, which awards \$3,000 toward tuition costs.

Winthrop University Nominee: **Bella Hovis (Pending)**

### **Critical Language Scholarship:**

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The Critical Language Scholarship (CLS) Program is an intensive overseas language and cultural immersion program for American students enrolled at U.S. colleges and universities. The program includes intensive language instruction and structured cultural enrichment experiences designed to promote rapid language gains.

Winthrop University Nominee: **Jammie Huynh**

### **Finding Your Future Program:**

---

Finding Your Future provides meaningful "medical experience" which will help support a student's AMCAS (medical school) application. Each student will rotate on a weekly basis among the following clinical areas within the USC School of Medicine in Columbia: Family and Preventive Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Surgery. The program offers exposure to various aspects of the clinical arena, including procedures, patient interaction, and education, as well as assistance with the medical school application process via a mock interview.

Winthrop University Nominee: **Zachary Wise (Pending)**

### **Fulbright Award for Teaching English Abroad:**

---

Among the most widely recognized academic honors, Fulbright awards provide support for graduate students and young professionals to teach English abroad. Awards include full grants for an academic-year teaching assistantship in English.

Winthrop University Nominee: **Cheyenne Walsh**

Winthrop University Nominee: **Brittany Winans**

### **Fund for Education Abroad:**

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(FEA) was established in 2010 to address the need for an independent study-abroad scholarship provider. FEA is expanding access to study abroad by raising awareness of its benefits to the individual and value to the collective, and by granting scholarships of up to \$10,000.

Winthrop University Nominee: **Norah Mendoza**

### **Fund for Education Abroad Access Scholarship:**

---

FEA's Access Partners join in the shared commitment to increase the number of underrepresented American college students studying abroad through the provision of scholarships. FEA scholarship applicants participating in programs hosted by providers in our Access Partner program may be eligible for financial support of up to \$5,000.

Winthrop University Nominee: **Norah Mendoza**

### **Ford Foundation Fellowships:**

---

Through its Fellowship Programs, the Ford Foundation seeks to increase the diversity of the nation's college and university faculties by increasing their ethnic and racial diversity to maximize the educational benefits of diversity and to increase the number of professors who can and will use diversity as a resource for enriching the education of all students. Predoctoral, Dissertation, and Postdoctoral fellowships will be awarded in a national competition administered by the National Academies of Sciences, Engineering, and Medicine on behalf of the Ford Foundation. Awards will be made for study in research-based Ph.D. or Sc.D. programs.

Winthrop University Nominee: **Ximena Perez-Velazco (Pending)**

Winthrop University Nominee: **Ta'Niss Robinson (Pending)**

### **Heroes of the Lowcountry:**

---

HOL is a 501(c)(3) organization providing tuition assistance to graduates of Beaufort and Jasper Counties in South Carolina since 2012. The reward for staying in school another year is an increase in the scholarship amount. Freshmen receive \$350, sophomores receive \$500, juniors receive \$750, and seniors receive \$1,000.

Winthrop University Nominee: **Emerald Vigil (Pending)**

### **Hispanic Scholarship Fund:**

---

The HSF Scholarship is designed to assist students of Hispanic heritage in obtaining a university degree. Awards are based on merit; amounts range from \$500 to \$5,000, based on relative need among the Scholars selected.

Winthrop University Nominee: **Emerald Vigil (Pending)**

### **Kia Great Unknowns Scholarship:**

---

Kia Motors America, Inc., (KMA) has established a scholarship program to assist students who plan to continue their education in college or vocational school programs. Their goal is to discover and reward students who embody the spirit of “Give It Everything,” and help them pursue their academic dreams. The scholarship is worth \$5,000.

Winthrop University Nominee: **Zachary Wise (Pending)**

### **National Science Foundation Fellowships:**

---

The purpose of the National Science Foundation’s Graduate Research Fellowship Program is to ensure the vitality of the human resource base of science and engineering in the United States and to reinforce its diversity. The program recognizes and supports outstanding graduate students in the relevant science, technology, engineering, and mathematics disciplines who are pursuing research-based master’s and doctoral degrees, including engineering and computer and information science. NSF Fellows are expected to become knowledge experts who can contribute significantly to research, teaching, and innovations in science and engineering.

Winthrop University Nominee: **Joey Jennings (Pending)**

Winthrop University nominee: **Ta’Niss Robinson (Pending)**

Winthrop University Nominee: **Jessica Stevens (Pending)**

### **New York Times Student Journalism Institute:**

---

The Institute is offered once a year in May. Participants must be students (or December or May graduates) who are members of the National Association of Hispanic Journalists or the National Association of Black Journalists, or students (or December or May graduates) at a historically black college or university. Students are provided with room and board and all of their costs, including transportation to and from the Institute, are paid by The New York Times Company.

Winthrop University Nominee: **Zuri Anderson**

### **National Society for Collegiate Scholars:**

---

NSCS offers a number of scholarships to members, including scholarships for study abroad and graduate school.

Winthrop University Nominee, Summer Internship Scholarship: **Zachary Wise**

Winthrop University Nominee, Jim Duncan Scholarship: **Zachary Wise**

Winthrop University Nominee, GEICO Award: **Zachary Wise**

### **Phi Kappa Phi Graduate Fellowship:**

---

Every year, the Honor Society of Phi Kappa Phi awards 57 Fellowships of \$5,000 each and three of \$15,000 each to members entering the first year of graduate or professional study. Each Phi Kappa Phi chapter may select one candidate from among its local applicants to compete for the Society-wide awards.

Winthrop University Nominee: **Blake Wallert (Pending)**

Winthrop University Nominee: **Anne Cushman (Pending)**

### **ProPublica Diversity Scholarship:**

---

ProPublica sponsors 20 need-based scholarships for aspiring journalists to attend a journalism conference.

Winthrop University Nominee: **Zuri Anderson**

### **Sigma Tau Delta Study Abroad Scholarship:**

---

The scholarship provides up to \$3,000 for the purpose of studying in a program that furthers the applicant’s engagement with Sigma Tau Delta’s mission for an academic term or year in a certified, undergraduate program outside the country in which the nominating chapter is located.

Winthrop University Nominee: **Faith Rush**

### **Tau Sigma National Honor Society Scholarship:**

---

Tau Sigma national honor society for transfer students offers members scholarships up to \$5,000.

Winthrop University Nominee: **Erin Paradiso**

Winthrop University Nominee: **Zachary Wise**

### **Tortuga Backpacks Study Abroad Scholarship:**

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Tortuga Backpacks sponsors a \$1,000 scholarship for students wishing to study abroad.

Winthrop University Nominee: **Nora Mendoza**

Winthrop University Nominee: **Hunter Dickerson**

Winthrop University Nominee: **Vlad Markarov**

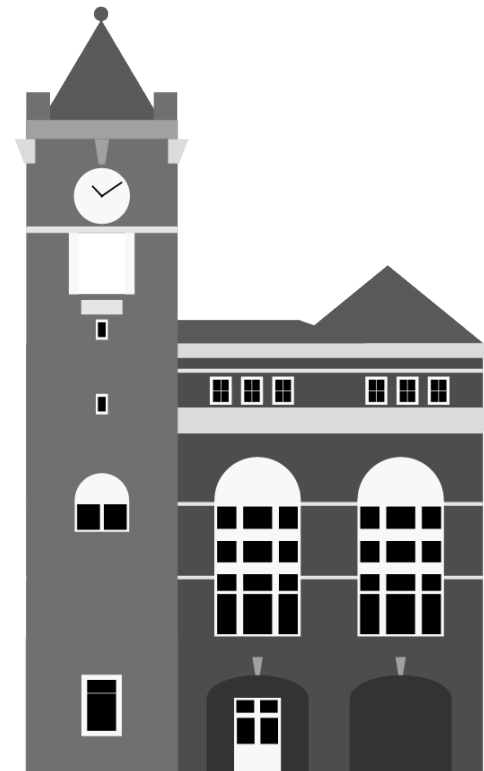
Winthrop University Nominee: **Ann Carroll**

# WINTHROP INITIATIVE FOR STEM EDUCATORS (WISE)

The Winthrop Initiative for STEM Educators (WISE) program is supported by a \$1 million grant through the National Science Foundation's Robert Noyce Scholarship Program. The focus of WISE is to recruit, support, and mentor science and mathematics majors choosing to pursue teaching as a career. WISE currently has two primary outreach activities. The WISE Scholars are graduate and undergraduate students committed to teaching in high-need schools. They receive scholarship funds, connections to state and national organizations for STEM teachers, opportunities for conference participation, additional mentoring, and access to STEM education resources on campus. The WISE Interns are first- and second-year Winthrop and York Technical College students pursuing STEM degrees. These students participate in a summer program that explores STEM research, engages in local schools for service learning, and promotes the formulation of individual STEM research questions for more extensive investigation through a variety of other avenues.

The following WISE Scholars and/or Interns submitted abstracts on their scholarly work for inclusion in this compilation:

**Kiera Alexander**  
**Resa Allen**  
**Jessika Bonner**  
**Olivia Greathouse**  
**Caroline Hammond**  
**Juliana Quay**  
**Allison Reed**  
**Hannah Tucker**



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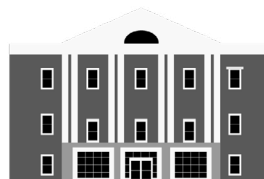
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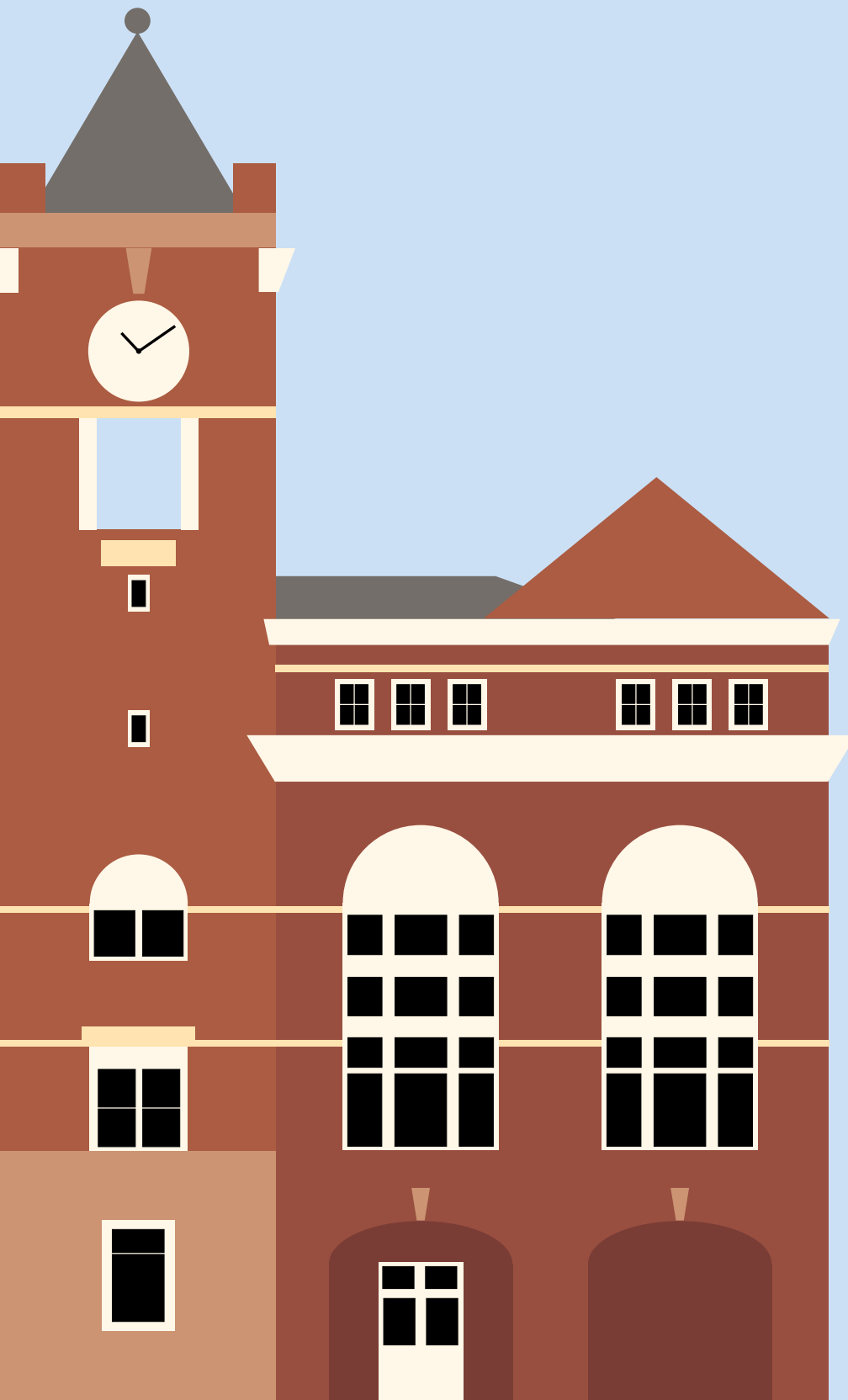
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