

WINTHROP UNIVERSITY
**UNDERGRADUATE
SCHOLARSHIP**
2015 BOOK OF ABSTRACTS

“Tell me and I forget. Teach me and I remember. Involve me and I learn.” Benjamin Franklin

“We keep moving forward, opening new doors and doing new things, because we’re curious, and curiosity keeps leading us down new paths.” Walt Disney

University College proudly presents the fourth annual *Winthrop University Undergraduate Scholarship Book of Abstracts*. This year’s book chronicles the accomplishments of students and faculty mentors from 23 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 collaborative projects grew from a variety of origins, including multiple 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 art 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 Morgan Yarborough, a visual communication design major, who designed the cover and interior of this book.

We also recognize the faculty members who served as research mentors, 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 Sarah Rains, graduate assistant in the Undergraduate Research Office, for her assistance in editing the abstracts.

We hope you enjoy our Book of Abstracts! Please note that much of the work described here will be presented, performed, or displayed as part of the first annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE) on April 24, 2015. We hope you will join us!

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

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



The five different colors of the triangles on the cover represent the five different colleges of Winthrop University: blue for the College of Visual and Performing Arts, red for the College of Arts and Sciences, green for the College of Business Administration, purple for the Richard W. Riley College of Education, and gold for University College. The idea is that the individual triangles depict the students at Winthrop and together they form a close-knit group that goes on into the world to accomplish great things as Winthrop Eagles.

- **Morgan Yarborough (2015)**



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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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Kristi Westover, Ph.D., Biology

PUBLICATION ABSTRACTS

Cognitive Flexibility as a Dominant Predictor of Depression Symptoms Following Stressful Life Events

Published in Journal of Psychological Inquiry, Vol. 20, 2015

Presented at the South Carolina TRiO McNair Symposium, June 2014, and the SAEOPP McNair/SSS Scholars Research Conference, June 2014

Student: Emily Hokett (2016), **McNair Scholar**

Faculty Mentor: Sarah Reiland, Ph.D.

CAS – Department of Psychology

(MCNR 300 – Fortner-Wood)

This study was conducted to examine the relationships among event characteristics, cognitive factors, and depression symptoms following stressful life events. Consistent with cognitive theories of depression (e.g., Beck, 1964), we predicted that cognitive factors would be stronger predictors of depression symptoms than stressful event characteristics. Participants ($n = 214$) completed questionnaires that assessed demographics, trauma, depression, intolerance of uncertainty, and world assumptions. Hierarchical regression analyses revealed that cognitions were more strongly related to depression than event characteristics were. We found that greater intolerance of uncertainty and more negative world assumptions (especially self-worth) were significantly associated with greater depression. Fortunately, cognitions, unlike past events, can be changed, and flexible thinking may aid in the prevention and treatment of depression.

Bedrock Geologic Map of the Northern Half of Ninety Six 7.5 Minute Quadrangle, South Carolina

Published in Geological Society of America Abstracts with Programs, Vol. 46, 2014

Presented at the Annual Geologic Society of America Meeting, October 2014

Student: Jordan Sommer (2017)

Faculty Mentor: Irene Boland, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

This is the third report of an on-going project to map in detail the bedrock geology of the Ninety Six 7.5 minute quadrangle for National Park Service and the USGS Geologic Resources Inventory. This report provides a digital bedrock geologic map for the northern half of the quadrangle. The topography consists of gently rolling hills with up to 180 ft. of relief. The bedrock is deeply weathered, overlain in most places by a thick layer of soil. The NW quadrant is dominated by spectacular large-boulder exposures of the Coronaca granite. In hand samples the Coronaca is unfoliated light gray to tan, fine to medium grained biotite metagranite with a xenomorphic equigranular texture and at least 20 percent quartz. Lake Greenwood obscures the geology in the NE corner of the quadrangle. As in the southern half of the quadrangle, the bedrock in the NE quadrant is deeply weathered. The predominant rock type is unfoliated biotite metagranite that is cut in numerous places by small plugs and dikes of unfoliated hornblende metadiorite. Cross-cutting relationships suggest the metadiorite is younger than the metagranite. Both rock-types have a xenomorphic-equigranular texture, which suggests they are metamorphic rocks. Aphanitic-textured white volcanic ash crops out in numerous places in the NE quadrant. The ash overlies metagranite or metadiorite where contact relations are observable. Limited exposures of strongly sheared quartz muscovite schist suggest the presence of several NE-trending shear zones. They could be traced only short distances.

Combinatorics of Linked Systems of Quartet Trees

Published in Involve: A Journal of Mathematics, 2015, In press

Presented at the Mathematical Phylogenetics Conference, June 2014; the South Carolina INBRE Spring Symposium, February 2015; and the MAA Southeastern Section Meeting, March 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Emili Moan (2016)

Faculty Mentor: Joseph Rusinko, Ph.D.

CAS – Department of Mathematics

We apply classical quartet techniques to the problem of phylogenetic decisiveness and find a value k such that all collections of at least k quartets are decisive. Moreover, we prove that this bound is optimal and give a lower-bound on the probability that a collection of quartets is decisive.

The Effects of Drawing, Listening, and Writing on Mood

Published in Journal of Psychological Inquiry, 2015, In press

Presented at the American Psychological Association Annual Convention, August 2014

Finalist, Raymond Corsini Student Poster Award, American Psychological Association Division One, August 2014

Student: Leah Brown (2015), **McNair Scholar**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

Moods have the power to affect how a person views the world and may be more influential in directing a person's life than the actual events that the person encounters (Burke, 2013; Thayer, 1997). This study compared the effectiveness of four mood management strategies. Participants ($n = 139$) were primed, using a written exercise, to be in a negative mood and then completed the PANAS (Positive and Negative Affect Scale; Watson, Clark, & Tellegen, 1988), which confirmed that the priming had elicited similar negative moods across conditions. Each participant was then assigned to a mood management condition (music listening, nature listening, written reframing, drawing) or a control condition. Immediately afterward, participants completed the same mood assessment. Results revealed that music listening was most influential in decreasing a negative mood. Writing and music listening were both equally effective and more effective than the other strategies in increasing a positive mood. Nature listening was least effective in improving mood. Music changed participants' moods and participants accurately perceived the greatest mood change in the music condition. Participants also exhibited inaccurate perceptions. The control changed the least in actual mood change scores but perceived that they changed as much as participants in the music condition. When participants were asked about usefulness of strategies in real-life, they ranked music as their top choice, reflecting some everyday usage of this helpful strategy. This study supports the findings of previous research, showing that listening to music and writing are very powerful mood-improving strategies.

HONORS THESIS ABSTRACTS

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, the program 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 300 students from 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 Thesis Colloquium is an annual event designed as a venue for the student to celebrate this accomplishment. Now in its 14th year, this year's colloquium will showcase eighteen students presenting their honors thesis research in the form of an oral presentation or poster.

The Honors Program students and I would like to thank the faculty members who have worked as honors thesis directors or readers throughout this process. Their expertise, guidance and commitment should be highly commended on this auspicious occasion.

Kathy A. Lyon, Ph.D.

Director of the Honors Program

2014–2015 Honors Advisory Committee

Kathy Lyon, Ph.D., Chair, Psychology

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Karen Kedrowski, Ph.D., ex officio, Dean, College of Arts and Sciences

Underreporting of Sexual Assault at Winthrop University

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Jordan Steele (2015)

Honors Thesis Committee: Bradley Tripp, Ph.D. and Kathy Lyon, Ph.D.

CAS – Department of Sociology and Anthropology

This thesis aims to identify the amount of unreporting of sexual assault cases by both male and female students. The goal is to determine why students do not feel safe reporting to the campus police or other authority figures and how the university might facilitate a better environment for these victims. The thesis first analyzes similar universities and their experiences with this problem. It also analyzes any previously existing research conducted at Winthrop University by the Office of Victim's Assistance and the Campus Police Department. The thesis then describes the research conducted on campus by way of an anonymous survey and its results. It finishes with potential suggestions as to how the campus could be made safer for students.

Amyloid-beta Aggregation Inhibitors: Synthesis and Evaluation of a Sterically Hindered Biphenyltetrol and a Dihydroxyphenylpyridine

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Jessica Logan (2016)

Honors Thesis Committee: James M. Hanna Jr., Ph.D.; Robin K. Lammi, Ph.D.; and Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 552H – Hanna)

Alzheimer's disease has been associated with amyloid plaques found in brain tissue. The main component of these plaques is aggregated amyloid-beta fibrils that form over time in the brain. Although the fibrils and plaques formed from amyloid-beta aggregates are toxic, it has been found that the smaller, soluble aggregates are the most toxic species. Therefore, one potential approach to treating Alzheimer's disease may be to inhibit aggregation of amyloid-beta peptide. Previous research found biphenyl-3,3',4,4'-tetrol (3,4-BPT) to be an effective inhibitor, with an IC₅₀ of approximately 1X. As part of this investigation, the symmetric isomer biphenyl-2,2',6,6'-tetrol has been synthesized and evaluated to determine if the position of the hydroxyl groups affects the level of inhibition. Preliminary results indicate this compound to be less effective than 3,4-BPT, with an IC₅₀ greater than 10X. It is also known that amyloid-beta has a phenylalanine-containing hydrophobic core, and it is suspected that pi-stacking plays an important role in aggregation. Pyridine and pyridinium moieties have been shown to form stronger pi-stacking interactions with a phenyl group than pi-stacking interactions between two phenyl groups and for this reason, the biaryl 3-(3,4-dihydroxyphenyl)pyridine is also being investigated as an amyloid-beta aggregation inhibitor. Synthesis and evaluation of this compound are currently being carried out in our laboratories.

High Risk: Truth, Lies, and Birth

Student: Leigh Fransen (2016)

Honors Thesis Committee: Kathy Lyon, Ph.D.; Merry Sleigh, Ph.D.; and Evelyne Weeks, M.A.

CAS – Department of Psychology

(HONR 450 – Lyon)

In the United States, a small but increasing number of women decide to give birth in non-hospital locations, such as their own homes or birth centers staffed with midwives. My insider's look into the world of home birth, midwives, and birthing mothers explored the questions: Is this practice safe for both mothers and their babies? How and why do women make the decision to give birth in a non-hospital location? A literature review of both midwifery and obstetric sources clearly indicated that birth in a non-hospital setting in the U.S. raises the risk of death to the baby by a factor of at least two, and as high as eight. I surveyed 1,057 women regarding their beliefs and perceptions of non-hospital birth. The top reasons cited for selecting non-hospital birth were to avoid medical interventions, to be in more comfortable surroundings, and belief that birth does not require hospitalization. In addition, even among women who experienced complications requiring transport to a hospital, women who choose non-hospital birth overwhelmingly believe that non-hospital birth is at least as safe as hospital birth for low-risk women. The disparity between the medical realities and the perceptions of women suggests that some women are making decisions based on incorrect information; in some cases, psychological phenomena such as cognitive dissonance, self-justification, and personal fable may be at play. To address this issue, midwives must adopt a more truthful informed consent process for women considering non-hospital birth, and the U.S. midwifery system must be overhauled.

Romantic Relationship Satisfaction and Non-Violent Risky Behavior of College Students

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Austin Bischoff (2015)

Honors Thesis Committee: Donna Nelson, Ph.D.; Kathy Lyon, Ph.D.; and Tara Collins, Ph.D.

CAS – Department of Psychology

The years we spend in college offer college students a way to experience new things, gain individuality, and develop romantic relationships; however, this time is also known for the surfacing of non-violent risky behaviors among college students. Involvement in a romantic relationship and satisfaction with that relationship might relate to subjective well-being, perceptions of stress, and the practice of non-violent risky behaviors. We expect that individuals who are involved in satisfying romantic relationships will experience greater well-being and less subjective stress compared to those in non-satisfying relationships or single persons. This may result in less involvement in risky behaviors such as alcohol and drug use for those in satisfying, committed relationships. We will examine other types of risky behavior as well, including consensual sex. We expect greater involvement in consensual sex for persons in committed relationships. We also expect a positive association between relationship satisfaction and consensual sex. We will assess well-being, perceptions of stress, and involvement in risky behavior in undergraduate college students at Winthrop University. The results are not yet available and they will become available at a later date.

The Construction of Lysophosphatidic Acid Receptor 4 (lpar4) RNAi Vector to Study Effects on Axon Guidance in the Chick Visual System

Presented at the Symposium for Young Neuroscientists and Professors of the Southeast (SYNAPSE), March 2015

Student: Katherine Le (2015)

Honors Thesis Committee: Eric Birgbauer, Ph.D.; Victoria Frost, Ph.D.; and Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

Lysophosphatidic acid (LPA) is a lysophospholipid that has been shown to behave as extracellular signals on axons. LPA induces growth cone collapse, which is indicative that it may be an inhibitory molecular cue. The receptors for LPA are G protein-coupled receptors, identified as LPA1 – LPA5 and encoded by the genes *lpar1* – *lpar5*, respectively. A report in the literature shows that, in the mouse visual system, LPA1, LPA2, and LPA3 are not required for axonal growth cone collapse, which suggests that LPA4 could be significant for axonal inhibition. We are using gene expression knockdown with small interfering RNA (siRNA) of *lpar4* to disrupt the gene-expressing pathway for LPA4. This procedure involves cloning *lpar4* siRNA inserts into a vector, and then injecting the expression vector into the retina of a chicken embryo. We used four target sequences of *lpar4* to clone into the site of a siRNA expression plasmid, and the vectors were transformed into *Escherichia coli* (*E.coli*) DH5 α cells. Successful cloning depends on many steps, and we are currently investigating the expression vector to ensure that the correct *lpar4* siRNA inserts are present. With the correct *lpar4* siRNA constructs, we will study LPA4 expression knockdown by introducing the expression vector in vitro, which will allow us to study of the impact of LPA4 and LPA on retinal axonal growth. Determining these effects provides further insight into the complex mechanism of neuronal growth from the eyes to the brain.

Factors Affecting Second-Dialect Acquisition among English-Speaking Spanish Majors Studying Abroad

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Trey Stokes (2015)

Honors Thesis Committee: Catalina Adams, Ph.D.; Victoria Uricochea, M.L.A.; and Adam Glover, Ph.D.

CAS – Department of World Languages and Cultures

Much research has been devoted to the applied linguistic subfield of second-language acquisition (SLA), the scientific study of how people learn languages different from their native tongues. Moreover, recent study has been devoted to the processes of second-dialect acquisition (SDA): the acquisition of changes in phonology, lexicon, and grammar within a language. However, there has not been much study as to when these two linguistic processes occur in students studying abroad to enhance their Spanish abilities. In this study, I will use recorded oral interviews and surveys to examine several students who have studied abroad in Spanish-speaking countries in order to determine both to what extent their study abroad experiences affected their levels of Spanish language proficiency and the development of their Spanish dialects, and what factors influenced these changes. I hope to find that their time spent abroad not only deepened their understanding and execution of the Spanish language, but also enriched their use of that language on a cultural level through the acquisition of the local dialect.

Analysis of Alternate Teaching Approaches in Comparison to Traditional Teaching Methods

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Dori Elizabeth Brown (2016)

Honors Thesis Committee: Diana Murdock, Ph.D.; Carol Marchel, Ph.D.; and Tenisha Powell, Ph.D.

COE – Department of Curriculum and Pedagogy

Schools and educators are shifting from traditional teaching methods to alternate methods that include but are not limited to problem based learning, cooperative learning, inquiry based learning and constructivist views of learning. These alternate approaches to learning seem to have potential, but what do they really entail? How are these alternate approaches different from traditional teaching methods? This thesis delves into these four specific alternate methods of instruction to discover their purposes, similarities, and overall benefits for students in the classroom. Research will include reviews of scholarly journals, case studies, and definitive definitions, resulting in a comparison and deeper look into problem based learning, cooperative learning, inquiry based learning and constructivist views of learning in comparison to traditional teaching methods.

An Artistic Parody of the National Endowment for the Arts

Student: Karenmarie Marley (2015)

Honors Thesis Committee: Kathy Lyon, Ph.D.; Timothy Boylan, Ph.D.; and Seth Rouser, M.F.A.

CVPA – Department of Fine Arts

(HONR 450H – Lyon)

This year marks the 50th anniversary of the National Endowment for the Arts (NEA), a U.S. governmental department that issues grant money and awards achievement medals. As an artist, and as an American, I wonder how a country prohibited from censoring speech and expression can judge speech and expression worthy of merit for taxpayer subsidy and presidential recognition. This would require that merit-worthy speech and expression be defined first. In the context of art, this would require an answer to the age-old question: What is art? In a political context, any government that answers this question is declaring an official position, representative of the entire group of citizens. This conflicts with any notion that art is subjective according to the values of unique individuals. My thesis project is an artistic parody of this conundrum created by the NEA. In my photography and digital art with political commentary, I endeavor to have my project images stimulate controversial reactions that result in the abolition of the NEA.

Relationships and Breakup Strategies

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Tori Horn (2015)

Honors Thesis Committee: Tara Collins, Ph.D.; Matthew Hayes, Ph.D.; and Sarah Reiland, Ph.D.

CAS – Department of Psychology

The purpose of this study is to assess how different breakup strategies are used across different relationship types. The goals of this research are to build on previous research done on relationship termination and add to the literature that already exists on different relationship types. Specifically, this study focuses on booty-call relationships, friends-with-benefits relationships, and committed relationships, and the differences in how they are each

terminated. I expect to find that booty-call relationships are more likely to be ended using avoidance strategies. In friends-with-benefits relationships and committed relationships, I expect that positive tone and/or open confrontation strategies will be more likely to be used than other strategies. If these expectations are found to be true, the findings would support previous research.

Technology's Impact on Reading Comprehension

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Karey Wengert (2016)

Honors Thesis Committee: Carol Marchel, Ph.D.

COE – Department of Curriculum and Pedagogy

The question that this thesis sets out to answer is: can a proper and developmentally appropriate use of technology increase a student's comprehension of a literary work? With the recent increase on the emphasis of literacy skills and an increase in access to technology in the elementary classroom, this question is more pertinent than ever. To answer this question, this paper sets out to first review the literature on technology use and reading comprehension in the classroom, and then to review data collected during a field-based research implementation to observe the impact of technology interventions on reading comprehension.

Effects of Summer Bridge Programs on Retention and Academic Performance of First-Year STEM Students

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Alexandra Jensen (2015)

Honors Thesis Committee: Matthew Stern, Ph.D.; Heather Evans-Anderson, Ph.D.; and Joseph Rusinko, Ph.D.

CAS – Department of Biology

This project will assess the benefits of summer bridge programs into university STEM programs for first-year college students. The findings will be based on two dominant factors: retention and performance. The implementation of such a program into a department at a middle-level delegation university will be assessed based on student interest, feasibility, and logistical factors. A model type and method for implementation will be discussed based on the findings of literary research, interviews with professionals who have implemented such programs, and a survey given to university STEM students.

The Effects of Sports Participation on Neurocognitive Function in NCAA Division I Collegiate Athletes

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Julia Greiner (2015)

Honors Thesis Committee: Alice McLaine, Ph.D.; Kathy Lyon, Ph.D.; and Janet Wojcik, Ph.D.

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

The purpose of this study is to examine the effects of sports participation on neurocognitive function, since cognition is one of many areas affected when an individual sustains concussive head trauma. The goal of this research is to identify whether sports participation can cause an increase in neurocognitive function, a decrease in neurocognitive function, or if neurocognitive function will remain unaffected by a bout of structured exercise at the collegiate level. If any differences in neurocognitive function are experienced with sport participation, it will shed light on the current methods utilized for concussion assessment and

management. This study focuses on testing conditioned athletes who compete in an in-season sport at the collegiate level, as opposed to recreational athletes, in order to lessen the gap between participant fitness level and testing. The computerized programs that will be used include the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) and the Automated Neuropsychological Assessment Metrics (ANAM). These testing programs both examine reaction speed, processing speed, as well as working memory, both visual and verbal. The goal of this research is to establish whether statistically significant differences exist between pre-practice and post-practice neurocognitive testing, and these data will also be compared to the scores of participants from the student population who are not involved in sports participation.

Income Tax Expense versus Cash Taxes Paid: An Empirical Analysis of Faithful Representation

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Justin Moore (2015), **McNair Scholar**

Honors Thesis Committee: Clarence Coleman, Ph.D. and Kathy Lyon, Ph.D.

CBA – Department of Accounting, Finance, and Economics

As the developed world seeks to solve their budget deficit problems through taxation or austerity, this research seeks to determine whether firms are paying the income taxes reported as expenses in their income statements. A firm's income tax expense may differ from its tax liability due to differences between the Generally Accepted Accounting Principles (GAAP) and the Internal Revenue Code. Thus, the users of financial statements may be misled about a firm's tax liability if its income tax expense is not faithfully represented in its income statement. By statistically analyzing a firm's reported cash taxes paid and income tax expense, we can determine whether the reported income tax expense faithfully represents the income tax liability as defined by the Financial Accounting Standards Board (FASB) conceptual framework.

100 Self-Portraits

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Anna Brenner (2015)

Honors Thesis Committee: Mark Hamilton, M.F.A. and Kathy Lyon, Ph.D.

CVPA – Department of Fine Arts

It has been theorized that every piece of work an artist creates is a self-portrait. Artists are passionate people; therefore their work will mirror that passion. My interest derives from Andy Warhol's Campbell Soup Cans. This famous series was created by silk-screening the same image of the soup can thirty-two times onto 20-by-16-inch canvasses. Warhol then stenciled on the names of the individual soup varieties, and removed his hand from the entire process. My question is: what if Warhol did include his hand in his series? If he hand painted or drew every soup can, each one would become a self-portrait, thus preserving the artist in his art. My goal is to replicate the same image 100 times to test this theory. If the viewer can gather some insight as to who I am as an artist (my fear, frustration, enjoyment, anger, anxiety, happiness, etc), then this project will be a success. Through various mediums, I will recreate a photograph I took. The photograph is of an egg. The egg is a symbol, not only of who I am as an artist, but also who I am as a woman.

Maternity Leave and the Economies of Austria, Canada, Poland, the United Kingdom, and the United States

Presented at the Southern Regional Honors Council Conference, March 2015

Student: Anna Eckenrode (2016)

Honors Thesis Committee: Laura Ullrich, Ph.D.

CBA – Department of Accounting, Finance, and Economics

(ECON 306 – Ullrich)

The purpose of this research is to examine the relationship between maternity leave duration, income granted during leave, and recentness of law updates with the female labor force participation rate and female unemployment rate. Maternity leave laws in many Organizations for Economic Co-Operation and Development (OECD) countries vary from one another, giving sample data for each maternity leave system. Data from the OECD countries of Austria, Canada, Poland, the United Kingdom, and the United States were observed and analyzed to indicate trends in female labor statistics in comparison to maternity leave implementation and updates. While causation cannot be determined, multiple conclusions about the relationship have been reached through this research.

Cacophony of Influence

Student: Gabrielle Wolfe (2015)

Honors Thesis Committee: Stacey Davidson, M.F.A. and Kathy Lyon, Ph.D.

CVPA – Department of Fine Arts

My Honors thesis refers to the art installation I created and placed in the Winthrop Student Galleries on April 3rd, 2015. This work is a result of an almost year-long exploration of memory that visually summarizes my thoughts and research about the way we process our experiences into memory in order to understand how these experiences shape who we are. The method by which I created my installation can easily be related as a metaphor for the way we naturally process experiences. Using a variety of media and processes, I aimed to achieve a visual "cacophony" that is richly layered with personal relics and non-traditional papers.

Intrinsic Motivational Factors for College Freshmen and Seniors and Employees in the Work Force Regarding Career Path Choice

Student: Brittany Ergle (2015)

Honors Thesis Committee: Darren Ritzer, Ph.D.; Merry Sleigh, Ph.D.; and Evelyne Weeks, M.A.

CAS – Department of Psychology

Within the area of industrial-organizational psychology, understanding motivation within organizations is a central concern. Motivation is defined as a person's internal disposition to be concerned with an approach to positive incentives and avoid negative incentives. Though it can be used to help predict behavior, there is also the involvement of ability and environmental factors surrounding individuals that differentiate between different people's behavior and performance. Dealing with the motivating factors that cause a person to pursue certain career paths, this review will provide a theoretical approach to the intrinsic value that someone would place on this process and would use to make his or her decision, rather than the extrinsic values that are commonly labeled. Looking at the reasons and processes that are used when determining both a major in college as well as a career in the real world, whether the latter follows the first or not, this approach will give an insightful reasoning as to the most common intrinsic values that people place on their areas in life, and the processes that accompany both the value-setting and decision-making.

MEETING ABSTRACTS

Field and Laboratory Studies of the Effect of Peppermint (*Mentha piperita*) on Insect Feeding Behavior and Damage on Green Bean (*Phaseolus vulgaris*)

Presented at the South Carolina Entomological Society, October 2014

Winner, Outstanding Undergraduate Student Presentation Award, South Carolina Entomological Society, October 2014

Student: Michael Hull (2014)

Faculty Mentor: Paula Mitchell, Ph.D.

CAS – Department of Biology

The brown marmorated stink bug, *Halyomorpha halys* (Stål) is an invasive species that has been reported from 41 states in the USA and is an agricultural and nuisance problem in at least thirteen. The objectives of this study were to determine the potential of peppermint extract as a repellent or antifeedant for *H. halys*, and to test the effectiveness of mint companion plantings in reducing insect damage to green beans. In the lab, bugs were placed on green beans treated with two concentrations of peppermint leaf extract or a control, and video recordings were analyzed with Noldus Observer behavioral software. Exposure to mint increased the incidence of leg and antennal cleaning and the frequency of flying. The duration of labial dabbing, which is a pre-feeding behavior, was significantly reduced on mint-treated beans compared with the control; no differences were found between concentrations. Field data were collected from six research plots; three-cornered alfalfa hopper (*Spissistilus festinus* [Say]) damage to leaf petioles and chewing insect damage to pods were measured in plots with and without companion mint plantings. Although differences were not significant, a strong trend was observed: both forms of damage were reduced in plots with mint plants. Thus, both mint extract and whole plants appear to have deterrent properties.

Britomart: Overcoming the Gender Binary at the House of Busirane

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Courtney McGrath (2015)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 514 – Fike)

The gender of Britomart, Edmund Spenser's female knight of chastity in *The Faerie Queene: Book III*, has received widely varying interpretations. She has been considered highly masculine (Judith Anderson), fairly feminine (Tracey Sedinger), anti-patriarchal (Mary Villepontoux), androgynous (Susan Frye), and properly balanced (Iris Tillman Hill). Most of these views participate in one part of the masculine-feminine gender binary or the other. The purpose of this paper, then, is to use the episode at the House of Busirane in cantos 11-12 to reply to these critics by showing that Britomart's gender actually disproves the gender binary completely. The fluidity of Britomart's gender relates to her Freudian backstory, phallic armor, the figurative castration of Busirane, and two different hermaphroditic conclusions (Book III's alternative endings). Gender theory, psychoanalysis, and feminist criticism buttress the argument. Ultimately, because Britomart embodies both gender presentations (male and female roles) as well as neither gender presentation, her gender deconstructs the binary that has been foremost in the minds of previous critics.

Redcrosse Knight and the Misconception of Medieval Chivalry

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Courtney McGrath (2015)

Faculty Mentor: Josephine Koster, Ph.D.

CAS – Department of English

The idea of medieval chivalry existing in Renaissance literature, such as Edmund Spenser's *The Faerie Queene*, is widely agreed upon. However, our 20th-century misconceptions about medieval knighthood and medieval life have led us to a mostly modern construction of medieval chivalry as opposed to an authentic analysis of medieval chivalry in *The Faerie Queene*. In the first canto of book one, Redcrosse Knight exemplifies and deviates from medieval chivalry in regard to political duties, social conduct, faith, and allegory as described by Ramon Llull's *The Book of the Order of Chivalry*. By examining Redcrosse Knight using an authentic medieval text that defines chivalry, we closely observe how he fits into and breaks the medieval model of knighthood. Ultimately, Spenser uses the idea of Chivalry as a stock image on which to base his epic character, then adds a Renaissance makeover. Unfortunately, this means that Redcrosse Knight may not have fit into the Order of Chivalry as well as previously thought. By applying Raymond Lull's theories of Chivalry to Redcrosse Knight, I argue that Spenser is in effect rewriting the definition of chivalry to appeal to his Renaissance audience and promote his Protestant agenda.

Mindfulness as a Predictor of Technostress in Young Adults

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Joseph T. Galtelli (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

People are becoming more dependent on technology, which introduces a particular type of stress called technostress (Qin, Qiang, & Kanliang, 2011). We examined technostress, different types of technology use, and mindfulness. Adults ($n = 82$) responded to the Technostress Scale (Qin, Qiang, & Kanliang, 2011), the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006), the Mindfulness and Attention Awareness Scale (MAAS; Brown & Ryan, 2003), and questions about technology use. Results revealed that the greater the technostress, the lower the participants' mindfulness. Technostress did not relate to the FMI. The higher the technostress, the more participants agreed that technology is a stressor for them. Technostress was not predicted by age, GPA, race, or self-esteem. Compared to men, women had higher technostress and higher levels of general stress. Women also reported higher MAAS scores, equating to lower levels of mindfulness. The manner in which participants used technology did not predict technostress. In sum, we found that people who were mindful experienced less technostress. Perhaps mindful individuals are aware of their emotions and can control them, thus minimizing stress when dealing with technology. In addition, mindful individuals may be focused on the task at hand, rather than distracted by how the current task is going to affect the future. Although the MAAS predicted less technostress, FMI did not. The fact that FMI measured mindfulness as a broader construct that included factors such as non-judgmental attitudes and a lack of specific goals renders it a less useful measure. Our participants had accurate awareness of their technostress levels, and these levels were consistent across numerous demographic characteristics.

The Interdependence of the Body and Soul in Donne's "The Ecstasy"

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015, and the 10th Annual Winthrop University Department of English Graduate/Undergraduate Research Conference, March 2015

Student: Chelsea Bergmann (2015)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 514 – Fike)

Due to its cryptic and challenging content, John Donne's "The Ecstasy" proves to be a work of many mysteries. Blaine Greteman explores the poem in terms of the 17th century's emphasis on the independence (separateness) of the body and soul, Ramie Targoff studies the unity of body and soul in Donne's poems (interdependence), and others discuss the possibility that the speaker's intention is merely sexual (i.e., centers exclusively on the body). But no one has considered body and soul as part of a pattern of dyads within the poem, and the criticism also fails to consider how the unity of body and soul provides a foundation for virtuous love. This paper argues that dyadic images in "The Ecstasy" underscore the unity of body and soul as a prerequisite for virtuous love. In order for the lovers' souls to intertwine, they must inhabit bodies first. Much as Sir Philip Sidney, in "An Apology for Poetry," asserts that poetry teaches virtue, "The Ecstasy" suggests that a synergy of body and soul leads to virtuous love. Parallels between the dyads – body vs. soul, reason vs. faith, and earthly vs. heavenly – evince a symbiotic relationship between the lovers' bodies and their souls. Finally, the pure "ecstasy" of virtuous love is rewarded once lovers have departed from the world because their example inspires those who come after them. No one has considered body and soul as part of a pattern of dyads within the poem, and the criticism also fails to consider how the unity of body and soul provides a foundation for virtuous love. This paper argues that dyadic images in "The Ecstasy" underscore the unity of body and soul as a prerequisite for virtuous love.

Changing Perceptions on Immigrants in Contemporary America: Evidence from the General Social Survey

Presented at the Southern Sociological Society Conference, March 2015

Student: Eboni Ford (2015)

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

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

The emerging literature on immigrant criminalization indicates that federal and state policies toward immigrants as well as media coverage are having negative effects on the perceptions of Americans toward persons who were born abroad and now reside in the United States. This is particularly salient after 9/11. In this paper, we compare data on natives' perceptions of immigrants before and after 9/11. We used data from the General Social Survey in 1996, 2000 and 2004 to explore two particular and related variables: perceptions on the effects on immigrants in the availability of jobs and perception of immigrants on crime. Our findings indicated that there are increasing negative perceptions of immigrants on crime but not on job availability. After September 11, 2001, we observe negative perceptions about immigrants. Rousseau argues that "many sociopolitical events can significantly alter stereotypes of discrimination, and numerous studies have reported increases in discrimination toward Arabs and Muslim minorities in the Western world since the events of September 11, 2001" (2011).

MacDonald, Hipp, and Gill show that back in 1931 there was no indication that immigrants increased crime patterns (2013). However, in this contemporary sample, we observe increased negative discrimination against immigrants compared to the recent past. In conclusion, our findings suggest that public opinion produces negative perceptions on immigrants. The media was a contributing factor as it has fueled negative stigma on immigrants (Massey 2012).

Influence of Facebook Secret Group Participation on Psychological Well-Being

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Winner, Psi Chi Regional Research Award, SEPA, March 2015

Student: Leigh Fransen (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYCH 302 – Sleight)

We examined the effect of Facebook Secret Groups (FSG) use on psychological well-being. Adults (n=104) responded to the Flourishing Scale (Diener et al., 2009), the Satisfaction with Life Scale (SWLS; Kobau et al., 2010), the Facebook Intensity Scale (FBI; Ellison, Steinfield, & Lampe, 2007), a social connectedness scale (OSC; Grieve et al., 2013), a social comparison on Facebook scale (Lee, 2009), and the Reinecke and Trepte (2013) authenticity measure (RAM). We divided participants into three groups: no FSG, light FSG, and heavy FSG usage. Participants in the heavy FSG condition had higher OSC scores than in the No FSG condition; however, FSG participation did not relate to any authenticity measures. Participants who did not use FSG had lower FBI scores than the other two conditions. The higher the FBI scores, the higher the negative social comparison score and the higher the OSC score. Participants with higher OSC scores also reported that they wanted people to see them as they truly are and that their friends were authentic on Facebook. The higher the RAM score, the lower the depression and the higher the Flourishing score. In sum, adults who heavily engaged in FSG reported being more socially connected to their friends on Facebook. However, this finding did not connect directly to online authenticity. Perhaps adults who are more socially connected to their Facebook friends are the ones more driven to join FSG. This study supports the assertion of previous researchers that social media use can either be alienating or encourage connectedness.

Cortical Bone Stiffness in the Axial Direction Demonstrates the Highest Variance between Samples

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences and a grant from the Winthrop University Research Council

Student: J.W. Barrera (2017)

Faculty Mentor: Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

Bone is a biomaterial; therefore, its mechanical properties start to deteriorate the moment it is removed from the living organism. When tested in the lab, bone samples are usually harvested and then fresh frozen until one day prior to the experiment, when they are thawed in the refrigerator for 24 hours. Here, we investigated the effects of much longer thawing times (7 days) on bone stiffness. Thirty cortical bone cubes were harvested from the proximal diaphysis of 5 young white-tailed deer femora and then were frozen (-20° C). Next, the cubes were tested in compression in the axial, transverse and radial directions, both one day and 7

days after they were thawed and kept in the refrigerator (4° C). Bone stiffness decreased by 5 % (not significant) when results were compared between day one and seven. Yet stiffness variance (measured as standard deviation, SD) was significantly different between the 3 directions, both on day one and seven. Axial stiffness showed the highest variance among samples, followed by transverse and radial stiffness. Wolff's law predicts that bone will adjust itself to loading (modifying bone mass and orientation). Thus, it predicts that the highest variance in stiffness will be in the direction which is normally loaded (i.e., this direction will be the most susceptible to changes due to the individual's level of activity). Our results support Wolff's law and show the highest variance in the axial direction and the lowest variance in the radial direction.

Body Preoccupation, Self-Worth, and Academic Achievement in College Students

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Stepphan A. Stover (2015) and **Brunson C. Robins** (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

College students (n = 93) responded to scales that measured willingness to persevere through difficult tasks (Duckworth, Peterson, Matthews, & Kelly, 2007), areas on which self-worth was based (Crocker, Luhtanen, Cooper, & Bouvrette, 2003), desire for control (Burger & Cooper, 1979), body checking behaviors and preoccupation (Reas, White, & Grilo, 2006), and academic performance. Results revealed that higher rates of body checking related to higher grade point averages. One explanation is that adults who are motivated to excel want to succeed in both cognitive (grades) and physical (appearance) arenas; thus, they body check and do well in school. We also found that the more body checking the participants reported, the lower their self-esteem. Thus, another possibility is that people who body check are feeling poorly about themselves, as evidenced by the lower self-esteem reported by our participants, and are compensating by performing well in school. It may be easier to earn good grades than to change body type and appearance. The more participants engaged in body checking behaviors, the more they based their self-worth on competition, appearance, and others' approval. Body checking behaviors did not predict perseverance or a desire for control. We compared men and women using an independent t-test. Women engaged in more body checking and based their self-worth more on appearance. Our study offers insight into yet another variable (body checking) that is potentially influencing, or being influenced, by college students' academic performance. It also raised new questions for future research.

Baroque and Rococo Medical Art

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Cathryn Smith (2015)

Faculty Mentor: Laura Dufresne, Ph.D.

CVPA – Department of Fine Arts

The research compiled within this thesis examines the resurgence in awareness surrounding the composition and function of the human form that followed the Italian Renaissance, which gave rise to a more approachable means of presenting the body across a variety of artistic media. Although general acceptance of anatomical study was slow to develop, artists worked in tandem with physicians to publish studies that imbued cadavers with the amount of personality necessary to disassociate them with the stigma of death. In time, carefully composed artwork retained the graphic honesty expected of learned medical professionals, but with a heavy semblance to Classical nudes like athletes or Venuses. This reliance on established archetypes helped dispel the squeamishness that surrounded the notion of tampering with the dead in lieu of more favorable portrayals of anatomy that rarely

sacrificed accuracy for beauty. Studios began to develop specific regional styles that ranged from idyllic, reclining wax models typical of Italian sculptors to the unabashedly realistic casts attributed to Northern Europe. The advent of the printing press allowed sketches of dissections to become available at a rate never before experienced, with mass-produced illustrations made available through medical texts, so that every student or scholar had immediate references that withstood the inevitability of biodegradation. Baroque and subsequent Rococo aesthetics manifested themselves comfortably within the corporeal sphere of anatomical study, an advantage that undoubtedly contributed to the continued advancement of medical science.

Winthrop University Students Unite for Black Lives, All Lives

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015, and the Second Annual Winthrop University Mass Communication Undergraduate Symposium, April 2015

Student: Wendrah M. McCoy (2015)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

The purpose of this project was to research and compose a soft news story that conveyed the emotions of Winthrop University students who protested during a die-in and injustice march on December 9, 2014. They were demonstrating solidarity with those who protested after two officers were not indicted for killing unarmed black males Michael Brown and Eric Garner. Primary research was conducted through recorded observations of the demonstrations and interviews with the protesters. Facts and statistics were obtained from secondary sources, such as the NAACP website and news sources, such as USA Today. About 100 students of diverse races, 2 percent of the student population, participated in the protests, but most were African. As per FBI reports, during a seven-year period ending in 2012, a white officer killed a black person nearly two times a week in the U.S. Eighteen percent of the blacks killed were under age 21, compared to 8.7 percent of whites. Protesters said they were tired of police brutality and racism, which is why they participated. Students also said that the solution starts with crossing color lines to have open conversations about race, respecting authority and voting. This project is important because it addresses the larger issue of racial discrimination in America. Protesting challenges the status quo, which is momentum for change. Though the movement is nationwide, the activists at Winthrop have the power to impact the future; they have taken the first step by publicly acknowledging that racism does still exist.

A Cross-Racial Study of Attitudes toward and Beliefs about Male Homosexuality

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the National Association of African American Studies Annual Conference, February 2015

Student: Alexandera Foster (2015), **McNair Scholar**

Faculty Mentor: Bradley Tripp, Ph.D.

CAS – Department of Sociology and Anthropology

(MCNR 300 – Fortner-Wood)

This study presents data about the attitudes toward homosexuality of black and white people. The survey used in this study was adapted from Furnham and Saito (2009), which compared the attitudes and beliefs about male homosexuality of British and Japanese participants. The sample consisted of 131 (37 black, 97 white) Winthrop students. The results were analyzed using T-tests. The results of the study were consistent with the literature in inconsistency. Of

the 17 categories tested, significant racial differences were found in 6. There were no significant racial differences in beliefs about attributing homosexuality to biological causes, the role of gender roles in causing homosexuality, or the belief that abnormality caused homosexuality. A relatively high percentage of all participants believed that factors such as father-son relationships could cause homosexuality, whereas abnormality was the least favored of all the factors. There were significant racial differences in the following factors: black participants were significantly more likely to believe that contact with homosexuals contributed to homosexuality; black participants were significantly more likely than whites to believe that the rights of homosexuals should be protected; and white participants were much more likely to hold stereotypical views of homosexuals. The size effect was small for all factors.

The Effect of Academic Circumstance on Substance Use and Exercise

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Tyler Wozniak (2015); Steven Rivera (2015); and Ariel Castillo (2015)

Faculty Mentor: Matthew Hayes, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Hayes)

The present study evaluated academic circumstance as a predictor of exercise and substance use as it is related to grade point average (GPA). Herrman, Schuckit, Hineman, and Pugh (1976) observed the effects of stress on drug use and GPA. They found that marijuana users reported the highest GPA, followed by non-users, and then multiple drug users, who reported the lowest GPA. Their research indicated that the situation in which drugs are used affects people differently, which led the researchers to suggest that drugs can either help or hinder academic performance based on the circumstance surrounding the use of the drug(s). The present study examined Herman et al.'s conjecture that the circumstance was related to drug use by not only collecting data on college students' GPAs in relation to substance use and exercise, but also by assessing subjects for the academic circumstances in which they exhibited these health factor behaviors. The academic circumstances were defined as 24 hours before/after a test and 6 hours before/during/after studying. Surveys were handed out to 136 Winthrop University students. The hypothesis was not supported and student use of drugs and exercise was not related to GPA. However, the correlation between a health factor in one academic circumstance and the academic circumstances across each health factor was significant. Our results suggest that college students do not use substances and exercise strategically in respect of academic circumstance to enhance academic performance. The results imply that dispositional variables, such as addiction or dispositional mindfulness, drive these health behaviors.

Color Effects on Perception, Memory, and Attention

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Ayana Crawford (2016) and Courtney Williamson (2015)

Faculty Mentor: Matthew Hayes, Ph.D.

CAS – Department of Psychology

(PSYC 302, 303 – Hayes)

Color is a profound element used in the world to enhance human visual experience. Previous research has been done to support the idea that color can be used to measure the brain's cognitive performance in areas such as memory and attention. The current study examined the effects of color on memory and attention by hypothesizing that, when being

exposed to a bright and vivid color stimulus, participants will be more likely to remember and be more attentive to it than when being exposed to a dark, dull color stimulus. Additionally, this study examined how well a person can detect color and object change. Participants were shown a PowerPoint presentation with two pictures of a busy, urban scene and given a questionnaire that consisted of multiple-choice questions that measured attention and memory. The results of the study showed that there was no significant interaction between Task, Attribute, and Condition, yet a significant interaction between Task and Attribute alone. These results indicate that warm and cool colors do not factor in memorization and attention but color, overall, is still important. Therefore, color influences memory and attention only when it does not change.

Factors That Influence Young Adults' Grief in Response to Celebrity Deaths

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Kaitlin Hawkins (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Sleight)

We examined how young adults emotionally responded to recent celebrity deaths. Young adults ($n = 127$) responded to an online survey that provided brief descriptions of the nature and date of death of five celebrities (Whitney Houston, Steve Irwin, Michael Jackson, Paul Walker, and Robin Williams). These celebrities were chosen based on their likeliness of being known and the (relatively) recent time frame of their deaths. Following each description, participants were asked to respond to four questions to assess feelings of connection with and admiration for the celebrity, as well as reactions to the cause of death. Participants also answered "The Brief Grief Questionnaire" (Shear & Essock, 2002) after each celebrity description to assess level of grief. Results revealed that, for all five celebrities, the more the participants "admired" the celebrity, the more intensely they grieved over the death of that celebrity. Lonely individuals were most vulnerable to intense grieving, while those with high self-esteem were less vulnerable. In addition, the less culpable the celebrity was in his/her own death, the more intense the grieving process. The more loved ones participants had lost in the past, the more they imagined themselves dying in the manner of Irwin or Walker. Both of these celebrities died in accidents; perhaps people who have lost many loved ones appreciate the fact that death can come at unforeseen times. These findings have relevance for today's young adults who have quick access to media information providing details of celebrity lives and deaths.

Pieces

Presented at the Big South Undergraduate Research Symposium (BigSURS) Intercollegiate Juried Exhibition, March – April 2015

Student: Morgan Willis (2017)

Faculty Mentor: Shaun Cassidy, M.V.A.

CVPA – Department of Fine Arts

(ARTS 332 – Cassidy)

"Pieces" is a 3D metal sculpture created for my Sculpture I class in Fall 2014. The work was originally meant to be a body adornment piece that sat on my shoulders and surrounded my head, but quickly turned into a process-driven work that stands freely on a pedestal. I started my process by cutting a sheet of metal into organic shapes of varying sizes, then ground them down to have smooth edges. The many pieces were then welded together in order to create a larger form with interesting positive and negative space. This process was repeated over the

course of many hours working in the welding studio. The outside of the larger structure was then ground down in order to make the smaller pieces appear as one continuous piece of metal on the outside, while the inside continued to appear as various pieces of metal welded together, thus creating a contrast between the interior and exterior of the form. The finished sculpture was 16-by-18.5-by-20-inches in size. It was displayed at the BigSURS Intercollegiate Juried Exhibition from March 18 through April 10, 2015. The process use of repetitive small pieces of various media continues to be a common motif in my ongoing work.

Brain-Penetrating Histone Deacetylase Inhibitor RG2833 Reduces the Growth and Viability of Malignant Melanoma Cells In Vitro

Presented at the SAEOPP McNair/SSS Scholars Research Conference, June 2014

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Winner, Winthrop University McNair Scholar Among Scholars Award, 2014

Student: Lauren Green (2016), **McNair Scholar**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Histone deacetylases (HDACs) play an important role in the epigenetic control of gene expression in both normal and cancer cells. Previous studies have demonstrated that pharmaceutical inhibition of HDACs can kill and/or suppress the growth of cancer cells. RG2833 is a brain-penetrating HDAC inhibitor that targets specific HDACs known to be active in cancer cells. Melanoma cells have previously been shown to respond to HDAC inhibitors that are structurally similar to RG2833. Thus, we hypothesized that the inhibition of HDAC activity by RG2833 would result in the reduced growth and/or death of cells from the malignant melanoma cell lines SK-MEL-5 and SK-MEL-28. To test our hypothesis, we exposed SK-MEL-5 and SK-MEL-28 cells to increasing concentrations of RG2833. We found that concentrations of RG2833 that effectively inhibited HDAC activity also resulted in reduced melanoma cell growth and viability. These results demonstrate the effectiveness of RG2833 in reducing the growth and viability of malignant melanoma cells in vitro and warrant further investigation of the potential therapeutic use of RG2833 and related compounds in the battle against cancer.

Chronic Myeloid Leukemia and Chemotherapy

Presented at the Winthrop University Mathematics Research Experience for Undergraduates (REU) Poster Session, July 2014

Supported by a grant from the Winthrop University Research Council

Student: Lindsay Bradley (2017)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

Leukemia is a form of cancer that affects thousands worldwide every year, with more than 30,000 cases diagnosed every year in the US alone. Chronic Myeloid Leukemia (CML) is one of the most prevalent types. It begins with a mutation in the Hematopoietic Stem Cells (HSC) that causes the stem cells to produce cancerous Differentiated Cells (DC). In the long run, these tumorous cells out-compete the normal cells and can be fatal if not treated. One of the more common treatments for CML is chemotherapy. In this model, we incorporate growth equations for four types of cells (HSC Normal, DC Normal, HSC Cancerous, and DC Cancerous) based on three different scenarios of homeostasis (1 depends solely upon population of stem cells, 2 depends solely upon population of differentiated cells, and 3

depends upon population of both stem cells and differentiated cells) with chemotherapy treatment. We model chemotherapy treatment with a function that shows how much of the chemotherapy agent is in the bloodstream at time t , as well as with a “killer equation” that can be tacked on to any growth equation to demonstrate the effect chemotherapy will have upon that type of cell. We then perform stability and sensitivity analysis and run numerical simulations to predict long-term behavior of the system under different parameter values.

Young Adults’ Engagement with and Self-Presentation on Social Media

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Holli Ryan (2014)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Sleight)

We examined social media use, social connectedness, and user authenticity. Participants were 131 young adults, recruited through social media, who responded to an online survey. Participants responded to measures of intensity of use (Ellison, Steinfield, & Lampe, 2007), social comparison (Lee, 2014), social connectedness (Grieve et al., 2013), and authenticity (Reinecke & Trepte, 2013). The researchers also developed questions to assess perceptions of authenticity for participants’ own and others’ social media use. Results revealed that social media users said they presented themselves in a “good light” 85 % of the time and presented themselves in a “bad light” 9 % of the time (with the remainder being neutral). Participants also felt that men are honest on social media 62 % of the time, while women are honest 47 % of the time. Participants’ own perceptions of their authenticity did not predict their perceptions of the average man and woman’s authenticity. Feeling connected and engaged to others on social media was linked to more honest self-presentation. Feeling disconnected was linked to less honest and more self-promoting postings on social media. Young adults who used social media to compare their lives to others suffered from low self-esteem, masked their true selves and failed to form deep connections. Caucasian adults were more likely to use social media for comparison purposes than were African-American users, and thus, were more vulnerable to the negative outcomes of doing so. These findings suggest that social media’s impact on users is related to the user’s goals and authenticity of self-presentation.

Implications of Participant Belief in an Afterlife for Pets on Grief over Deceased Pets

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Winner, Psi Chi Regional Research Award, SEPA, March 2015

Students: Brianna Murray (2015); **Sara Tennant** (2016); and **Leigh Szeman** (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Pet owners grieve, sometimes very intensely, at the loss of their pets, and there are a number of factors that affect this grieving process, such as attachment level, gender, and nature of death (e.g., Adrian, Deliramich, & Frueh, 2009; Field, Orsini, Gavish, & Packman, 2009; Packman, Carmack, & Roden, 2012). We examined the relationship between beliefs about the post-death experiences of pets and grief over deceased pets. Young adults ($n = 106$) responded to the Religious Commitment Inventory-10 (Worthington et al., 2012), the Pet Bereavement Questionnaire (Hunt & Padilla, 2006), and questions created by the researchers to assess beliefs about the afterlife. Participants also provided information about their experiences with pet ownership and pet loss. Results revealed that the more grief participants reported after losing a pet, the more they agreed that pets will live on in the afterlife and the

more they agreed that owners and pets will be reunited in the afterlife. In contrast, the more pets participants owned, the less they agreed that pets and owners are reunited in the afterlife. Compared to men, women reported higher levels of anger and grief following the death of a pet. Women also were more likely to agree that they believe in life after death; however, they were not more likely to agree in life after death for pets specifically. Caucasians, older adults, and students with higher GPAs reported more intense grieving following pet loss. These findings may have application for grief counselors, religious agencies, and pet owners.

Problem Solving During Peak and Non-Peak Circadian Arousal

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Winner, Psi Chi Regional Research Award, SEPA, March 2015

Student: Erin Rhoads (2015)

Faculty Mentor: Donna Nelson, Ph.D.

CAS – Department of Psychology

The aim of our project was to examine variables that inhibit or augment creative thinking about personal social problems. Prior research indicates that types of information processing strategies adopted by people vary as a function of circadian arousal levels and mental fatigue. Non-peak circadian arousal seems to prompt a closed-minded, inflexible approach to information processing (Webster, Richter, & Kruglanski, 1996). This may translate into less flexible and creative thinking about solutions to social problems. Our study focused on the effect of circadian arousal on functionality of solutions to adults' personal problems. Participants were randomly assigned to complete the experiment in the early morning (7-9 AM), late afternoon (4-6 PM), or at night (9-11 PM). Participants completed the Horne-Osberg (1976) Morningness-Eveningness Questionnaire. Participants were then instructed to describe a personal social problem and generate as many different solutions as possible. Our findings indicate that synchrony of testing time and trait-like circadian arousal patterns influences efficacy of social problem solving. Morning types generated more functional solutions when tested in the morning compared to the late afternoon and night. Evening types generated fewer functional solutions when tested in the morning compared to the late afternoon or night. Operating under non-peak circadian arousal can interfere with generating functional solutions to social problems. A better understanding of the effects of peak and non-peak circadian arousal levels on creative problem solving may be useful for improving functioning in work, academic, and interpersonal contexts.

The Effects of Simulated Wildfire on Particle Size and Carbon Content in Piedmont Soils

Presented at the American Geophysical Union Fall Meeting, December 2014

Supported by the Boland Geology Endowment and the Dalton Endowment at Winthrop University

Student: Alaina Wynes (2015)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Soils are a known carbon sink, holding twice as much carbon as the atmosphere (Schlesinger, 1995). However, little is known about how much soil organic carbon (SOC) is released from the soil during fire events. Surface fires can heat mineral soils to up to 500 °C at depths of several centimeters and maintain that temperature for hours (Werts & Jahren, 2007). This has been known to affect the size of particles in soils, the carbon content in soils, and the clay mineralogy (Hungerford et al., 1993). This study looks at relationships between soil clay content and clay chemistry in relation to carbon emissions during surface fires, to determine

temperature effects on several Piedmont soil types from South Carolina. Soil samples were taken from three different sites varying in clay content, clay type, parent material, and development. Temperature increases were applied in increments of 50 °C, with a range from 100 °C to 500 °C, to determine fire effects on SOC, particle size, and clay mineralogy of the soils. We found a decrease in SOC (up to 98 %) from the original amount in all soil horizons with temperature applications up to 500 °C. At a temperature range between 100 °C and 300 °C, most soil horizons showed an increase in clay of a range between 0.1 and 34 %. At temperatures ranging from 300 °C to 500 °C, there was a decrease in clay ranging from 2.5 to 42 %. While previous research suggests that a positive correlation between the percentage of clay and SOC in soils is common (Feller & Beare, 1997), in this study, a negative correlation was found between the percentage of clay and SOC in all three soil types ($R^2 = 0.87, 0.76,$ and 0.59) at 100 °C. There appears to be an increasingly positive relationship between clay and carbon as temperature increases, although a consistent high correlation was not present at all temperatures. This is counter to what was found initially in our soils prior to heating. While research into surface fires is important to the understanding of ecosystems and carbon cycling above ground, understanding SOC dynamics following a surface fire event can provide further insight on carbon cycling and erosion impacts of surface fires.

The Myth of the Irish Woman: Identity in Traditional and Modern Irish Folklore

Presented at the 10th Annual Winthrop University Department of English Graduate/ Undergraduate Research Conference, March 2015

Student: Laurie Hilburn (2016)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

(ENGL 525 – Cothran)

Since its insurrection, Ireland has been suffering from an identity crisis, struggling against European influences for what defines the country and its people. However, in literature, the question of what is sacrificed in order to reach a unified identity is controversial. The disparity between traditional and modern Irish folklore contributes to the lack of an Irish identity, reflected primarily in the portrayal of the Irish woman and the embodiment of Ireland as a woman. According to William Butler Yeats and Lady Augusta Gregory in *Cathleen Ni Houlihan*, Ireland will return to its full strength once its people celebrate the importance of preservation through sacrifice, supporting a pastoral Irish identity while favoring rural life over the materialistic urbane represented by the English; *Cathleen Ni Houlihan* demonstrates Ireland's desire for independence, as male citizens stand up against the United Kingdom for the noble cause of a woman—not just any woman, but the female epitome of Ireland. In contrast, James Joyce's "Eveline" in *Dubliners* and Marina Carr's *By the Bog of Cats* show an Ireland clinging to decaying ideas of nationalism, purporting new freedoms for Irish citizens so long as life is pursued outside of a country that has died in solitude; by forgoing the magical, political personification of Ireland as a woman and illustrating the real, tangible Irish women stagnating in society, Joyce and Carr question whether the country or individual should survive. Overall, the representation of women in Irish literature explores the opportunity to exist outside of the embodiment of Ireland as a woman, as something ethereal and therefore unattainable, and to live finally as an authentic Irish woman in order to discover a unified identity.

"His Owne Scriveyn": Adam Pinkhurst and the Consequences of "Chaucer's Scribe"

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Brierly Harris (2015)

Faculty Mentor: Josephine Koster, Ph.D.

CAS – Department of English

(ENGL 511 – Koster)

In 2004, Linne Mooney announced that she has discovered the identity of Chaucer's primary scribe, Adam Pinkhurst, formerly known as Scribe B, as well as linking his handwriting to the Hengwrt and Ellesmere manuscripts of *The Canterbury Tales*. Her 2006 article, "Chaucer's Scribe," has facilitated a critical conversation over the last eight years that represents a 21st century perspective into medieval studies. Interest in Adam and Chaucer's professional relationship can be attributed to one of Chaucer's shorter poems, "Chaucer's Words to Adam, His Own Scribe," which Mooney argues can only represent Adam Pinkhurst. My research focuses on the rapid changes within Chaucer studies since Adam's identification, particularly in light of any disproportionate readings of Chaucer's short poem. Adam was Chaucer's scribe, not his editor or his muse, but his influence on Chaucer can be tricky to define without records of friendship beyond employment. My assessment of previous scholarship attempts to deflate any exaggerated characterization of Adam Pinkhurst, as well as contributing my own opinion on the significance of this particular scribe to Chaucer's creative process.

Clay Chemistry's Influence on the Average Carbon Content and Particle Size at the Ninety Six Historical Site, South Carolina

Presented at the American Geophysical Union Fall Meeting, December 2014.

Supported by a grant from the Winthrop University Research Council and the Boland Geology Endowment at Winthrop University

Student: Lauren Lintz (2016)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The Ninety Six National Historic Site is located in Greenwood County, South Carolina. Recent geologic mapping of this area has revealed differences in soil properties over short distances within the park. We studied the chemistry of the clay minerals found within the soils to see if there was a correlation between the amounts of soil organic carbon contained in the soil and particle size in individual soil horizons. Three different vegetation areas, including an old field, a deciduous forest, and a pine forest, were selected to see what influence vegetation type had on the clay chemistry and carbon levels, as well. Four samples containing the O, A, and B horizons were taken from each location and we studied the carbon and nitrogen content using an elemental analyzer, particle size using a Laser Diffraction Particle Size Analyzer, and clay mineralogy with powder X-ray diffraction of each soil sample. Samples from the old field and pine forest gave an overall negative correlation between carbon content and clay percentage, which is against the normal trend for Southern Piedmont Ultisols. The deciduous forest samples gave no correlation at all between carbon content and clay percentage. Together, all three locations show the same negative relationship, while once separated into vegetation type and A and B horizons it shows even more abnormal relationships of negative while several show no correlation ($R^2 = 0.007403-0.56268$). Using powder XRD, we ran clay samples from each A and B horizon for the clay mineralogy. All three vegetation areas had the same results of containing quartz, kaolinite, and iron oxides; therefore, clay chemistry is not a reason behind the abnormal trend of a negative correlation between average carbon content and clay percentage. Considering that all three locations

have the same climate, topography, and parent material of metagranite, it could be reasonable to assume these results are a factor of environmental and biological influences rather than clay type.

The Reaction of O-Silylated Cyanohydrin Anions with Epoxides as an Alternative for the Enantio- and Diastereoselective Preparation of Aldols

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the 249th National Meeting of the American Chemical Society, March 2015

Winner, 3rd Place in Posters at the SAEOPP Conference, June 2014

Student: Diamond R. Melendez (2015), **McNair Scholar**

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

CAS – Department of Chemistry, Physics, and Geology

The aldol addition is one of the most important carbon-carbon bond-forming reactions in chemical synthesis. The traditional form of this reaction, between an aldehyde or ketone and a second enolized aldehyde or ketone, results in the formation of a beta-hydroxycarbonyl (often referred to as an "aldol product"). The reaction can result in the formation of up to two new chiral centers, and the absolute and relative stereochemistry of the product can be challenging to control. Modern variations have allowed for significant enantio- and diastereoselectivity in the reaction. These useful methods are not without drawbacks, including poor atom economy, use of expensive auxiliaries, and the additional synthetic steps required to introduce and remove these auxiliaries. An alternative potential route for the enantio- and diastereoselective preparation of aldol products is the reaction of O-silylated cyanohydrin anions with epoxides. This method would take advantage of the wealth of excellent asymmetric epoxidation procedures available, providing an efficient method for the stereoselective formation of aldols. The scope and limitations of the method have been investigated with respect to the epoxide structure. The tert-butyldimethylsilyl (TBS) ether of mandelonitrile was prepared and reacted with a variety of differentially substituted epoxides. The reactions were carried out using LiHMDS as the base in either toluene or ether solvent. The newly formed adducts were then desilylated with tetrabutyl-ammonium fluoride (TBAF) to form the desired aldol product. Yields up to 90 % for the two-step process could be achieved.

Enhancing the Developmental Potential of Murine Adipose-Derived Mesenchymal Stem Cells

Presented at the South Carolina Academy of Science Annual Meeting, April 2015

Supported by a grant from the Winthrop University Research Council and an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Kathryn V. Steverson (2016)

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Adipose-derived stem cells (ADSCs) are multipotent somatic stem cells obtained from the microvasculature of adipose tissue. ADSCs cannot match the differentiation potential of pluripotent embryonic stem cells (ES cells). However, previous studies have suggested that the non-traditional method of culturing ADSCs as three-dimensional spheroids can induce the expression of factors associated with pluripotency, including the transcription factor Oct-4. We hypothesize that non-traditional, three-dimensional spheroid culturing of ADSCs can upregulate the expression of several genes associated with pluripotency, as well as increase

the differentiation potential of ADSCs. Here, we show that murine ES cells cultured in our lab maintain expression of genes associated with the pluripotent state and known to be expressed in ES cells, thereby validating our ES cell culture conditions for future studies. We also show that ADSCs cultured under traditional two-dimensional conditions do not express markers of pluripotency. Interestingly, the expression of several genes known to be expressed in populations of somatic stem cells does vary with the level of confluence of ADSCs and is also affected by medium supplementation with murine leukemia inhibitory factor (mLIF), which is used to maintain pluripotency in cultured murine ES cells. Future work will examine the expression of the same subset of genes in ADSCs cultured as three-dimensional spheroids in the presence/absence of mLIF and murine embryonic fibroblast feeder cells.

How to Own a Language: Linguistic Ownership and the Perils of Linguistic Marginalization

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Andrew Harris (2015)

Faculty Mentor: Josephine Koster, Ph.D.

CAS – Department of English

(ENGL 507 – Koster)

Regardless of its distinctive purpose in our existence, the concept of language ownership has been a topic of debate for legal scholars and linguists alike. Without responsible linguistic education, the perceived ownership of particular sounds will continue to negatively impact linguistic minorities that are prone to discrimination. Paramount in the discussion of language is its ensured protection and the protection of the rights of its speakers. In general, the legal copyrighting of an entire language is retained for languages created within corporations or as the shared property of a private entity. For example, the languages created by J. R. R. Tolkien for Middle Earth are not public property; rather, they are subject to standard Fair Use guidelines, as the languages are the creative property of the Tolkien estate. Linguistic communication is a part of what makes us uniquely human. Although the construction, formation, preservation, and continued use of a language are not fundamental human rights – in an appropriately broad sense – at present, progress in such a direction is underway. Ownership of a language is not an objectively definable notion and attempts to define such constraints usually cause more strife than is alleviated. My paper diffuses common misconceptions about language ownership and offers insight into the linguistic application of ownership and personal property.

Comparison of Piedmont Clay Complexity and Carbon and Nitrogen Release at Various Temperature Intensities through Simulated Wildfires

Presented at the American Geophysical Union Fall Meeting, December 2014

Supported by a grant from the Winthrop University Research Council and the Boland Geology Endowment at Winthrop University

Student: Taylor Davis (2015)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Past research indicates that clay chemistry of soil can be altered below ground following a wildfire. Higher intensity burns can alter the pre-existing clay type and transform it into another. By contemplating the composition of a soil before a wildfire starts, it is possible to determine the outcomes and negative impacts of the burned soil at various temperatures, including possible emissions of carbon and nitrogen. Through evaluating different soil samples using the Rigaku Miniflex 600 XRD powder X-ray diffractometer, the clay

composition of each sample was determined to be either in the kaolinite grouping, which is a less complex structure, or in the smectite, mica, or vermiculite groupings, which are more complex structures. After examination of field data using the Costech Elemental Combustion System for elemental analysis, a trend was found that as clay complexity increases in the individual horizons, the release of carbon and nitrogen from the soil also increase versus the other less complex horizons. It can be suggested that areas holding more complex clay mineral structures have the capacity to release more carbon and nitrogen into the atmosphere when burned at higher temperatures and intensities. Using this information, it is possible to indicate those areas holding more complex clay minerals and put further protection or emphasis on ensuring their exposure to wildfire is lessened. In turn, this will reduce the amount of harmful greenhouse gases released into the surrounding environment in the event of future uncontrolled wildfires.

Synthesis and Anti-Cancer Activity of Benzisoxazolo[2,3-a]azinium Tetrafluoroborates

Presented at the Annual Meeting of the American Society for Biochemistry and Molecular Biology, March 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences and a grant from the Winthrop University Research Council

Student: Jamie Murakami (2015)

Faculty Mentors: James M. Hanna Jr., Ph.D. and Takita Sumter, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

(CHEM 551, 552 – Hanna)

Despite the success of genomics in identifying new essential oncogenic signaling pathways, there have been a limited number of sustainable leads in anticancer drug discovery to address increasing chemoresistance. To improve progress in this area, our lab synthesized several novel benzisoxazoloazinium tetrafluoroborates with structural characteristics similar to clinically effective DNA binding drugs. From a series of eight tricyclic pyridinium compounds with various substituents, a methyl-substituted compound effectively inhibits proliferation in colon cancer cell lines (IC₅₀ = 2.95 micromolar) and shows significant in silico and in vitro DNA binding affinity. Incorporation of a fourth ring generated quinolinium derivatives that recapitulate DNA binding activity of ellipticine. Preliminary IC₅₀ values for these compounds range from 52 to 202 micromolar. To evaluate the impact of a second nitrogen, we synthesized and evaluated a quinoxalium analog; results for this compound (IC₅₀ of 18 micromolar) show increased cytotoxicity compared to the quinolinium analog. All compounds induce cell death via non-apoptotic pathways. Future work will involve the synthesis and evaluation of other quinoxalium analogs, as well as evaluation of their activity against PC3 human prostate cancer cells.

Molecular Evaluation of Transformation-Induced Methylation of the High Mobility Group A1 (HMGA1) Chromatin Binding Proteins

Presented at the Annual Meeting of the American Society for Biochemistry and Molecular Biology, March 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences; additional support provided by NIH-AREA and NSF-RIG grants, as well as a UAN Student Travel Award (ASBMB)

Student: Kendra Bufkin (2015), **McNair Scholar**

Faculty Mentor: Takita Sumter, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Aberrant expression of high mobility group A1 (hmg1), resulting from inactivating defects in upstream tumor suppressor genes or upregulation of oncogenic transactivators, induces the initiation of cancer progression pathways. The protein products of hmg1, HMGA1a and HMGA1b, are characterized by the presence of three DNA-binding motifs that possess a central RGR sequence that plays a key role in preferential binding to the minor groove of AT-rich stretches of target DNA. Importantly, R25 of the RGR sequence within the first DNA-binding motif bears covalent modifications that may recruit or repel specific transcriptional regulators in cancer cells. Despite the implication of hmg1 and arginine methylation in oncogenic function, the role of epigenetic regulation of hmg1 by arginine methylation has not been evaluated. Here, we investigate the impact of R25 substitutions on HMGA1b binding DNA targets using fluorescence spectroscopy and functional cellular assays. R25 substitutions disrupt DNA binding to various targets and suppress HMGA1-dependent oncogenic transformation. Together, our data reveal new potential anti-cancer strategies by targeting HMGA1 protein methylation and downstream targets.

Health Habits and Physical Activity of Student Truck Drivers

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the Annual Meeting of the Southeast Chapter of the American College of Sports Medicine (SEACSM), February 2015

Winner, 1st Place Poster Presentation at the SAEOPP Conference, June 2014

Student: Shalace Rose (2015), **McNair Scholar**

Faculty Mentor: Janet Wojcik, Ph.D.

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

This study examined health habits and physical activity levels of student truck drivers to determine if they are already at risk of developing health conditions that are shown in the truck driving industry. Student truck drivers from a technical college (N=52) participated in this study. They completed a modified version of a truck driver survey from the Transport Engineering Research Limited in New Zealand (2008). Questions regarding the students' health habits, physical activity (PA), and wellness in the workplace were included in the anonymous questionnaire. The mean age was 35 ± 11.03 years. Mean body mass index was 29.4 ± 6.38 with 44 % feeling they are overweight. Current smokers are 38 %. Over 72 % reported at least moderate PA greater than 3 times per week, with 37 % work-related PA. Sleep was reported to be 7 hours or greater by 71 %. Bacon, eggs, and pancakes were reported for breakfast by 31 %; 29 % consume cereal, while 31 % do not eat breakfast. Concern about health habits changing was expressed by 41 %, while 37 % were unsure. Student truck drivers are in need of improving health behaviors. They are concerned how their health habits would change and prefer to work for a company that provides wellness programs and incentives for health. These preliminary data could possibly lead to implementing wellness education into truck driving training courses.

Synthesis and Evaluation of Symmetrical Biphenyltetrols as Aggregation Inhibitors for Alzheimer's Amyloid-beta Peptide

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; the Southeastern Regional Meeting of the American Chemical Society, October 2014; the South Carolina INBRE Spring Symposium, February 2015; and the 249th National Meeting of the American Chemical Society, March 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Winner, 2nd Place, Life Sciences Oral Presentations, SAEOPP Conference, June 2014

Student: Sarah Wicks (2015), **McNair Scholar**

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

CAS – Department of Chemistry, Physics, and Geology

Inhibition of amyloid-beta peptide (A β) aggregation is one therapeutic target for prevention and treatment of Alzheimer's disease. We have previously demonstrated that biphenyl-3,3',4,4'-tetrol (3,4-BPT) effectively abrogates A β aggregation at stoichiometric concentrations. To investigate this molecular architecture and determine how the positioning of the hydroxyl hydrogen-bond donors impacts inhibitor efficacy, we have synthesized five additional symmetrical biphenyltetrols (2,3-, 2,4-, 2,5-, 2,6- and 3,5-BPT). Congo red and Thioflavin T dye-binding assays were employed to monitor A β aggregation as a function of time and determine inhibitor IC₅₀ values for reducing equilibrium levels of aggregation. The six characterized isomers exhibit a range of IC₅₀ values spanning more than one order of magnitude. Circular dichroism and transmission electron microscopy measurements, in progress, will enable comparison of secondary structural transitions and aggregate morphologies in the presence and absence of inhibitors. Collectively, these results will aid in the design of unsymmetrical biphenyltetrols and related inhibitor architectures.

How to Interpret a Scream: On Dance Collaboration

Presented at the Winthrop University CVPA Undergraduate Research Symposium, March 2014

Student: Alexandria Nunweiler (2014)

Faculty Mentors: Emily Morgan, M.F.A.; Stacy McConnell, M.F.A.; and Amy Gerald, Ph.D.

CVPA – Department of Theatre and Dance and CAS – Department of English (DANA 442 – Morgan; DANA 432 – McConnell; and WRIT 350 – Gerald)

Of all the existing art forms, one of the least written about is dance. For the dancer and non-dancer, writing about movement can prove to be difficult; at least for me, it did. Over the course of the Fall 2014 semester, I tracked my choreographic process from the first development of movement to the concert in a blog I have titled "How to Interpret a Scream." This research piece pulls together art history, dance, and writing components as a cross-disciplinary project as well as it shows the collaborative creative process of dance making. As a choreographer, this dance was especially challenging because it involved research on the life of Edvard Munch and his painting "Scream," on which the dance is based. In conjunction with the information, the piece requires two live dancers to collaborate with me to show the process in front of the audience. As the work is shared, the dancers and I create an entirely new phrase to interpret a scream.

Relative Influence of Event and Cognitive Factors in PTSD Symptoms in Survivors of Childhood Trauma

Presented at the International Society for Traumatic Stress Studies Annual Meeting, November 2014

Supported by a grant from the Winthrop University Research Council

Student: Brady Nichols (2015)

Faculty Mentor: Sarah Reiland, Ph.D.

CAS – Department of Psychology

Risk and resilience factors have been identified that predict differential responses to stressful events, but the relative importance of these factors is not well understood. Social-cognitive theories (e.g., Foa, Steketee, & Rothbaum, 1989) emphasize the role of cognitions in the development and maintenance of post-traumatic stress (PTS) symptoms. This study examined the relationships among PTS symptoms, event characteristics (e.g., type, injury) and cognitive factors (e.g., attributions, beliefs about the importance of the event to one's identity, and cognitive flexibility) in a sample of 153 college students who reported a childhood trauma. Consistent with predictions, although events involving child abuse and greater injury were positively associated with PTSD symptoms ($\beta = 0.171$ and 0.181 , $p < 0.05$) and explained 7.7 % of variation in symptoms, these factors were no longer significant when cognitive factors were added to the model. Cognitive variables alone explained 32 % of variability in symptoms, with perceived importance to identity and cognitive inflexibility associated with higher symptoms ($\beta = 0.365$ and 0.254 , $p < 0.01$). The findings support social cognitive theories of PTSD and suggest that cognitive factors are associated with risk and resilience following stressful life events.

British and American Young Adults' Cross-Cultural Stereotypes of Regret and Shame

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Leah Brown (2015), **McNair Scholar**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

Stereotypes are beliefs and attitudes held about groups and their group members (McCauley, Jussim, & Lee, 1995). Our study examined the possibility of stereotypes that British and American young adults might have of each other related to regret, shame, and guilt. We hypothesized that the two cultures would perceive each other more inaccurately than accurately. British ($n = 85$) and American ($n = 120$) young adults completed an online survey. Participants were asked to briefly describe one thing in their lives that they regretted the most. Next, participants were instructed to respond to statements about the regretted event, such as "I feel strong regret when I think about this situation." In the last part of the survey, participants were instructed to picture themselves as members of the opposite cultural group (British or American) and to answer the same set of questions (described above) as members of that group. Results revealed that regretted events were similar across cultures. British participants perceived Americans as more emotional in response to regret, while Americans did not hold the same view of British participants. British participants also perceived that Americans would agree that the guilt resulting from the event was difficult to bear, and that Americans would spend time wishing the situation had not occurred. In contrast to our hypothesis, we found that British and American young adults revealed many similarities and mostly accurate perceptions of one another. Our findings offer a new cross-cultural comparison between these two groups.

Interactions of a Captive Maturing Female Hamadryas Baboon

Presented at the South Carolina TRiO McNair Symposium, June 2014, and the SAEOPP McNair/SSS Scholars Research Conference, June 2014

Student: Jordyn Kessler (2014), **McNair Scholar**

Faculty Mentor: Janice Chism, Ph.D.

CAS – Department of Biology

In the wild, hamadryas baboons (*Papio hamadryas hamadryas*) typically practice male philopatry, where females transfer out of natal units to avoid inbreeding (Swedell et al., 2011). However, little is known about hamadryas female transfer in captivity. In this study, we used focal animal sampling (Altmann, 1974) to observe the behavior of a young female hamadryas baboon at Riverbanks Zoo in Columbia, South Carolina. We hypothesized that she would transfer outside her natal unit and into the other unit present as she approached the age at which transfer occurs in the wild. We recorded proximity between the subadult female and all other individuals, as well as affiliative and agonistic behavior exhibited between them. Preliminary results show that the subadult female is still spending, on average, a greater percent of her time with her natal unit than with the non-natal unit.

Attitudes toward Cross-Sex Friendships of Men and Women in Romantic Relationships

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Kelsey Doucette (2015) and **Caroline Roark** (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Cross-sex friendships are platonic relationships between men and women (Miller, Denes, Diaz, & Ranjit, 2014). We compared 101 young adults' openness to having cross-sex friends with their comfort towards their romantic partners having cross-sex friends. We modified a scale by Emmett and Weger (2007) to measure attitudes and behaviors related to friendship maintenance. We instructed participants to respond while picturing their closest cross-sex friend. We then asked participants to respond to the same questions but this time to picture their romantic partners' closest cross-sex friendship. Results revealed that women were uncomfortable with their partners flirting with cross-sex friends; however, in general, men and women had equal levels of comfort with their partners' cross-sex friends. These comfort levels were consistent across age, commitment to romantic partner, and self-esteem. We did find support for our prediction that young adults would feel more comfortable having cross-sex friends than allowing their partners to do so, and this was true regardless of how committed the romantic relationship was reported to be. People seem to trust situations that they can control more than those that are out of their control. This sentiment might be warranted as our participants provided evidence that cross-sex friendships may not always stay platonic. Men were more likely than women to report that they have been romantically involved with their cross-sex friends in the past and might be in the future. These findings contribute to the understanding of the complexity and diversity of relationships that are a typical aspect of young adulthood.

Young Adults' Knowledge of World Events, Sources of Information, and Associated Emotions

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: **Melissa Snodgrass** (2016); **Ayanna Stewart** (2015); and **Kelsey Baker** (2015)

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleigh)

Media coverage of world and local events can have a stressful impact on viewers (DeRoma et al., 2003). We examined young adults' knowledge of world events, their confidence in their knowledge, and its effect on their mood. Participants were 105 young adults with a mean age of 20.16 (SD = 2.32). Participants first responded to the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) to assess their mood. Next, participants responded to a knowledge quiz from the New York Times' Learning Network (Schulten, 2014). Following the quiz, participants were asked to rate their accuracy and confidence. Immediately following, participants responded to the PANAS a second time to assess mood change. We incorrectly hypothesized that participants who had less knowledge of world events would experience a decrease in positive mood after taking the knowledge test. Our results also revealed that young adults fairly consistently scored around 58 %. Knowledge scores could not be predicted based on participants' GPA, school classification, age, family financial situation, or self-esteem. Men scored slightly higher on knowledge, and confidence in their knowledge, than did women; this gender finding supports previous research in this domain (Hambrick et al., 2008). Informational, rather than entertainment-focused, news sources related to higher knowledge scores. Young adults consistently underestimated their knowledge, especially women and African-Americans. Understanding how young adults receive and remember current world events may have useful implications for targeting information toward this age group and encouraging participation in the political process.

Cross-Cultural Comparison of Regret, Time Perspective, and Shame and Guilt Proneness

Presented at the South Carolina TRiO McNair Symposium, June 2014

Student: **Leah Brown** (2015), **McNair Scholar**

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

The purpose of this study was to see if English and American university students differ in their time perspective, proneness towards shame and guilt, and/or regret. Our hypothesis was non-directional and exploratory due to limited previous research comparing British and American participants. Participants (n = 208) completed an online survey. We first had the participants complete the short form of Zimbardo's Time Perspective Inventory (Keough, Zimbardo, & Boyd, 1999), which measures whether the participants are more future-or past-oriented. Next, we had the participants respond to the GASP (Guilt and Shame Proneness Scale), which is a commonly used tool to assess the extent of guilt and shame felt about things done or not done in a person's life (Cohen, Wolf, Panter, & Insko, 2011). We also had participants respond to an open-ended question instructing them to describe an event in their lives they regretted the most. Results revealed that the two groups had similar types of regret, thoughts about the regretful situation, and proneness towards shame and guilt. However, Americans were more focused on the future, while English adults were more focused on the present. The more guilty participants felt about their regretted events, the more regret participants felt about their described situations and the less important the participants felt it was to forgive themselves. The two groups reported different patterns of seeking forgiveness: American adults felt it more important to seek forgiveness from the people they wronged and God, and less important to seek forgiveness from witnesses.

Integrating Principles for Choreographic Evaluation into Education: One Proposed Model for Dropout Prevention

Performed at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the National Dance Education Organization Conference, November 2014

Student: **Brittany M. Johnson** (2015), **McNair Scholar**

Faculty Mentor: Stephanie Milling, Ph.D.

CVPA – Department of Theatre and Dance

This research proposes a model that represents the synthesis of various choreographic evaluation principles and education reform curricula that can simultaneously be used to advocate for the inclusion of arts education within the school system. Education reformers may find this useful in attempting to reach students at risk of dropping out of school. Considering key concepts within education reform and arts education, this model attempts to meet educational reform goals through: enhancing student motivation, fulfilling the needs of students at risk, and meeting the curricular goals geared toward student success through applying the principles of choreographic evaluation processes in dance education.

Relationship between Strength of Student Athletes' Identity and Quality of Academic Experiences

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: **Kevin Fowler** (2016) and **Luke Maldonado** (2014)

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleigh)

Being a student and athlete can create role conflict, with the demands of one role making it difficult to meet the demands of the other (Marx, Huffmon, & Doyle, 2008; Settles, Sellers, & Damas, 2002). We examined college student-athletes' identities and their academic experiences. We hypothesized that a stronger athletic identity would result in poorer academic performance and that male athletes would have a stronger athletic identity than female athletes. Participants were 80 current Division One student-athletes who were equally divided between gender, race (African-American and Caucasian), and sports teams (basketball, soccer, and volleyball). These athletes responded to established scales related to their academic and athletic identities (i.e., Cieslak, 2004; Rivera, 2004). In general, our results revealed that athletes who felt positively about sports also felt more positively about their academic experiences. In addition, the more important athletes felt it was to perform well in school, the more academic support they felt they received from their teams. These findings may reflect the fact that success or stress in one arena is likely to have implications for the other arena. Gender emerged as an influential variable. Male athletes seemed to enjoy their sports and focus less on academics, while female athletes were more focused on academic performance and found less enjoyment from sports participation. One possible reason is the prestige that male athletes have on campus and their greater likelihood of continuing to play sports post-college. These data may be useful as athletes and coaches seek strategies to help student-athletes succeed.

Similarities and Differences in Mother, Father, and Sibling Relationships

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Winner, Psi Chi Regional Research Award, SEPA, March 2015

Students: Sara Tennant (2016); Courtney Cabaniss (2014); Lauren Adams (2015); and Emily Rounds (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Siblings hold a unique relationship in that it is unchosen, long-lasting, and often characterized by a strong mix of polarizing emotions that set the stage for future social interactions outside of the family (Shalash, Wood, & Parker, 2013; Solmeyer, McHale, & Crouter, 2013). Similarly, parents' relationships with their offspring affect future social interactions (Jensen, Whiteman, Fingerman, & Birditt, 2013). The current study examined whether the status of children's relationships with their parents has an effect on their relationships specifically with their siblings. Eighty-eight young adults responded to questions that assessed the quality of their maternal, paternal, and sibling relationships using established scales (Fischer, & Cocoran, 2007; Furman, & Buhrmester, 2009; Stocker, Lanthier, & Furman, 1997). In general, our hypothesis was supported. We found that the better the relationships young adults had with their parents, the better relationships they had with their siblings and the more positively they viewed their family relationships overall. Young adults' relationships with their mothers emerged as an even more powerful predictor than father relationships. Ironically, the more young adults perceived parents favoring them over siblings, the better relationships they reported with those parents. We also found that getting along with siblings was related to treating parents better. Taken together, these findings suggest that healthy relationships among family members benefit not only those members but other family members, as well. Parents play an important role in their children's relationships with each other, a fact that may contribute to understanding family dynamics and improving sibling relationships.

Relations among Materialism, Morality, and Concealment

Presented at the 2014 American Psychological Association Annual Convention, August 2014

Student: Leah Brown (2015), McNair Scholar

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

This study looked at the relationships between materialism and morality, materialism and concealment, and morality and self-monitoring. Since materialism is more of a self-oriented characteristic and morality is more focused on the well-being of others, we hypothesized that young adults who have higher moral values (which are also portrayed outwardly) will be less materialistic and young adults who are more materialistic will have lower morality. We hypothesized that materialism would be highly correlated with concealment, based on the assumption that materialism may be used to conceal insecurities. In regard to morality and self-monitoring, we hypothesized that morality would be highly correlated with self-monitoring based on the assumption that moral behavior can be a form of self-monitoring. Participants (n = 85) completed the Materialism Scale (Richins & Dawson, 1992) and the Self-Concealment Scale (Larson & Chastain, 1990). Then, participants answered nine questions created by the researchers to assess morality, self-image, and the extent to which materialism manifests in moral behaviors (e.g., "I think I am good-looking"). Participants also responded to the Self-Monitoring Scale (Lennox & Wolfe, 1984). Last, participants

completed a word completion task that measured morality (Gino & Desai, 2011). Results showed that people who are materialistic are not necessarily less moral than non-materialistic people and that morality does not relate to self-monitoring. Results also showed that materialism does not relate to self-concealment. This study suggests that moral actions are not always motivated by moral purposes and that people do not behave morally as a form of materialism.

The X-Ray Crystal Structure of a Mutant Glycerol Dehydrogenase from *Bacillus coagulans* with Acquired Lactate Dehydrogenase Activity

Presented at the Annual Meeting of the American Society for Biochemistry and Molecular Biology, March 2015

Student: Grace Jones (2015)

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

CAS – Department of Chemistry, Physics, and Geology

Successful metabolic evolution of an industrial biocatalyst depends on accumulation of desired genetic changes that enhance product titer, yield and productivity. Strains with beneficial mutations are readily isolated using an appropriate selection. During the development of a strain of *Bacillus coagulans* for production of D-lactic acid, a glycerol dehydrogenase (GDH) evolved to catalyze reduction of pyruvic acid to D-lactic acid (D-LDH) by acquisition of two mutations, D121N and F245S. The native GDH oxidized glycerol and a variety of diols, but displayed very low D-LDH activity. The evolved enzyme has a 10-fold lower level of glycerol oxidation activity and a 15-fold higher D-LDH activity than the wild type enzyme. In order to explain these kinetic data, we have determined the X-ray crystallographic structure of *B. coagulans* GDH D121N/F245S. The protein crystallized within 48 hours in 0.2-M ammonium citrate dibasic, pH 4.5 with 10 % PEG3350 at room temperature. The crystals belonged to the orthorhombic space group C2221 and had unit cell parameters of 211 Å, 211 Å and 149 Å with $\alpha = \beta = \gamma = 90^\circ$. Diffraction data were collected to 2.5-angstrom resolution on beamline 22-ID at the Advanced Photon Source at Argonne National Laboratory, and an initial model was created using the automated molecular replacement software MrBUMP. Multiple rounds of model building and refinement were performed using Coot and Refmac, respectively. The active site of the double mutant enzyme is better able to bind carboxyl functionalities in substrates, in addition to having a decreased affinity for the hydroxyl groups of the original substrate diols.

A History of Winthrop College, 1886-1900

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Brierly Harris (2015)

Faculty Mentor: Eddie Lee, Ph.D.

CAS – Department of History

(HIST 590 – Lee)

In a study of the founding years of Winthrop College (1886-1900), the institution underwent several changes, including relocation by approximately 70 miles, name changes, and construction of significant buildings. The college itself transformed from a one-room schoolhouse in Columbia (the Little Chapel) with Winthrop's first instructor, Mary Hall Leonard, and twenty-two students, to a multi-building campus in Rock Hill with enrollment over 500 and a four-year curriculum. The formation of Winthrop Training School and the subsequent rebranding as the South Carolina Industrial & Winthrop Normal College are seminal events in South Carolina educational history: the establishment of a premier teaching college for white women in the Industrial South to educate the new Southern women of the twentieth century. My primary research questions were: 1) why was Winthrop established in

South Carolina, and 2) how did Winthrop fit into women's education in the postwar South? My research is restricted to the first fourteen years of Winthrop's history as an institution of higher education. I use primary sources from the Pettus Archives as well as reliable secondary sources to support my thesis. My contribution to Winthrop as a graduating history major is a visual-narrative interpretation of Winthrop College in the nineteenth century.

The X-Ray Crystallographic Structure of Endoxylanase Xyn10C from *Xanthomonas axonopodis* at 1.6 Angstrom Resolution

Presented at the Annual Meeting of the American Society for Biochemistry and Molecular Biology, March 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Akilah Murray (2015)

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

CAS – Department of Chemistry, Physics, and Geology

The recent biochemical characterization of the xylanases of glycoside hydrolase family 10 (GH10) has identified a distinctive endolytic mode of action, hydrolyzing the β -1,4 xylan chain at a specific site directed by the position of an α -1,2-linked glucuronate moiety. Xylanase C (XynC), the GH10 xylanase from *Xanthomonas axonopodis*, has been cloned, overexpressed and crystallized. Crystals grew in 100 mM sodium phosphate citrate, 200 mM NaCl, 25 % (w/v) PEG 8000, 5 % (v/v) glycerol, pH 5.5. The crystals belonged to the orthorhombic space group C2221 and had unit cell parameters of 71 Å, 80 Å and 161 Å and $\alpha = \beta = \gamma = 90^\circ$. Diffraction data were collected to 1.6-Å resolution and an initial phasing model was created using molecular replacement techniques. Multiple rounds of model building and refinement were performed using Coot and Phenix, respectively. The protein was found to possess the typical $(\beta/\alpha)_8$ fold observed in all members of GH10. A large loop on the aglycone side of the active site was found to adopt a unique conformation. This loop was in a position that would prevent it from binding substrates larger than three xylose units in size and would be expected to produce a xylobiose and a free xylose upon cleavage of such a trimer. This work will help to identify the structural determinants that grant the exceptional specificity of this enzyme and the role it plays in the biological depolymerization and processing of glucuronoxylan.

Love Thy Neighbor: The Challenge of Liberation Theology

Presented at the South Carolina Political Science Association Annual Meeting, February 2015, and the Southern Regional Honors Council Conference, March 2015

Student: Jessica Doscher (2017)

Faculty Mentors: Michael Lipscomb, Ph.D. and Stephen Smith, Ph.D.

CAS – Department of Political Science

(PLSC 510H – Smith and Lipscomb)

The central role of religion throughout history is indisputable, and the Catholic Church has been one of the most influential religious organizations, exerting its sway over colonization of the world and ingraining itself into the mentality and lifestyles of millions of people. However, the Church was not the only factor that affected the development of the world. Economics, governments, and the quest for power helped shape this as well. The resulting tug-of-war between governing systems and religion is one that has caused considerable strain, especially in developing areas of the world, where poverty runs rampant and social inequality stirs bitterness and conflict. Latin America is one such example. Alarmed by the amount of poverty and corruption in their communities, many Catholic priests in

Latin America turned to a new way of thinking: liberation theology. Liberation theology, while still adhering to many of the teachings of the Catholic Church, responded to the social injustices by calling for a new, revolutionary method of addressing these issues, a method that made certain groups quite nervous. Liberation theology's radical approach to rectifying the social inequality it observed was a threat to many of the capitalist countries that were invested in Latin America. Therefore, these countries, in alliance with the Catholic Church, which was also threatened by liberation theology because of the Church's own ties to capitalism, set out to crush the movement. Liberation theology was incapable of gaining the traction that it needed to make a significant impact in Latin America because of the strength of capitalism's power, both within and outside of their respective borders.

The Ecology of Middleton Place: An Old Garden's Contribution to the New State of Horticulture

Presented at the Second Annual Winthrop University Mass Communication Undergraduate Symposium, April 2015

Student: Brandon Grate (2015)

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 491 – Schulte)

Started in 1741, Middleton Place, which is located in Charleston, South Carolina, is home to the country's oldest landscape garden. This enterprise news story explores how the classical garden design of Middleton Place contributes to the design and structure of other gardens in the United States. This enterprise news story is produced for the Mass Communication Undergraduate Symposium. The garden has flowers and plants in bloom year-round, and its captivating beauty has been preserved for over 200 years. This work explores the secrets to maintaining the longevity of this garden through planned cultivation and maintenance and how its blueprint has influenced horticulture. This work features interviews with groundkeepers at Middleton Place, as well as a horticulturalist and botanist, to explore how the preservation techniques and layout of Middleton Garden contribute to the overall future of horticulture and all of its underlying branches.

Expression, Purification and Crystallization of the Xanthomonas Avirulence Protein, AvrBs1.1, and its Target in *Capsicum annuum*, the Transcription Factor WRKY1

Presented at the Annual Meeting of the American Society for Biochemistry and Molecular Biology, March 2015

Student: Jessica Michala Tesney (2017)

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

CAS – Department of Chemistry, Physics, and Geology

Brown spots and leaf loss of *Capsicum annuum*, a pepper found in the Americas, are caused by prolonged activation of the plant's defense mechanisms to bacterial infection, resulting in a phenomenon called the hypersensitive response. In the hypersensitive response, the plant "walls off" the infected tissue with lignin and then a variety of chemical processes occur within the lignified zone which results in the death of both bacterial and plant cells. Certain species-specific bacterial pathogens inject effector proteins with different activities into the cytosol of the host to prevent activation of the plant's defense mechanisms. Our work focuses on the effector protein AvrBs1.1, a dual-specificity protein tyrosine phosphatase produced by *Xanthomonas euvesicatoria*. Recent work has identified the transcription factor WRKY1 as a possible target for AvrBs1.1. We hypothesize that AvrBs1.1 dephosphorylates WRKY1 in the cytosol, thereby preventing it from entering the nucleus and activating the genes of the

plant's defense response. In order to understand the molecular basis of the function of AvrBs1.1, we need to determine the X-ray crystallographic structure of AvrBs1.1 and the AvrBs1.1/WRKY1 complex. We crystallized AvrBs1.1 in 2.0 M ammonium sulfate, 10 % PEG 400, 50 mM HEPES pH 7.0, and 50 mM zinc sulfate. Using this condition as a base, we employed a small molecule additive screen to enhance crystal growth. In the future, we will screen the AvrBs1.1 crystals for X-ray diffraction, optimize the expression of WRKY1 and attempt to crystallize the AvrBs1.1/WRKY1 complex.

A Nonlinear Model of Cancer Tumor Treatment with Cancer Stem Cells

Presented at the Mathematical Association of America (MAA) MathFest, August 2014, and the MAA Joint Mathematics Meetings, January 2015

Supported by a grant from the National Science Foundation

Winner, Janet L. Andersen Award for Undergraduate Research in Mathematical or Computational Biology, MathFest, August 2014

Student: Alexander D. Middleton (2016)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

According to the American Cancer Society, cancer is one of the leading causes of death, second only to heart disease. We present a system of nonlinear, first-order, ordinary differential equations that describes tumor growth based on healthy cell, tumor cell, and cancer stem cell populations. We include terms within our model which reflect the differing effects of chemotherapy and anti-angiogenic therapy to respective cell populations. We perform stability analysis on the equilibrium solutions to predict the long-term behavior of the cell populations. With analysis, it is shown that chemotherapy, with the co-administration of anti-angiogenic treatment, can produce three states: recurrence or persistence of cancer, and a cure state. Results are supported analytically and numerically. Bifurcation diagrams are included to illustrate the different behavior of cell populations depending on the amount of treatment administered.

Knowledge of Deaf Individuals and American Sign Language Improves Perceptions of the Deaf

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Felicia Harnish (2015)

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

Eighty-five adults responded to Opinions about Deaf People (Berkay, Gardner, & Smith, 1995). We also assessed participants' personal experiences with deaf individuals and knowledge of American Sign Language (ASL). Results revealed that adults had generally positive attitudes toward deaf individuals. The ASL Knowledge score was 2.91 (SD = 1.69) on a six point scale. The more positively participants felt toward deaf individuals, the more ASL and deaf individuals they knew. Overall, participants reported very little contact with deaf individuals. There were no gender differences on any of our variables. Freshmen and sophomores were more likely than upperclassmen to agree that deaf individuals are incapable of living alone and that it is impossible for deaf individuals to keep up with their hearing peers in school. Perhaps these younger students are struggling to learn to live on their own and manage classwork, and are thus sensitive to the extra challenges that a deaf individual would face in these situations. However, even upperclassmen had pockets of negative attitudes. As one example, compared to all other students, seniors were least likely to agree that a deaf individual could escape a fire as easily as a hearing individual. In sum, attitudes

toward deaf individuals were generally positive and more so for people who knew deaf individuals and ASL. This finding supports data collected over a decade ago (Nikolarazi & Makri, 2004). Interestingly, the contradictory data based on year in school suggests that life experience is not enough to shape attitudes; improved attitudes were linked specifically to exposure to deaf culture.

Purification and Characterization of Nickel Uptake Regulator (NUR)

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the Winthrop University Summer Undergraduate Research Experience (SURE) Symposium, July 2014

Supported by a grant from Research Corporation and an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Winner, 1st Place, Physical Sciences Oral Presentations, SAEOPP Conference, June 2014

Student: Denise Peppers (2015), **McNair Scholar**

Faculty Mentor: Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The Nickel Uptake Regulator (NUR) is a metalloregulatory protein found in the microorganism *Streptomyces coelicolor*. It is the first Ni(II)-sensing member of the FUR family of metalloregulatory proteins. NUR is responsible for regulation of a variety of genes involved in nickel uptake and oxidative stress. Interestingly, NUR is also responsible for regulation of the enzyme Superoxide Dismutase (SOD) within *S. coelicolor*; it regulates Fe-containing SOD through a direct mechanism and indirectly controls Ni-containing SOD. The goal of this research is to purify and characterize the metal and DNA binding affinities in Wild Type (WT) NUR. There are two metal-binding sites within NUR that are believed to contribute to the function of this protein. The "M-site," which corresponds to a well conserved site within FUR proteins, contains Zn(II) in a square-planar geometry when purified from *E. coli*. The second site, denoted the "Ni-site," is a unique site in FUR proteins and has been suggested to be the sensory Ni(II)-binding site. The work presented will describe a series of biophysical experiments that aim to assess the role of each metal site in NUR function. This was approached using a complement of biophysical techniques including site-directed mutagenesis, competitive metal-binding assays, fluorescence anisotropy, atomic absorbance spectroscopy, and quantitative chromatography. Together, our data suggest that the "M-site" plays a more profound role in the metal sensory function of NUR.

Bone Tissue Stiffness in Three Orthogonal Directions and its Dependence on Temperature

Presented at the Winthrop University Department of Biology Poster Session, December 2014

Student: Arielle Black (2017)

Faculty Mentor: Meir Barak, Ph.D., D.V.M.

CAS – Department of Biology

(BIOL 300 – Barak)

The purpose of this experiment was to discover the effect of temperature on the stiffness of cortical bone. Four cortical bone cubes (2 mm on each side) were cut from the proximal medial diaphysis of five young white-tailed deer femora. The cubes were tested in compression three times: once at room temperature (20.4 °C), and then at cold (4 °C) and hot (70.5 °C) temperatures, respectively, in individual trials. The stiffness of each bone cube was measured in the axial, radial and transverse orientations. Our results demonstrated that hot and cold temperatures increased bone's stiffness in the axial direction, but surprisingly had

little effect on bone's stiffness in the radial and transverse directions. Since higher bone stiffness in vivo may lead to increased risk of bone failure (i.e., fracture or shatter) extra care is needed (e.g., warming of lower extremities) when people train in extreme climate conditions.

Physical Fitness Components and Posture Screening of Female Competitive Dancers

Presented at the South Carolina TRiO McNair Symposium, June 2014; the SAEOPP McNair/SSS Scholars Research Conference, June 2014; and the Annual Meeting of the Southeast Chapter of the American College of Sports Medicine (SEACSM), February 2015

Student: Kristin Ramirez (2016), **McNair Scholar**

Faculty Mentor: Janet Wojcik, Ph.D.

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

The purpose of this study is to evaluate and fill the lack of information on physical fitness components, posture, amount of pain experienced, and past injuries of female competitive dancers at the pre-professional level. Fifteen female dancers were tested between the ages of 15-18 years old. The participants performed a three-minute step test, push-ups and crunches test, sit-and-reach test, and a posture screen. These measurements were analyzed and correlated. The BMI values were healthy for age, except for two dancers, and postural deviations were minimal. Aerobic endurance was above the 75th percentile in eight dancers; all dancers but one scored below the 40th percentile in abdominal endurance, and over half scored above the 60th percentile in push-ups. Lastly, flexibility was high, with almost all dancers above the 75th percentile. There were no significant correlations of BMI and aerobic endurance ($r = 0.025$), crunches and push-ups ($r = 0.33$), and flexibility and posture ($r = -0.19$, $r = 0.17$). The most pain reported was in the lower back ($n = 8$) and most injuries reported were in the ankles ($n = 4$) and lower back ($n = 4$). In conclusion, there is a need for dancers to improve overall muscular fitness, with potential to prevent further injuries and pain experienced from dance. More data should be collected in this population and comparison groups such as professional dancers.

Sources of Sexual Education and Young Adults' Sexual Behavior

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Jerre' Gowdy (2015) and **Alicia McCray** (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

We examined the sources from which young adults learned about sex and how those relate to sexual activity in adulthood. Participants were 88 young adults. Sexual activity was assessed with the Sexual Attitudes and Activities Questionnaire (Noll, 2003), and sexual education was assessed with questions created by the researchers. Results revealed that most young adults received sexual education by learning it on their own. Gender emerged as a more influential variable in sexual education than did race. Women were more likely to agree that they learned sexual education from their mothers, from friends, and from doctors. Men were more likely to agree that they learned sexual education from their fathers. These different sources of knowledge may contribute to gender-related differences in adult sexual behavior patterns, such as our finding that men were more sexually active than women. We compared African-American and Caucasian participants and found no differences in how these two groups learned about sexual education. Participants who learned about sex from their mothers or from doctors were less sexually active and less likely to experience negative outcomes, such as STDs. Perhaps young adults perceive mothers and doctors as trustworthy sources of information, and these are sources that probably promote safe sexual behavior.

In addition, adults who learned about sexual activity from their mothers may experience emotional closeness at home and be less likely to seek it through sexual relationships. These findings suggest that the source of sexual education is an influential factor in sexual decision-making.

The Effects of Premarital Sex on Relationships

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Robin Daniels-Joyner (2015)

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

The focus of this study was premarital sex and its associations with satisfaction in relationships. We hypothesized that engaging in premarital sex would be related to less relationship satisfaction. Our sample included eighty-four volunteers (21 men and 63 women) from a university. The study consisted of a questionnaire asking participants about: relationship satisfaction, what they considered to be "sex," and in which of these behaviors the participants actually engaged. We conducted an independent-samples t-test to test our hypothesis. We found that participants who did not engage in premarital sex had significantly lower satisfaction scores than participants who did engage in premarital sex. Our hypothesis that individuals who do not engage in premarital sex are more satisfied in their relationships than people who do engage in premarital sex was not supported. In fact, we found the opposite, in that people who had premarital sex reported more satisfaction. We experienced several limitations while conducting this study. For instance, the sample size of the participants who did not have premarital sex was small and this was mostly because we used the convenience sampling technique. In future studies, it might be more appropriate to use another sampling technique that will generate a larger sample. A high number of college students seem to be engaging in sexual activities in their premarital romantic relationships; based on our findings, they tend to be more satisfied in their relationships than those who choose not to do so.

The Role of Social Support in Relationship Longevity

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Krystal Sprouse (2015) and **Monique Haynes** (2015)

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

The purpose of our study was to investigate the influence of interpersonal social support, relationship satisfaction, and the longevity of the relationship. Our hypothesis is that when the level of social support and satisfaction increases, then the length of the romantic relationship increases as well. We surveyed a total of 108 students (26 male and 82 female) who did not receive any kind of course credit for taking the survey. Participants' ages ranged from 18 to 42 with an average of 19.57; only those who had relationship experience were included in analyses. We assessed interpersonal social support using two questionnaires, Interpersonal Social Support short version and Interpersonal Social Support full version, relationship satisfaction from the Relationship Assessment Scale, the longevity of the relationships through self-reports of how long were they in a relationship if they were currently in one, and if not, how long was their most recent relationship. We conducted two regression analyses, one for each of the two measures of social support, to predict relationship longevity from the satisfaction in the relationship and the social support received. Both

regression analyses revealed that relationship satisfaction and social support were not significant predictors of relationship longevity. From these results, we can conclude that interpersonal social support and relationship satisfaction cannot predict the longevity of the relationship. In the future, we could gain more information on the extent of social support and relationship satisfaction by limiting our survey to only those who are currently in a relationship.

Identification of the *Ciona intestinalis* FoxO DNA Binding Domain and Target Gene Sequences

Presented at the South Carolina Academy of Science Annual Meeting, April 2015

Supported by a grant from the National Institutes of Health and a South Carolina EPSCoR/IDeA Science Affiliate Network grant

Student: Lucas Boncorddo (2015)

Faculty Mentors: Nicholas Grosseohme, Ph.D. and Heather Evans-Anderson, Ph.D.

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

Ciona intestinalis is a useful model for studies examining heart development. FoxO1 is a highly conserved gene as well as an important transcription factor that regulates myocardial development. Previous in vitro experiments in our lab have characterized the interaction between the forkhead DNA binding domain of FoxO from *C. intestinalis* and target sequences of complementary Human and *Drosophila melanogaster* DNA. These studies confirmed that the *C. intestinalis* FoxO DNA Binding Domain (DBD) is able to bind to target sequences from other organisms. Our next step is to determine which regions of the genome FoxO binds to in *C. intestinalis*. This will help to identify which genes are targeted and regulated by FoxO in *C. intestinalis*, which will help us to understand the function of FoxO during heart development. We will utilize Chromatin Immunoprecipitation (ChIP)-Seq assay to identify sequences of the *Ciona intestinalis* genome that FoxO binds to, as well as the potential target genes. A hexahistidine-tagged FoxO DBD sequence was inserted into a pCes vector containing a H2B-cherry fluorescent tag to produce an expression plasmid (FoxO DBD-H). Once confirmed by sequencing, the FoxO DBD-H expression plasmids were electroporated into *Ciona intestinalis* embryos prior to the first cell cleavage. The ultimate goal of this project is to generate transgenic *Ciona intestinalis* embryos that express the FoxO DBD-H sequence so that it will interact with chromatin in vivo. The resulting embryos will be collected and their chromatin isolated in order to perform a ChIP-Seq assay that will identify the FoxO1 target DNA sequences.

Sustained Photocurrent in CdS/a-Fe₂O₃:Co Stacked Thin Films on Titania-Coated Transparent Conductive Substrates

Presented at the 249th National Meeting of the American Chemical Society, March 2015

Student: Tyra Douglas (2015)

Faculty Mentor: Clifton Harris, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

The viability of water-splitting catalysts as commercial sources of renewable energy is strongly dependent on the ability of these materials to utilize the visible portion of the solar spectrum, though most narrow band gap materials (Eg < 3 eV) are capable of efficiently driving only one-half of the water-splitting reaction (i.e, the hydrogen-evolution reaction or the oxygen-evolution reaction), not both. In the absence of sacrificial reagents, these materials are subject to deactivation or decomposition. Stacked thin films of CdS (Eg 2.4 eV) and a-Fe₂O₃ (Eg 2.2 eV) have been fabricated by sequential electrodeposition on titania-coated transparent conductive oxide substrates to photocatalytically drive the full water-splitting reaction. Under

visible irradiation, a-Fe₂O₃ is known to drive the oxygen-evolution reaction, leaving behind an accumulation of conduction band electrons. These electrons act to suppress the decomposition of the hydrogen-evolution catalyst, CdS, which would otherwise proceed due to oxidation of sulfide by trapped valence band holes. However, a-Fe₂O₃ is a poor conductor. Therefore, the use of dopants, such as Co(II), is necessary to improve electron mobility. Stabilization of the composite is confirmed by a two-electrode photocurrent decay experiment. Further research is underway to optimize the relative film thicknesses.

Efficient Quartet Systems: A New Systematic Approach to Supertree Reconstruction

Presented at the MAA Joint Mathematics Meeting, January 2015, and the South Carolina INBRE Spring Symposium, February 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: MaLyn Lawhorn (2017)

Faculty Mentor: Joseph Rusinko, Ph.D.

CAS – Department of Mathematics

A phylogenetic tree is described by quartets that show where a split in the tree should occur. The number of compatible quartets that define a tree is the number of taxa on the tree to the fourth power. Scientists often want to combine multiple phylogenetic trees, or input trees, to derive a “supertree.” This is typically done by giving a collection of all the quartets that define the input trees to tree reconstruction software such as MaxCut. However, the number of compatible quartets that define a supertree is often too large for MaxCut to handle and contains a lot of conflicting quartets. Therefore, it would be helpful to find a subset of quartets which would return a correct input tree so that, when the quartet systems defining the input trees are combined, there are not too many quartets for MaxCut to consider and a correct supertree is returned. An efficient quartet system is a collection of quartets which distinguish unique paths across a phylogenetic tree. An efficient quartet system is found by first distinguishing each internal vertex on a phylogenetic tree with pairs of taxa and then consistently using these vertex-distinguishing pairs to create quartets that distinguish the paths of the tree. An efficient quartet system reduces the number of quartets used to reconstruct a tree and, additionally, returns the correct tree for multiple different topologies of trees.

Expression of Heart-Specific Construct in *Ciona intestinalis* Embryos

Presented at the South Carolina Academy of Science Annual Meeting, April 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences and an NIH Grant from the National Heart, Lung, and Blood Institute

Student: Katlyn Brumley (2016)

Faculty Mentor: Heather Evans-Anderson, Ph.D.

CAS – Department of Biology

Ciona intestinalis is a useful animal model system for studying developmental processes. It is particularly helpful in studies of heart development, since many of the developmental steps and genes are conserved in *C. intestinalis*. This system replicates early heart development in other chordates, such as vertebrates. In addition to evolutionary conservation of genes and developmental features, there are many advantages to using this model system, including rapid development and simple maintenance. Our main focus is the process of myocardial growth in *Ciona*. In order to monitor the growth of the heart during development, we have constructed an expression vector using a fluorescently-labeled, heart-specific gene

(BC030863/Micalcl, transcript model ci0100139114 from the ANISEED database). Previous studies have shown that development of Ciona embryos is altered if the PI3K/AKT signaling pathway is disrupted. Ciona embryos treated with PI3K- or AKT-specific inhibitory drugs at the larval stage just prior to metamorphosis and heart formation have reduced heart size and delayed development. We will quantitatively assess heart growth using the reporter plasmid we constructed that contains a heart-specific promoter to generate fluorescently labeled hearts in juveniles. In addition, we also have obtained similar reporter constructs from the Ciona intestinalis transgenic line resource (CITRES, Japan). The requested plasmids, pMiCiTnIG and pMiCiTnIGciprmG, are specifically expressed in muscle cells, including the heart. Electroporation of these plasmids is currently underway.

Ritualistic Significance of the Human Anatomy in Pre- and Post-Colonial Mesoamerican Art

Presented at the 25th Annual Regional Collegiate Art History Symposium

Student: Cathryn Smith (2015)

Faculty Mentors: Laura Dufresne, Ph.D. and Alice Burmeister, Ph.D.

CVPA – Department of Fine Arts

For Mesoamerican peoples, the purpose of the human form as a means of ritual tribute, in addition to exploring more esoteric pursuits, meant that the body (and all its functions), was designed to serve as a highly specialized, living vessel. Following the introduction of Christianity by Spanish colonizers, indigenous beliefs and Catholic dogma established subservience of the flesh to the spirit. Artwork generated prior to and during European contact provides a wealth of context about the reverence for and awareness of the notion that Mesoamerican cultures treated anatomical anomalies, biological limiters, and foreign dogma as important considerations in their aesthetic choices.

The Influence of Parenting Styles on College Students' Preferences for Professors

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Arianna Brittany Brown (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

Many factors influence college students' selections of courses and professors. For example, the parenting styles that college students experienced while growing up have been linked to both course selection and enjoyment (Bassett, Snyder, Rogers, & Collins, 2013). Our study examined whether college students' experiences with their own parents predicted their preferences specifically for professors. Participants were 72 college students. We created three versions of a survey, with each version describing a fictitious professor that was authoritarian, authoritative, or permissive (based on Bassett, Snyder, Rogers, & Collins, 2013). All participants responded to the "Parenting Style Questionnaire" to evaluate their parents in the categories of authoritarian, authoritative, and permissive (Robinson, Mandleco, Olsen, & Hart, 1995). All participants also responded to additional descriptions of professors and adjectives corresponding with the three parenting styles and created by the researchers. In other words, we evaluated preference for authoritarian, authoritative, and permissive professors in multiple ways. Results revealed that participants did not prefer professors that matched the style of their own parents. Instead, all of our students seemed to have very clear preferences for the authoritative professor followed by the permissive and then authoritarian professor. Participants also found the authoritarian professor to be the hardest, lowest in clarity, and lowest in helpfulness. These characteristics are likely to interfere with students' learning and affect their grades, leading to students wanting to avoid that situation.

These findings suggest that college students have a strong preference for professors with high expectations and encouraging support.

Writing and the Broken Child: Expressive Writing as a Coping Strategy for Childhood Trauma

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Margaret M. Adams (2017)

Faculty Mentor: Amy Gerald, Ph.D.

CAS – Department of English

(WRIT 305 – Gerald)

According to the National Institute of Mental Health, thousands of children face traumatic events every day; how they perceive these tragedies can determine their future outcomes. Through psychological studies and personal experience, I will demonstrate in this paper how expressive writing is a positive method for coping with traumatic events. A pioneer of writing therapy, James Pennebaker, reveals that traumatic events that are kept secret will result in more health problems. This is why expressive writing is so successful: it gives people the opportunity to manifest their trauma on paper without having to let others know about their trauma. The writing process makes a child think about his/her traumatic experience and how to grow from trauma. Dr. Pennebaker validates the process of expressive writing; making feelings graspable and turning traumatic experiences into language is what makes expressive writing a positive method in coping with tragedy. When a child experiencing trauma can translate his/her thoughts onto paper, that child can then begin to heal from tragedy. Many psychological studies were performed using expressive writing; the results all showed a minimum of sixty-seven percent improvement in suffering children, both mentally and physically. The creative writing class I teach, for middle school students who have been taken away from their homes, reveals a vast improvement in the students' writing abilities as well as their confidence in themselves. Expressive writing is a social outlet for children; in addition to helping them deal with their current traumas, this technique may help them in the future.

Social Networking and Negative Effects on Relationships

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Imani Kinsey (2015) and **Ta'Tanisha Jones** (2015)

Faculty Mentor: Matthew Hayes, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Hayes)

Social networking websites such as Facebook are a common form of communication among undergraduate students. When one's significant other interacts with potential rivals for affection on Facebook, it may cause that person to experience jealousy or insecurity depending on his or her gender and the nature of the interaction. The current study assessed how individuals perceive online exchanges as unfaithful and whether or not those exchanges result in positive (stability and happiness) and negative (jealousy and insecurity) emotional outcomes and whether the type of communication (messages, videos, and pictures) mattered. The participants were 108 undergraduate students (70 women). The survey consisted of a set of nine target scenarios describing a Facebook interaction between the participant's significant other and a potential rival. Participants rated whether the interaction was an example of infidelity and how jealous, happy, insecure, stable, and trusting they would feel in their relationships. The experiment used a 3 (Severity: blatant, questionable, innocent) X 3 (Communication type: pictures, video, messages) within-subjects design. There were significant main effects for Severity and Communication on perceptions of infidelity. These

were qualified by a significant Severity X Communication interaction, resulting from significantly lower ratings for blatant videos than for pictures and messages, which did not differ. All five emotional responses exhibited similar patterns of results. The current study reveals that people differentiate severity of online infidelity and videos elicit stronger reactions than messages or pictures. More importantly, the emotional consequences vary according to the perceived severity of the infidelity.

Comparative Characterization of the Hedgehog Signaling Pathway in *Isodiametra pulchra* and *Stenostomum virginianum*

Presented at the South Carolina INBRE Spring Symposium, February 2015, and the Experimental Biology Annual Meeting, April 2015

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Marquet Minor (2015)

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology

The purpose of this study is to compare the Hedgehog Signaling Pathway (Hh) in the acoelomorph *Isodiametra pulchra* (Ipul) and the flatworm *Stenostomum virginianum* (Svirg). The former occupies a primitive placement in the bilaterians, while the latter is placed in a primitive position in the flatworms. Certain organisms are cilia-dependent in their Hedgehog signaling, while others conduct signaling independently of cilia. Protostomes (Svirg), for example, have cilium-independent signaling, whereas deuterostomes (Ipul) require cilia to conduct signaling. Proteins associated with the Hh pathway were identified from the unpublished (Univ. of Innsbruck) transcriptome for Ipul, including orthologues for Hedgehog and multiple possible orthologues for Patched. Primers have been designed and tested to verify the existence of the transcripts listed. The transcriptomic sequences of wild-type animals (North Carolina coast) displayed both synonymous and non-synonymous mutations when compared to the transcriptome of the animals cultured in Innsbruck. Next, qPCR primers will be designed and tested to analyze Patched expression, since it is a marker for Hh signaling. Animals treated with cyclopamine, a Hh pathway inhibitor, should display a reduction in Patched expression; this technique will allow us to identify the correct Patched orthologue. The Hh pathway plays a critical role in development in many organisms, including humans. The importance of this study is to establish the relationship between the Hh pathway and cilia. This can ultimately lead to control of abnormalities associated with both cilia and the Hh pathway, and prevent disorders in humans.

Young Adults' Shame and Guilt Proneness and Perceptions of Minorities

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015
Winner, Psi Chi Regional Research Award, SEPA, March 2015

Students: Gabrielle McDowell (2015) and **Marissa Grant** (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology
(PSYC 302 – Sleight)

Participants were 80 adults who responded to the Guilt and Shame Proneness Scale (GASP; Cohen et al., 2011) and two scenarios. (Shame-negative people blame themselves for mistakes, considering themselves to be “bad persons.” Shame-withdrawal is the same self-blame along with withdrawal from others. People who experience guilt feel badly about their behavior, not themselves.) In the first scenario, the main character stole something, and

in the second, the main character cheated on a romantic partner. Half of the participants received a version of the survey that described the main character in Story 1 as a lesbian, and in Story 2 encountered a main character not specifically described. The second half of participants received a version in which the main character of Story 1 was not defined and the main character in Story 2 was described as being physically disabled. Participants responded to questions after each story regarding how the main character should feel. In both scenarios, participants felt that the culprit should feel guilty and ashamed, regardless of the minority status of the culprit, or the guilt- or shame-proneness of the participant. All participants expressed willingness to forgive, except for those with tendencies for shame-negative and shame-withdrawal. People who were high in shame withdrawal also reported being the most prejudiced. In sum, participants in this study revealed strong feelings toward the scenarios provided, and people with a tendency to feel shame responded most harshly to the scenarios.

Cloning and Characterization of Nickel Uptake Regulator (NUR) Mutants from *Streptomyces coelicolor*

Presented at the SAEOPP McNair/SSS Scholars Research Conference, June 2014, and the Southeastern Regional Meeting of the American Chemical Society, October 2014

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences and a Research Corporation grant

Student: Olivia Manley (2016), **McNair Scholar**

Faculty Mentor: Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Sufficient concentrations of various metal ions within a cell are required for proper cellular function; however, the same chemical properties that make metals vital also make them toxic at high concentrations. Therefore, it is important for an organism to have a mechanism for maintaining metal homeostasis within its cells. *Streptomyces coelicolor*, a soil-dwelling bacterium important in the production of antibiotics, utilizes the nickel uptake regulator (NUR) to maintain nickel homeostasis and oxidative response. NUR functions as a transcriptional repressor that responds to changing cytosolic concentrations of Ni(II). Previous research describes two key metal-binding sites per NUR monomer. To study each of the binding sites, NUR mutants containing one or more amino-acid substitutions of binding site residues have been cloned. Biophysical characterization of the mutants will aid in understanding the specific roles of metal binding at each site in the function of NUR. Complete characterization of these mutants is ongoing.

Synthesis and Evaluation of Unsymmetrical Biphenyltetrals as Aggregation Inhibitors for Alzheimer's Amyloid-beta Peptide

Presented at the Winthrop University Summer Undergraduate Research Experience (SURE) Symposium, July 2014, and the Department of Biology Poster Session, December 2014

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Jake Roberts (2017)

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

CAS – Department of Chemistry, Physics, and Geology
(BIOL 300 – Barak)

Amyloid-beta peptide (A β) 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 to enable binding to Abeta. We have previously identified biphenyltetrols (BPTs) as a class of molecules exhibiting promising inhibitory efficacy. 3,3',4,4'-tetrahydroxybiphenyl (3,4-BPT) is the most promising, reducing equilibrium aggregation by 50 % when present in stoichiometric concentrations (i.e., IC50 = 1X); 2,5- and 2,3-BPT also show significant inhibition. Based on these results, we hypothesized that "hybrid," unsymmetrical biphenyltetrols combining these arrangements of hydroxyl groups – specifically, 3,4 plus 2,5 and 3,4 plus 2,3 – may also be successful inhibitors. 2,3',4',5-BPT and 2,3',4',3-BPT were synthesized and evaluated for inhibitory efficacy using the Congo red (CR) spectral-shift assay, which exploits CR's specific binding to beta-structured aggregates to enable monitoring of Abeta aggregation as a function of time. Preliminarily, 2,3',4',3-BPT showed little to no inhibition of Abeta aggregation; however, 10 equivalents (i.e., 10X) of 2,3',4',5-BPT completely abrogated Abeta aggregation. Further tests will be completed to verify these preliminary results and determine a quantitative IC50 value for 2,3',4',5-BPT. Additional hydroxy-substituted biphenyls will also be investigated.

The Role of Tutors as Cultural Informants, Preservers, and Enforcers in Writing Centers

Presented at the Southeastern Writing Center Association Conference, February 2015

Student: Sara Elizabeth Parnell Wilcox (2016)

Faculty Mentor: Jane B. Smith, Ph.D.

CAS – Department of English

(WRIT 500 – Smith)

For writing centers and tutors, an American-centric mindset can be problematic, because almost no university or college serves students exclusively from its own region. In fact, many writing centers are inundated with ESL students. For example, Winthrop had a total of 6,130 students as of Fall 2013, and there were 47 countries represented campus-wide. Tutors often encounter domestic students from backgrounds that differ widely from their own. In order to be effective, a tutor must analyze and understand his or her own ethnocentrism before stepping into the important role of a tutor. I argue that tutors act as cultural ambassadors to foreign students and domestic dialect speakers. Tutors must be trained in how to navigate the space created by the cultural gap between tutor and tutee, because it is rare that they would be from the same cultural and linguistic background. Thus, tutors become cultural ambassadors. As cultural ambassadors, their duties are separated into two categories: cultural informers and cultural preservers. It is a delicate balancing act that tutors must navigate in order to ensure both the academic success and cultural integrity of the students' writing. In addition, the tutor must understand his or her role as informer and preserver in order to prevent him or her from becoming a colonizing force. If the tutor cannot recognize his or her own ethnocentrism, then the tutor runs the risk of becoming a cultural enforcer, that is, unknowingly appropriating and colonizing the student's voice as a writer.

King Henry V: The Star of England and Übermensch

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: James Davidson

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Previous criticism of Shakespeare's Hal/Henry V as a "madcap prince" and fraudulent king is unjust. Preceding critics such as Jennifer Ann Bates, Marilyn Williamson, Harold Bloom, and Jamey E. Graham reach such negative conclusions about Shakespeare's prodigal character.

Analyzing the Henriad in conjunction with Nietzsche's concept "will to power" suggests, in contrast, that Hal develops into a hero king commensurate with Nietzsche's "Übermensch." By recognizing Falstaff and Prince John of Lancaster as instances of will to power and foils to Henry V and by reading key scenes in court and tavern as developmental moments, this paper argues that Henry V is not morally compromised through sybaritic zeal or lack of responsibility. He instead gains a phenomenal wisdom that guides his passage to a skill and insight that compare favorably to Alexander the Great. Therefore, if Nietzsche's "Übermensch" is the superior form of will to power, two conclusions arise from Hal's progress through the tetralogy. First, the "Übermensch" is the supreme individual triumph, since the courageous trials stimulate progress by influencing members of the community. Second, the most celebrated examples of cultural shift result from such models of the "Übermensch."

Disabled but Able: Assisting Students with Disabilities in the Writing Center

Presented at the Southeastern Writing Center Association Conference, February 2015

Student: Laurie Hilburn (2016)

Faculty Mentor: Jane B. Smith, Ph.D.

CAS – Department of English

(WRIT 500 – Smith)

In the United States, there is a storied history behind individuals with disabilities and the right to receive accommodations. From the Americans with Disabilities Act (ADA) passed in 1990 to the Learning Disabilities Association of America (LDA) founded in 1964, establishments and regulations exist today to support those with disabilities, laboring to improve quality of life through assistance in the workplace, in school, and at home. For example, in Section 504 of the Rehabilitation Act of 1973, colleges and universities are required to provide academic adjustments for individuals with disabilities; since this legislation took effect in 1977, the United States has seen the development of disability services on campuses, defending students with disabilities from discrimination and offering educational aid up through graduation. At Winthrop University, the Office of Disability Services (ODS) "helps to create an accessible campus community where students with disabilities have equal opportunity to participate fully in their educational experience," actively promoting the variety of resources available on campus, like the Academic Success Center and the Math Lab, used by students with and without disabilities ("About Disability Services"). However, a lack of a thriving relationship between the ODS and Winthrop University's Writing Center has been observed. In an anonymous survey distributed to students registered with the ODS, 61 % reported having not attended the Writing Center for a tutorial. Yet, 22 % of those who stated they had not been to the Writing Center reported that they would start attending once relations between the Writing Center and the ODS had better developed. Ultimately, the results from this survey illustrate a need for improvement from the Writing Center and its tutors in order to provide better assistance to students with disabilities. Through raising awareness, preparing tutors, and promoting attendance, ultimately reaching for open communication, the Writing Center can fulfill its promise as an invaluable resource at Winthrop University, building a connection with the ODS and improving assistance for students with disabilities.

The Madness of Misogyny: A Jungian Analysis of Lear and Edgar's Hatred toward Women

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Connie Shen (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

In William Shakespeare's *King Lear*, Lear and Edgar refer to female sexuality in similarly pejorative terms. Previous critics are divided in their evaluation of parallels between the two characters. Jungian Shakespeare critics H. R. Coursen and Alex Aronson discuss Lear's resistance to feminine integration and Edgar's fully individuated nature. Claudette Hoover states that Lear must first reconcile his femininity before achieving wholeness, but she identifies Cordelia rather than Edgar as the bringer of order and justice. Peter Rudynitsky claims that Edgar's remarks about female sexuality reflect a true hatred of women rather than merely a disapproval of wayward sexuality. This paper probes further into Edgar's heroism by comparing and contrasting his role and Lear's within a Jungian psychological context. The king's misogyny reflects lack of anima integration, but Edgar does not share his marginalized view of women. My thesis is that Lear, king turned madman, deploras women as a result of anima possession, while Edgar, future king disguised as a madman, is an individuated man whose apparent hatred of women is in reality a hatred of sexual promiscuity and societal injustice. C. G. Jung suggests that a man possessed by the anima is immature, hostile, and erratic, whereas the properly individuated man is emotionally discerning, intelligent, and stable. Whereas Lear, in his madness, displays characteristics of the former, particularly in his troubles with his daughters, he seems to make some progress with the anima in the final scene, though too late to avert tragedy. Edgar, who merely feigns madness, is a more properly integrated psyche. The condition of the state reflects both men's psyches: under Lear it is in chaos; under Edgar, justice and order return. Ultimately, the psycho-dynamics of the individual determine the well-being of the body politic.

Feminist Hip-politics: Reimagining Gender Roles and Power Structures in *A Midsummer Night's Dream*

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Skyler Teal (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Hippolyta has been largely overlooked as the gender-flexible axis around which the concept of power must turn in *A Midsummer Night's Dream*, so my research highlights the importance of her role in the discussion of Shakespeare's commentary on Elizabethan social hierarchies. My interpretation builds upon Kathryn Schwarz's claim that gender, power, and other "generic categories, like those imposed by socialized desire, are not natural truths ... but products of imagination" (Tough Love: Amazon Encounters in the English Renaissance [2000]: 234). Going beyond Schwarz's assertion, I argue that Hippolyta introduces and stresses the importance of imaginary boundaries in constructing gender roles and thus demonstrates the fluidity of gender and its relation to power, two concepts that were ambiguously represented and practically reinvented by Queen Elizabeth in relation to her own culture's patriarchal social system. Keeping in mind the feminist principles related to gender and power, I examine the very few lines Hippolyta speaks in the play to prove that her source of power is androgynous, derived from both masculinity and femininity. A historical

overview of Elizabeth's role in English politics during her reign provides an opportunity to explain the ways in which the Virgin Queen was also flexible in the construction of her gender and, therefore, of her power as a monarch. The result is a clarification of how Elizabeth's social power was intrinsically situated not in a male- or female-specific gender construction but in the ability to vacillate between the imaginary boundaries her patriarchal society used to establish gender.

Discussing the Monolithic Given: Masculinity in Ancient Egyptian Art and Culture

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Kathryn Thoma (2016)

Faculty Mentor: Kathleen Burke, M.F.A.

CVPA – Department of Fine Arts

(ARTH 483 – Burke)

The study of masculinity with all of its influences and nuances is often grossly overlooked, or even assumed, when discussing ancient cultures. In the study of ancient Egyptian art and culture, such an oversight can lead to incomplete interpretations and create an unrealistic idea about their culture and beliefs. Masculinity plays a key role in concepts such as creation, reproduction, life, and death in ancient Egyptian culture and these concepts are prevalent in the majority of Egyptian works of art, folklore, and mythology. Even while dominated by a small population of elite males, Egyptian art shows diverse interpretations of existing concepts of masculinity, which are dependent upon the time period, social status, and economic conditions of those it is reflected upon. Examining these conditions, their effects on masculinity, and the reflection of these effects in the art and culture of the times in statuary, stone carvings, paintings, language, mythology, and legends help to create a fuller understanding of gender and ancient Egyptian culture.

Comparing Ethnocentric Bias: 20th Century and Today

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Students: James Diaz (2016) and **Kristin Ramirez** (2016)

Faculty Mentors: Margaret Schriffen, M.F.A. and Emily Morgan, M.F.A.

CVPA – Department of Theatre and Dance

(DANT 385 – Schriffen)

Dance historians are prone to forms of bias which, as scholars, it is their duty to minimize, since objectivity in academic discourse is essential to seeking truth. Western dance historians and scholars should be wary of the resultant bias from viewing non-western dance forms. This ethnocentric bias is fostered by a tendency to belittle other cultures with which one is only superficially familiar. Anthropologist Joann Kealiinohomoku in her widely studied article "An Anthropologist Looks at Ballet as a Form of Ethnic Dance," claims that it is common for western dance historians to believe that their dance is more developed and inherently superior in form compared to those labeled as "primitive." Throughout the rest of her piece, she continually references the perpetrations of non-objective literature regarding many "primitive" dance forms, especially regarding Native Americans. Fortunately, in the discussion of Native American dance forms, more recent writings from 21st-century authors such as Gilda Frantz, Jay Myers, and Jacqueline Murphy are less shaded by ethnocentric bias compared to the writings published by Walter Sorell and Walter Terry during the 20th century. In comparing these 21st-century writings to those from the 20th century, the discussion of Native American dance forms by western dance scholars has changed greatly. This includes the way Native Americans are addressed, how their movement is described in terms of appreciation and understanding, and finally, how the significance of their dance is

recognized. Thus, we see writers shedding ethnocentric bias to provide more objective commentary on non-western dance forms.

Relationship between Religiosity and Willingness to Voice Attitudes about Homosexuality

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Paige Kisker (2017); Itali Jackson (2015); and Laura Arrant (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

We examined the relationship between religiosity and willingness to voice attitudes about homosexuality. Participants were 79 young adults who responded to Attitudes Toward Lesbians and Gay Men (Gato, Fontaine, & Carneiro, 2012), the Mature Religiosity Scale to measure integration of religion into the participants' lives (De Vries-Schot, Pieper, & Uden, 2011), and The Centrality of Religiosity Scale to measure how central religion was to the participants (Huber & Huber, 2012). Participants also responded to questions to assess willingness to voice attitudes toward homosexuality. Results revealed that attitudes toward homosexuality were generally positive; however, religiosity was associated with less positive attitudes toward homosexuality. We also found that mature religiosity predicted less willingness to discuss those negative attitudes. One possible explanation is that individuals who experience a deeper faith may feel confident in what they believe, not having to argue or share their opinions with others. Another possibility is that deeply religious people may worry that voicing their convictions could sound judgmental, something that they want to avoid out of concern for others' feelings. Although mature religiosity predicted reluctance to voice opinions, our second measure of religiosity did not have predictive value. Centrality of religion assessed religion in a different way, asking more about whether participants perceived themselves to be religious instead of how integrated their religion was in their decision making; this difference may explain the divergent outcomes. These findings might have relevance in the context of the ongoing societal discussion about homosexual rights and policies related to homosexual individuals.

Avisa, The Lady of Light: An Intertextual and Metacritical Study of Shakespeare's Sonnets and *Willobie His Avisa*

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Daniel Covin (2015)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 514 – Fike)

It is possible that that Avisa, from Henry Willoughby's *Willobie His Avisa*, may be the Dark Lady in William Shakespeare's Sonnets, a historical figure, or someone from the poet's circle of friends. Much of the previous scholarship on *Willobie* has attempted such a connection from a New Historical vantage point. For example, Chambrum, De Luna, and Angell, in attempting to uncover Avisa's identity, highlight events that occurred within Shakespeare's circle of friends and acquaintances in the 1590s, when the Sonnets were probably written. Avisa and the Dark Lady, it is often asserted, may be connected. Though there are potential clues within *Willobie His Avisa* that seem to link it to Shakespeare's Sonnets, the differences between Avisa and the Dark Lady are too great to ignore. More likely, the text stands alone and positively promotes female chastity, an extolled Biblical and Elizabethan virtue. The essay furthers G. B. Harrison's New Critical approach by distinguishing Avisa's spiritual prudence

and adamant abstinence from the Dark Lady's infamous sexuality, which contradicts Biblical principles (particularly those set out with regard to the adulteress in Proverbs 5). In fact, Avisa and the Dark Lady are so different that it is surprising that parallels between them have ever been proposed. More likely, Avisa is simply a fictional character, not the Dark Lady, Queen Elizabeth, or anyone in Shakespeare's life, because the proposed similarities do not stand up to scrutiny.

The Effect of Race and Gender on Perceived Beneficiaries and Attitudes about Affirmative Action

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Student: Malyn Pope (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Caucasian and African-American adults (n = 85) were asked to imagine themselves as the directors of a scholarship program and to rank two sets of four fictitious scholarship applicants after being instructed that affirmative action (AA) was important to the program. In the first scenario, the four applicants varied in race (Caucasian and African-American) and gender; however, their qualifications were equivalent. In the second scenario, the four applicants varied in race and gender; however, the qualifications of the African-American candidates were lower than those of the Caucasian candidates. Participants also completed a knowledge test and an attitude survey about AA. Results revealed that people tended to (sometimes unfairly) support their own race but not their own gender when making decisions in the context of an AA policy. Knowledge about AA was relatively low in young adults, while attitudes about AA were generally positive. In contrast to our hypothesis, knowledge did not predict attitudes. African-American participants were more likely than Caucasians to agree that people are discriminated against and that they had been discriminated against. Women were more likely than men to agree that people are discriminated against and that they had experienced discrimination. Ironically, when participants were asked if people are "treated unfairly" instead of "discriminated against," there were no group differences, suggesting that participants might not connect these two ideas. In sum, our data revealed some misunderstandings of AA implementation. Young adults may benefit from AA education and, because of their positive attitudes, may be receptive to such education.

Social Media Uses and Its Impact on Romantic Relationships

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Winner, Psi Chi Regional Research Award, SEPA, March 2015

Student: Grace Ferguson (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

We examined young adults' social media use and romantic relationship quality. Participants were 123 young adults. Those in romantic relationships responded to questions about their relationship satisfaction (Hendrick, 1988) and commitment (Rusbult, Martz, & Agnew, 1998). Then, participants responded to six questions created by the researchers to assess frequency of social media use, as well as level of offense and sexual content related to their social media use. The six questions were repeated for four specific types of social media: Facebook, Tinder, Instagram, and Snapchat. Results revealed that Tinder and Snapchat were associated with negative relationship outcomes. For example, the more participants'

interactions on Tinder was sexual in nature, the lower their relationship satisfaction scores. The more participants reported using Snapchat, the lower their relationship commitment scores. Perhaps these negative outcomes are due to the tendency for these sites to be used for sexual purposes, such as soliciting short-term sexual partners. Participants who used social media for sexual reasons felt more shame in general, and the use of Tinder and Instagram was associated with adults believing their parents did not feel proud of them. In contrast, Facebook was associated with positive relationship outcomes. For example, the more participants reported using Facebook, the higher their relationship commitment and satisfaction scores. One explanation may be that Facebook is targeted to a broader audience for broader purposes. Taken in conjunction, our findings demonstrate that social media use can impact romantic relationships.

Superstitious Behavior and Locus of Control in Athletes, Musicians, and the General Population

Presented at the Southeastern Psychological Association (SEPA) Annual Meeting, March 2015

Students: Brittany Ergle (2015) and **Devin Puckett** (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Research on superstitious behavior in athletes is extensive; however, there has not been much research outside of the athletic spectrum. We compared musicians, athletes, and the general population. Eighty young adults responded to the Athletic Coping Skills Inventory-28, which measures feelings of pressure and anxiety before and during high-stress events (Smith, Schutz, Smoll, & Ptacek, 1995). We also used a superstitious behavior scale (Brevers, Dan, Noel, Nils, & Frederic, 2011) and the Rotter Locus of Control Scale. We compared two groups (athletes/musicians versus students) using an independent t-test. Results revealed that athletes and musicians had a higher belief in the effectiveness of their ritual activities than did college students. One reason may be that they also had a higher internal locus of control than the general student population, perhaps reflecting that they felt that the rituals gave them control over the outcome of events. Across all of our adult participants, engaging in rituals strongly impacted emotional states. For example, being prevented from engaging in rituals led to annoyance, while frequently using them reduced any embarrassment about such an action. Understanding that athletes and musicians believe that their own actions affect their outcomes more than external qualities, and that their rituals are a portion of this internal control, could allow coaches and instructors to better guide these individuals. In addition, our study demonstrates that rituals are not limited to athletes or a specific gender, and may instead be used universally across adults as an emotional management strategy.

The True Cost of Higher Education

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Student: Raven Brown (2015)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Reel)

This journalistic piece investigates the impact that student loan debt has on recent college graduates, and seeks to offer possible solutions that may help to alleviate some of the burden, in order for borrowers to remain financially stable. The article provides the viewpoint of a recent graduate's financial situation that gives greater depth into the hardship of having the added responsibility of repaying student loans while trying to forge a life after higher

education. Along with in-person interviews, research compiled from several publications and consultation from a university figure were used to provide insight into the intricacies of student loan debt and financial management. The piece concluded that, while 71 % of college graduates have student loan debt, the loans provide an opportunity for those who don't have the means to pursue higher education, and student loans are not necessarily a bad debt to have. Through responsible management of loans while in school and after graduation, defaulting on loans can be prevented and financial stability is feasible.

The Effects of Exercise on Self-Esteem, General Happiness, and Body Image

Presented at the Big South Undergraduate Research Symposium (BigSURS), April 2015

Students: Courtney Rivers (2015) and **Jennifer Dilger** (2015)

Faculty Mentor: Joni Marr, Ph.D.

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

(PHED 381 – Marr)

Research focused on exercise has shown many positive physical and psychological health benefits. Past research has determined that exercise can improve mood, relieve stress and anxiety, and promote overall well-being. This research study sought to evaluate the effect exercise has on self-esteem, general happiness, and body image. Participants in the study consisted of 464 college students with an average age of 21.2 years who completed a 20-item online survey. The questionnaire assessed average amount of exercise per week, self-esteem level, degree of happiness, and perception of body image. Researchers hypothesized that individuals who reported higher levels of exercise would have higher self-esteems, greater overall happiness, and better body image perception. Correlation analysis showed no significant relationships between exercise, self-esteem, general happiness, and body image. Analysis determined a significant relationship between male gender and exercise amount. The data showed males were more physically active than females. In addition, there was a significant relationship between level of happiness and self-esteem. Those who reported higher levels of self-esteem reported higher overall levels of happiness. There was also no significant relationship between gender, self-esteem, or body image.

OTHER FACULTY/STUDENT COLLABORATIONS

Synthesis of Isoxazolopyridines via Cyclization of 3-Acylpyridine N-Oxide Oximes

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Brandon J. Hicks (2016)

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

CAS – Department of Chemistry, Physics, and Geology

Isoxazoles are associated with a wide spectrum of biological functions, including antiviral, anthelmintic, anti-inflammatory, anticonvulsant and insecticidal activities. Derivatives of isoxazolopyridines are also reported to have cholesterol-lowering activities. Recently, the Hanna laboratory reported that tosylhydrazones formed using 3-acylpyridine N-oxides could be cyclized into pyrazolopyridines. Through the reaction of N-oxide tosylhydrazone with a proper electrophile, they were able to form an activated intermediate that allowed nucleophilic attack at C2 on the pyridine N-oxide; in the presence of a base, an E2 elimination then formed the desired cyclized product. We envisioned that this same method could be applied to form isoxazolopyridines from 3-acylpyridines. Previously, it had been discovered that the N-oxide tosylhydrazones in the Z-configuration cyclized smoothly, but those in the E-configuration did not. We reasoned that formation of the oxime of 3-pivaloylpyridine N-oxide would force the oxime into the Z-configuration; thus, we initially studied the cyclization of 3-pivaloylpyridine N-oxide oxime (1). Cyclization of 1 to 3-*t*-butylisoxazolo[5,4-*b*]pyridine (2) was accomplished using the electrophile/base combination of PyBroP and Et₃N. The resulting isoxazolopyridine was isolated in 51 % yield and characterized using ¹H- and ¹³C-NMR. Several different electrophiles and bases were subsequently tested and product yields determined by ¹H-NMR using an internal standard. The most effective combination was triisopropylbenzenesulfonyl chloride (electrophile) with diisopropylethylamine (base), which gave an 86 % yield of 2 and a 9 % yield of 3-*t*-butylisoxazolo[4,5-*c*]pyridine (2'), as determined by ¹H-NMR.

True Kates and Ironic Kates: An Examination of Kate's Final Speech in *The Taming of the Shrew*

Student: Chrystal Winzenried (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

The tone of Kate's final speech in Shakespeare's *The Taming of the Shrew* remains one of the most important questions that the audience must address. While some critics like Melinda Kingsbury and Michael Shurgot focus mostly on how character directions affect Kate's speech, others like John Cox and H. J. Oliver have examined the importance of the Induction, which features Christopher Sly. However, the relationship between Kate and Sly has not received sufficient analysis. In fact, the Induction provides a key to understanding Kate's intent. This paper uses Sly and the theme of illusion to argue that the true nature of Kate's final speech is ironic. The Induction and the final speech are like the play's bookends: as with Sly, so with Kate. Many parallels between the two characters suggest that they both further the theme of illusion. For example, both are placed in an unfamiliar environment and are called upon to play a new role. Initially, both resist; eventually, both conform. But

whereas Sly is a dupe, Kate achieves a feat of "self-fashioning" through the understanding and manipulation of illusion. As a result, her final speech is ironic because she exaggerates the role of the dutiful wife she has to some extent become. Illusion is thus a way in which she and Petruchio express their kindred spirits in the final scene. Her speech is a fun prank. Unlike Sly, who is consumed by illusion, Kate wields it to bring the play to a satisfying close.

Synthesis of Pyrazolopyridin-3-ones by Cyclization of 3-Acylpyridine N-Oxide Tosylhydrazides

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Alexandria I. Pinnix (2016)

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

CAS – Department of Chemistry, Physics, and Geology

Pyrazolopyridinones are fused heterocyclic compounds that contain a pyridine ring as part of the fused bicyclic system. Pyrazolopyridinones are currently studied for their link to a range of biological activities, including antiviral, antitumor, anti-hypertensive, anti-anxiety, and cardiotoxic agencies. Previously, the Hanna group investigated the use of tosylhydrazones formed using 3-acylpyridine N-oxides, and discovered that the N-oxides can be cyclized to pyrazolopyridines. We sought to exploit the chemistry behind that cyclization for the synthesis of pyrazolopyridinones. We began with the synthesis of pyridine 3-carboxylic acid N'-tosylhydrazide, which was achieved in 79 % yield. Initial attempts at oxidation using the Sharpless method of aqueous hydrogen peroxide and methyltrioxorhenium (MTO) in dichloromethane (DCM) were unsuccessful, presumably due to insolubility of the starting hydrazide. Through an adaptation of this method using urea hydrogen peroxide and MTO in ethanol, the tosylhydrazide was successfully oxidized to its N-oxide with a yield of 75 %. Cyclization was attempted under several different sets of conditions, and the results of these experiments will be presented.

Exploration of Solutions and Refutations of the Theological Fatalism Debate

Student: Gerrard Goines (2014)

Faculty Mentor: M. Gregory Oakes, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 495 – Oakes)

The theological fatalist debate is articulated as the dilemma between divine foreknowledge and human free will. Theological fatalism is the belief that infallible foreknowledge of a human act makes the act necessary and hence unfree. Through an examination of the historical development of the notion of free will and the development of solutions to theological fatalism, along with contemporary thought on the human free will and divine foreknowledge issue, it will be shown that it is possible that human free will and divine foreknowledge can be reconciled; hence, they are not necessarily incompatible. The thoughts of Aristotle, Epictetus, and Origen are utilized to give the reader a sense of what human free will entails. Solutions to the debate are given by Boethius, Molina, and Ockham by redefining human free will or divine foreknowledge. Zagzebski, Open Theists, and Goldberg are utilized as contemporary thoughts on the issue; Zagzebski attempts a refutation of Boethius, while Open Theists attempt to refute Molina and Ockham indirectly, and Goldberg proposes another solution to the issue. The essay seeks to prove that human free will and divine foreknowledge are not necessarily incompatible due to the fact that the refutations do not successfully refute the solutions.

Prospero: Shakespeare's Portrayal of Himself as a Regretful Father

Student: Kirstie Lorentz (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Contrary to Ania Loomba's negative critique of Prospero in *The Tempest*, he is frequently thought to represent Shakespeare himself, as critics like David Bevington and Stephen Greenblatt suggest. They do not, however, consider him to be a regretful father. Despite Prospero's unpredictable temperament and deep thirst for power, this paper argues that his treatment of Miranda and Ariel, combined with the actions he takes during *The Tempest*, reveal him to be a repentant father filled with haunting regret, not only for his own past mistakes but also as a representation of Shakespeare's own past mistakes. As a character in his own right, Prospero harbors strong feelings of regret for his daughter's life of isolated poverty and devotes himself to righting his wrongs. His actions also constitute an emotional catharsis for Shakespeare himself. For example, Prospero's speeches against premarital sex and the labor he designs to test Ferdinand's love reflect the author's wishes for his own daughters and his feelings regarding his forced marriage to a pregnant Anne Hathaway. As an autobiographical figure who reflects Shakespeare's own shortcomings, Prospero embodies the author's wish that he had handled certain things differently. Whereas claims that *The Tempest* is Shakespeare's farewell to the theater are overstated, the paper concludes that a biographical approach has value because Shakespeare and Prospero, as fathers, have more in common than has been previously realized.

Thinking about Malory: The Edmund-Mordred Parallel in Shakespeare's *King Lear*

Student: Hayden Clement (2015)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

This paper contributes to the source study of Shakespeare's *King Lear* (1605), which critics such as Cherrell Guilfoyle, Harry Rusche, Samuel T. Coleridge, Waldo McNeir, and Richard Matthews have explored. Left under-explored in Shakespeare's debt to Malory's romance *Le Morte d'Arthur* (1485), however, is Edmund's relationship to Mordred and Gawayne. This paper uses common themes – nature, primogeniture, pride, love, justice, and fate – to argue that Edmund undergoes a transformation from Mordred-like ambition to Gawayne-like redemption. Besides Shakespeare's direct allusions to Malory's text, Edmund resembles Mordred in having a troubled relationship with his father and brother. But by embracing regret, Edmund aligns himself more with the good brother, Gawayne, who eschews pride, embraces humility, and seeks redemption. As a result, Edmund comes to terms with his disenfranchised state as an illegitimate younger brother and submits to the justice of his fate.

The Historical and Contemporary Understanding of Moral Value

Winner, Certificate of Achievement for Excellence in Scholarship in Senior Capstone Seminar, Winthrop University Department of Philosophy and Religious Studies, December 2014

Student: Carson Cope (2015)

Faculty Mentor: M. Gregory Oakes, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 495 – Oakes)

In the following essay, I argue that, while historically moral value has been posited as coming from an objective source (such as God) and while this objective source has been understood as a necessary condition for the existence of moral value, in the absence of an objective source of moral value (such as the death of God) there exists a potential for the creation of moral value, so that moral nihilism does not follow from the lack of an objective source of moral value. I look at Plato, Augustine, and Kant, who assert that moral value requires an objective source to exist. For Plato, the form of the good is the objective source of moral value, for Augustine, God, and for Kant, the categorical imperative. Next, I examine Frans De Waal, Bernard Reginster, and Simone de Beauvoir, who provide potentials to avoid moral nihilism. Frans De Waal rejects Veneer Theory that posits morality as a thin veneer over an otherwise selfish nature and instead asserts that the building blocks of morality are evolutionarily ancient. Next, Bernard Reginster interprets Nietzsche's will to power as the will to overcome resistance and subsequently advocates an ethics of creativity. Finally, Simone Beauvoir asserts that we should treat every man's ultimate end as freedom. I conclude that, in the absence of an objective source of moral value, there exists a potential for the creation of moral value, so that moral nihilism does not follow from the lack of an objective source.

Christianity and Capitalism

Student: Sarah Simonelli (2015)

Faculty Mentor: M. Gregory Oakes, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 495 – Oakes)

In this paper, I discuss the impacts of individualism and materialism on Christianity and capitalism, and I argue that Christianity and capitalism alter their goals and values according to their responses to these ideologies. Christian attitudes are first traced through a historical reaction cycle, beginning with the writings of Augustine of Hippo and Thomas Aquinas on property ownership. The Roman Church corruption of 1000-1300 is discussed as a contrast between the ideals of Augustine's and Aquinas' teachings and the Protestant Reformation and the Protestant Ethic thesis of Max Weber develop as a response to the corruption. The historical cycle ends with the reactions of American Christians to the rise of capitalism and consumerism from 1700-1800. Historical developments in capitalism are discussed in terms given by James Fulcher, with an emphasis on the anarchic capitalism of 1701 to 1890, the beginnings of managed capitalism in the 1930s and its end in the 1970s with the rise of remarketed capitalism in the 1980s and onwards. Modern Christian attitudes are seen in the reactions of the Word of Faith movement and the writings of its founders Essek William Kenyon and Kenneth Hagin, Sr., the reactions of Roman Catholicism and the papal encyclicals of Pope Paul VI, and ends with the response of Liberation Theology as found in Valpy Fitzgerald's and Robert Brown's writings. After surveying the two reaction cycles, I conclude that Christianity and capitalism alter themselves based on their responses to individualism and materialism.

The Creative Process of a Director to Bring Dramatic Literature to Life

Student: Jasmine Gunter (2016)

Faculty Mentors: Andrew Vorder Bruegge, Ph.D. and Daniel Gordon, M.F.A.

CVPA – Department of Theatre and Dance

(THRA 470 – Vorder Bruegge)

A director acts as the decision-making body of a production in any play. A team of designers, a cast of actors, and a crew of technicians come together under the creative concept of a director to bring a play to life. A concept is a director's personal and creative vision or message that he or she has for a play. It is something that the director hopes to leave with the audience members after they have walked away from the show. The fascinating part about a concept is how do you bring it to life? What decisions do you make in order for the concept to translate? How much creative freedom do you give to the designers and actors, while still holding on to the directorial concept you have? The following presentation will focus on a director's ability to interpret a script, the creative process it takes to bring those characters to life and to create the environment that they live in, and how the collaboration between actors and designers can morph the concept or vision. In the fall of 2014, I directed a drama, a creative project, called *reasons to be pretty*, by Neil Labute. My task as a director was to create a three-dimensional world from the script. From proposal, to the auditions, to the production meetings, to rehearsals, to the final dress, every moment contributed to the production of *reasons to be pretty*.

Feuerbach and Alienation: Religious Projection and the Essence of Human Consciousness

Student: Graham Lay (2014)

Faculty Mentor: M. Gregory Oakes, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 495 – Oakes)

My essay examines Ludwig Feuerbach's accounts of the nature of man, the nature of religion, and his subsequent assertion that the ultimate object of religion (God) is a projection of human consciousness that alienates itself from its essential nature. Feuerbach argues that religious consciousness projects its own qualities onto that of its ultimate object and furthermore externalizes its essence onto this object. Paul Tillich broadly criticized theories of religious projection for failing to account for the infinite object of religious concern, and stated that, by doing so, such theories neglect an explanation as to the "screen" onto which the images of human consciousness are said to be projected. However, Tillich also praised Feuerbach's account for attempting to explain this by characterizing the essential form of human consciousness as infinite. Nevertheless, Tillich argued that Feuerbach's justification proved inadequate in its attempt to account for the infinitude of the religious object. Tillich's assertion of the insufficiency of Feuerbach's account of human nature serves as the starting point for my own analyses. My essay examines the multiple problematic contradictions within Feuerbach's characterization of human nature as essentially universal and infinite and attempts to evaluate the extent to which these contradictions compromise his account of the self-alienating qualities of transcendent religion. Specifically, I examine the inconsistency of Feuerbach's purported empiricism, his contradictory criticism of Hegelian idealism in spite of the abstract nature of his account of the form of human consciousness, and the dichotomy between his attempted inversion of Hegelian philosophy and his own apparent idealist account of the infinitude of consciousness. I argue that, while the contradictions within Feuerbach's account of human nature do indeed compromise the cogency of his philosophy in this regard, his account of the self-alienating quality of transcendent religion nonetheless serves as a necessary mediation between Hegelian idealism and the more-fully realized materialism of later thinkers within the same tradition.

Yoshinao Nakada and Japanese Art Song

Student: Angel Thomason (2015)

Faculty Mentor: Tomoko Deguchi, Ph.D.

CVPA – Department of Music

Yoshinao Nakada is a well-known Japanese art song composer of the 20th century. My lecture recital will feature two of Yoshinao Nakada's Japanese art songs, "Sakura Yokocho" and "Tanki Ponki." I will perform these songs and speak about the composer, the meanings of the two art songs, performance practice, and the history of Japanese art song.

Salinity Tolerance and Survival of Laboratory and Environmental Strains of *Escherichia coli*

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Leigha Stahl (2017)

Faculty Mentors: Matthew Heard, Ph.D. and Victoria Frost, Ph.D.

CAS – Department of Biology

Escherichia coli are commonly utilized as fecal indicators to assess contamination and water quality in a variety of ecosystems. One group of ecosystems of particular interest is sandy beaches, which are exposed to varying stressors from both terrestrial and marine sources. Historically, beach ecosystems were not thought to be ideal habitats for *E. coli* because salinity can inhibit growth and survival of these bacteria. However, recent studies have demonstrated that certain strains may be able to persist in these environments. Here, we expand upon this recent research and test the effects of salinity on the survival and growth of a laboratory strain of *E. coli*, as well as environmental strains collected from sand samples at Folly Beach, South Carolina. We exposed our strains of *E. coli* to salt concentrations ranging from 0.5-10 % and assessed the colony forming units (CFUs) following each of our treatments after a period of 24 hours at 37 °C. Our data indicated there was a significant decrease in CFUs and a noticeable reduction in diameter of colony size as salinity increased. In addition, we observed that there is a cut-off for salinity tolerance, as no colonies were able to grow in salinity concentrations greater than 5 %. Collectively, our findings suggest that *E. coli* can persist on sandy beaches despite the stress of salinity and may be a useful tool in the future for assessing these ecosystems for fecal contamination levels.

The Proposed Formation of Acylsilanes through Tandem Nucleophilic Activation-Silylation and Retro-Brook Rearrangement

Student: Sarah Lacey Robbins (2015)

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

CAS – Department of Chemistry, Physics, and Geology

(CHEM 552 – Hanna)

The purpose of this research project was to create a valid synthesis in which aldehydes were used to produce acylsilanes through the use of tandem nucleophilic activation-silylation and the retro-Brook rearrangement. The nucleophiles that were selected to undergo investigation consisted of cyanide and phosphonates. The temperature was varied during experimentation in correlation to the type of base and starting material used during synthesis. The overall data collected during experimentation concluded that the proposed method of synthesis was correct and the production of acylsilanes was confirmed through both ¹H and ¹³C NMR spectroscopy.

A Look at Stuart Saunders Smith's Use of Voice and Percussive Ecology in "Poems, I II III"

Students: Nathan Matthews (2016) and Rachel Trueblood (2016)

Faculty Mentor: B. Michael Williams, Ph.D.

CVPA – Department of Music

Renowned composer Stuart Saunders Smith is known for his percussive works and for incorporating the use of the voice into "speech songs," giving his compositions a unique style and vision. His first work, "Poems, I II III," foreshadows his use of spoken words and vocal sounds relating to percussive noise, and their own inherent sound nature as opposed to literal meaning. This obvious John Cage influence on the use of vocal sounds is spread subtly through his first work, as opposed to his later more elaborate percussion and vocal pieces, alluding to early beat poetry. This piece also showcases his idea of percussive ecology, the ability to get an incredibly large amount of sound from minimal instrumentation (5 break drums and one cow bell played under water). Smith instructs that the performer should play the brake drums melodically and that there be no over dramatization. By doing this, the piece comes off as a reflective and subtle work, playing with sounds and instruments in ways that an audience might not be used to hearing. In my performance of this early work, I hope to embody the spirit that this incredibly important staple of music, in the unique voice of Stuart Saunders Smith, naturally exudes. "Music is not reason. Music need not have anything to do with logic or sequencing. I want the structure of music to be just as alive as life. When I compose, each note is there for a sound." - Stuart Saunders Smith

Examination of Factors Surrounding Solar Power-Friendliness in U.S. State Policies

Student: Peter Nagovnak (2015)

Faculty Mentors: Stephen Smith, Ph.D. and Timothy Boylan, Ph.D.

CAS – Department of Political Science

(PLSC 490 – Smith and Boylan)

This study aims to investigate the political, social, economic and geographical correlates of solar-power friendly policies in the U.S. states and the District of Columbia. Given the role of the states in shaping current energy policy, this topic has received relatively little scholarly attention. This lack of attention is particularly unfortunate given the potential importance of solar energy in the nation's future energy mix. Theoretical considerations and the existing research suggest that the extent to which a state is solar-friendly will be associated with the following variables: the per capita number of residents employed in the fossil fuel economy, the per capita amount of residents employed in the solar industry, the per capita amount of companies in the fossil fuel industry, the per capita amount of companies in the solar industry, the ruling party in a state's legislature, the relative amount of contributions to political campaigns made by the fossil fuel and the solar industry, the amount of sunshine available, the average family income, education levels, and current electricity prices. This research investigates the extent to which these associations exist. The results of this study will increase scholarly understanding of an important yet under-researched issue, as well as hopefully increase the ability of policymakers, advocacy groups, and the public to assess the feasibility of future planned or demanded policies.

Synthesis and Characterization of Hydroxyapatite Crystals

Supported by a grant from the Winthrop University Research Council

Student: Jessica Zinna (2016)

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Pentacalcium hydroxide phosphate, or hydroxyapatite, is an important biological apatite found in tooth enamel and bone. Hydroxyapatite is used as a biomaterial to replace hard tissues, and as such, is useful synthetically. However, some synthetic hydroxyapatite crystals have too low of a fracture toughness to be viable for weight-bearing bone grafts. Acicular, or needle-like, hydroxyapatite crystals have been found to have higher fracture toughness than other crystal formations. For this reason, it is useful to focus on the synthesis of needle-like hydroxyapatite crystals. In this research, hydroxyapatite was synthesized with variable calcium to phosphorous ratios in order to investigate the effects of stoichiometry on crystal habit. It was found that the calcium to phosphorous ratio affected the crystal habit of synthetic hydroxyapatite crystals, which was then related to supersaturation values calculated with aqueous speciation software (OLI Systems). The crystals were identified to be hydroxyapatite through X-ray diffraction and characterized with optical microscopy. Future work will focus on synthesizing transition-metal complexed hydroxyapatite, and further characterization studies.

Synthesis of Calcium Carbonate under Variable Aqueous Conditions

Supported by a grant from the Winthrop University Research Council

Student: Danielle L. Thibault (2016)

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Calcium carbonate, or calcite, is a very prominent biomineral in the ocean that accounts for the skeletons of coral and the shells of other aquatic organisms. As a result of recent increases in carbon dioxide atmospheric pressures, the ocean has been gradually acidifying. As the ocean becomes more acidic, we expect the concentration of carbonate as well as the formation of calcite to decline. This was studied using experiments with calcium nitrate, sodium carbonate and lysine as a ligand that binds to calcium ions. Speciation calculations (OLI Systems) revealed that supersaturation increases with pH, and this is expected to produce smaller crystals with pH increases. As pH increased from 6 to 9, generally more product was observed by optical microscopy. Further, digital size analysis revealed that at pH 6 the crystals were smaller than those at the higher pH values, corresponding to predictions made using supersaturation calculations.

Synthetic Modification of "Zone 1" on a Known Sphingosine Kinase 1 Inhibitor to Improve Oral Bioavailability

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Deanna Worley (2016)

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

CAS – Department of Chemistry, Physics and Geology

Among various cancer treatments, targeted therapy has gained an especially high level of interest. Ideally, targeted therapy would decrease cell proliferation while simultaneously increasing pro-apoptotic activity in a selective and noncompetitive way. Two sphingolipid metabolites, ceramide and sphingosine-1-phosphate (S1P), have been linked to cellular

apoptosis and proliferation, respectively. Sphingosine kinase 1 (SK1) sustains the molecular equilibrium between ceramide and S1P by the phosphorylation of sphingosine. However, the targeted inhibition of SK1 can cause concentrations of sphingosine-1-phosphate to decrease, meanwhile forcing the equilibrium to favor ceramide. Several SK1 inhibitors have been successfully identified by Smith et al.; however, due to a lack of oral bioavailability, a number of inhibitor modifications are necessary. With the aid of enzymatic docking programs, it was possible to make approximations as to which portions of Smith's inhibitor interact with SK1's binding site. Using this information, we can make synthetic modifications to uninvolvement regions of the drug in order to increase polarity without impacting the enzyme interactions. Calculations of the theoretical Log P and Ki values were also performed for inhibitor variants. Said calculations directed synthetic changes and a number of improved SK1 inhibitors have been prepared. In the future, our procedures must be further optimized and the drug molecules must be purified before effective inhibition analyses can be performed. Bioassays will then provide information as to how successfully our inhibitors interact with SK1 and what further modifications need to be made to realize the potential therapeutic value of these compounds.

A Bad Rep: Winthrop University's Student Newspaper Gets a Bad Reputation and Low Readership

Student: Alisha Kennerly (2014)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication
(MCOM 301 – Reel)

Winthrop University's weekly-produced student newspaper, *The Johnsonian*, suffers from two problems: many students are not even aware that the paper exists, and the students that have heard of the paper believe it has a bad reputation for being full of mistakes, both grammatical and factual. Survey data collected in October 2014 from 400 students and faculty in all majors and different age groups appeared to echo these two issues. Researchers at Winthrop University collected survey data from the students and faculty on campus in order to examine their readership and opinions of *The Johnsonian*. Researchers asked evaluators to rank certain aspects of the paper, such as credibility, quality, and headline accuracy. Evaluators were also asked to list the strengths and weaknesses of the paper and share how often they read the paper. The paper examined the topic through two theoretical prisms – the uses and gratification theory and the social network theory. Many students said they did not know the paper existed, where to get a copy, or when the paper is published. They continuously suggested that the paper should advertise around campus to get a better presence on campus. Readership levels of the paper were low with only 30 % of people reading it in the two weeks prior to taking the survey and about 49 % reading it during the semester. Furthermore, almost 60 % of participants said they were unlikely or highly unlikely to pick up a copy of the paper in the two weeks following the survey.

A Mathematical Model for Balanced Card Collecting Games

Students: Alesha Love (2016); **Kimberly Mack** (2016); and **Noah Weber** (2016)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics
(MATH 471 – Abernathy)

Online Free-To-Play Collectible Card games typically rely on players purchasing additional card packs for revenue. These card packs may also be given out for free in order to retain interest from non-paying players. Players are encouraged to purchase these card packs in order to obtain powerful cards to give them an advantage in the game. Typically, the more powerful

the card, the less often it appears in these card packs. Because paid players can obtain cards at a faster rate, they have a higher chance of obtaining these powerful cards. This can lead to the game becoming imbalanced, which leads to players losing interest in the game. We propose a mathematical model for a semi-generic card game that will assist developers in picking optimal values for parameters relative to the free/paid player imbalance issue in Online Free-To-Play Collectible Card games.

Synthetic Optimization and Modification of “Zone 4” Reaction on a Known Sphingosine Kinase 1 Inhibitor to Improve Oral Bioavailability

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Morgan Turnow (2016)

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

CAS – Department of Chemistry, Physics, and Geology
(CHEM 551 – Hanna)

Targeted therapy, a form of chemotherapy, has the ability to target a specific molecule and pathway, increasing the efficiency of attacking the abnormal cancerous cells. By inhibition of an enzyme known as sphingosine kinase (SK), it is possible to lower the intracellular concentration of sphingosine-1-phosphate (S1P). S1P is a molecule overexpressed in cancer cells and linked with cell proliferation. Inhibition of the SK enzyme leads to a buildup of sphingosine and ceramide, two molecules directly linked to cell apoptosis. Therefore, our project objective is to develop inhibitors of sphingosine kinase in order to lower the intracellular concentration of S1P and generate apoptosis through the buildup of sphingosine and ceramide. Smith et al. discovered a compound that was successful in inhibiting SK in vitro, but unsuccessful in vivo. Therefore, this inhibitor must be modified to improve inhibition success in vivo. Inhibitors with a modified Zone 4 have been synthesized using microwave synthesis. These modified inhibitors also have lower log P values, which will improve oral bioavailability and potency levels. Optimization of these reactions to improve purity and percent yields continues. Once these inhibitors are purified, their interactions with the SK enzyme will be evaluated to potentially aid in the prevention and treatment of cancer.

Uncovering the Meiofaunal Buffet via Diagnostic PCR

Supported by a grant from the Winthrop University Research Council

Student: Kyle McDaniel (2016)

Faculty Mentor: Julian Smith III, Ph.D.

CAS – Department of Biology

One of the fundamentals of any ecosystem is the trophic relationships between the organisms living in the environment. Therefore, it is vital that these interactions be thoroughly researched and elucidated in order to continue with other studies on the ecosystem in question. Sandy beaches are home to a multitude of microscopic and macroscopic creatures and the microscopic interstitial meiofauna are an important part of the ecosystem. However, prior to this work, the trophic relationships among the meiofauna had not been identified. Using diagnostic PCR techniques, I have worked to identify these links and reveal the predator-prey interactions occurring in the meiofaunal realm with a variety of flatworm predators in the Bogue Banks, North Carolina area. Intra-meiofaunal predation and macrofaunal-meiofaunal predation have been detected with a number of groups of organisms, such as Harpacticoida, Gastrotricha, Diatoms, and Nematoda. Next-Generation Sequencing (NGS) studies being conducted in the near future will allow for an even better understanding of how energy transfer works in this subvisible world, and will lead to investigations into how rapid development of beaches is affecting the community.

The Reaction of Protected Cyanohydrins with Epoxides as an Alternative for the Enantio- and Diastereoselective Preparation of Aldols: Studies with Lactonitrile

Supported by a grant from the Winthrop University Research Council

Student: James R. Dean (2016)

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

CAS – Department of Chemistry, Physics, and Geology

The aldol addition is one of the most important carbon-carbon bond forming reactions in chemical synthesis. The traditional form of this reaction, between an aldehyde or ketone and a second enolized aldehyde or ketone, results in the formation of a β -hydroxycarbonyl (often referred to as an “aldol product”). The reaction can result in the formation of up to two new chiral centers, and the absolute and relative stereochemistry of the product can be challenging to control. Modern variations have allowed for significant enantio- and diastereoselectivity in the reaction. These useful methods are not without drawbacks, including poor atom economy, use of expensive auxiliaries, and the additional synthetic steps required to introduce and remove these auxiliaries. An alternative potential route for the enantio- and diastereoselective preparation of aldol products is the reaction of O-silylated cyanohydrin anions with epoxides. This method would take advantage of the wealth of excellent asymmetric epoxidation procedures available, providing an efficient method for the stereoselective formation of aldols. Experiments were performed to determine conditions that would allow for the successful reaction of cyanohydrins lacking an electron-stabilizing group adjacent to the developing carbanion. The tert-butyldimethylsilyl (TBS) ether of lactonitrile was prepared and reacted with a variety of bases in various solvents to attempt to form the cyanohydrin anion. Several forms of decomposition of the anion were observed, including evidence of Thorpe condensation and retro-Brook rearrangement. Deprotonation was also complicated by trace amounts of water and other impurities found in the substrate.

Implementation of an In Vivo FRET Sensor for RhoA Activation

Supported by a grant from the Winthrop University Research Council and a grant from the National Eye Institute of the National Institutes of Health

Student: Elijah Wyatt (2015)

Faculty Mentor: Eric Birgbauer, Ph.D.

CAS – Department of Biology

Axon guidance is an important factor during development, in which nerve cells send out axons to attach to their respective targets. This process is mediated by a plethora of factors and signaling molecules. These factors direct axonal growth through both attraction and repulsion. Furthermore, in greater concentrations, some repulsive factors can cause the growth cone located at the tip of a growing axon to collapse and retract. This phenomenon plays a large role in inhibiting neural injuries from healing. The molecule we are interested in is a bioactive lipid – lysophosphatidic acid (LPA). LPA works through a pathway that results in the activation of RhoA which, in turn, results in cytoskeletal rearrangements that cause growth cone collapse. The detection of molecules like RhoA has been greatly improved through use of techniques with fluorescence resonance energy transfer (FRET). FRET proteins can be used to visualize the presence of various factors because they can be made to change colors, in real time, when a certain molecule is activated. The chief goal of this project is to develop and implement a delivery system for an externally engineered RhoA FRET sensor, then use said sensor to examine RhoA activation in growth cones during growth cone collapse assays. We are using an electroporation-based method that is not yet completed; however, we will perform growth cone collapse experiments in which RhoA activation is observed using the FRET sensor in time-lapse assays within the near future.

A Juxtaposition of Dorothy Day and Reinhold Niebuhr as Christian Socialists

Student: Jessica Doscher (2017)

Faculty Mentor: Stephen Smith, Ph.D.

CAS – Department of Political Science

The Christian social justice movement in the United States is far from new. For years, men and women of the faith have rallied against the treatment of the poor and impoverished, coming from all walks of life and political persuasions. Dorothy Day and Reinhold Niebuhr are perhaps two of the most recognizable names in that regard, championing the fight against poverty and speaking out against the hypocrisies and inequalities that they viewed in the world around them. Despite fighting for like causes, Day and Niebuhr were two very different people. Day, a woman who was an open Leftist who found herself drawn to the Catholic Church, presents a sharp contrast with Niebuhr, who was a Protestant Calvinist. Socially, one again finds a distinct division. Day was an outspoken protester and rabble-rouser to those who did not care for her and lived among the poor to bring herself closer to God; Niebuhr was a seminary professor who wrote, thought, and wore suits. However, at the core, the ideologies of Day and Niebuhr had significant similarities as well as important differences. Day was a pacifist, and Niebuhr flirted with the idea on and off throughout his life, but even more than that, they both believed in equal treatment of the downtrodden and the exploited. This is no coincidence. What brought the two together was a combination of their religion and their political views, a combination that opens up new doors for analysis and understanding. In exploring both their Socialist ties and their core beliefs, one not only sees the extent to which these social justice ideas stretch across the span of Christianity, but also the fluidity and flexibility of the Socialist mindset concerning morality and faith, which ultimately acts as a guide for a person aspiring to live a good and moral life.

The Expression and Purification of Human Sphingosine Kinase 1 (hSK1)

Student: Justin Hutchinson (2017)

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

CAS – Department of Chemistry, Physics, and Geology

Human sphingosine kinases (hSKs) are a novel group of enzymes that regulate the balance of sphingolipids such as ceramide, sphingosine, and sphingosine-1-phosphate (S1P). Sphingolipids are key regulators of biological responses such as apoptosis and angiogenesis. The product of the sphingosine kinase 1 catalyzed reaction, S1P, has been shown to promote antiapoptotic behavior in vitro, and elevated levels of sphingosine kinase isoform 1 (hSK1) have been found in cells from tumors of the breast, colon, lung and prostate. These observations have made hSK1 an attractive target for the development of new therapeutic agents for the treatment of cancer. Our laboratory uses X-ray crystallography to determine the three-dimensional structure of proteins, which, in turn, can be used for the design of inhibitors specifically targeted to the enzymatic active site. As an initial step in the determination of the structure of hSK1, we have expressed and purified the catalytic core domain of recombinant hSK1. The protein was expressed as a fusion protein with maltose binding protein (MBP) in *Escherichia coli* Rosetta2 cultures grown at 37 °C. The fusion protein was purified by affinity chromatography using an amylose column, the MBP and hSK1 were cut from each other using Factor Xa, and the hSK1 was purified from the MBP using anion exchange chromatography. We are currently scaling up production so as to accumulate enough purified hSK1 to initiate crystallization trials with several inhibitors and, should diffraction quality crystals be obtained, we will determine the structure of the inhibitor-bound forms of the enzyme.

Mathematical Models of Incremental Games

Students: Kristin Hinson (2016); Gabrielle Epelle (2015); Charles Farmer (2016); and Christina Knight (2018)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 471 – Abernathy)

An incremental game is a video game where a player performs a simple, repeated action to progress through each level. Using sensitivity analysis on the different mathematical elements of an incremental game, we model the individual variables, with the intention of predicting the outcomes of the game when played for a certain time interval. We then import our model to an Excel sheet that video game programmers/developers can use to predict the long-term results of the parameters they choose in their individual games. Allowing the programmer to input desired goals, such as when a level should be achieved, our work will output a set of specific numbers the developer can use in his/her video game to reach these targets.

Combinatorics of Card Collecting Games

Students: Emili Moan (2016); Lindsay Bradley (2017); and Zoe Vernon (2016)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 471 – Abernathy)

Card collecting games involve a mechanic often referred to as gacha-fuse-evolve where players randomly draw items with different levels of rarity that can subsequently be fused and evolved to create stronger items. Fusion, putting two different cards together, and evolution, putting two identical cards together, can be used to create new, stronger cards known as unique and recipe cards respectively. We use combinatorial methods to create a model that calculates the probability of a player creating a unique card or a recipe card given the number of cards in a deck, the number of cards chosen over a certain time period, and the number of cards of each level of rarity in the deck. We also develop a C++ program that runs simulations to generate data and test our analytic model.

Cloning and Expression of the DNA Binding Domain of FoxO from *Ciona intestinalis* That Contains an N-Terminal Nuclear Localization Signal

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences, an NIH grant from the National Heart, Lung, and Blood Institute and a South Carolina EPSCoR/IDeA Science Affiliate Network grant

Student: Mikala Smith (2017)

Faculty Mentors: Nicholas Grossoehme, Ph.D. and Heather Evans-Anderson, Ph.D.

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

FoxO proteins are a subgroup of the Forkhead family of transcription factors. FoxO proteins are highly conserved and regulate expression of genes that control a wide variety of cellular processes, including: apoptosis, cell differentiation and proliferation, and atrophy. *Ciona intestinalis* is a useful model system to study developmental biology, particularly heart development, since all chordates share a conserved cardiac gene program, as well as similar cellular processes during development. *Ciona* FoxO (ciFoxO) protein is very similar to the FoxO1 protein in humans. In order for ciFoxO to transcriptionally regulate gene expression, it must localize to the nucleus. The major goal of this project is to add a nuclear localization signal (NLS) to an expression vector containing ciFoxO sequence that will be electroporated into *Ciona* embryos where it will be expressed. The N-terminal NLS will direct the

exogenous ciFoxO sequence to the nucleus of cells, where it will be able to bind to target DNA sequences in the *Ciona* genome. The ultimate goal is to express ciFoxO constructs containing a NLS in vivo and then isolate chromatin in order to perform a ChIP-Seq assay to determine ciFoxO target genes. The ciFoxO target genes will be compared to vertebrate FoxO1 target genes to determine the level of conserved function of FoxO family members in chordates during heart development. To date, we have successfully inserted the NLS into the vector and produced dechorinated embryos; electroporation optimization is underway.

Impacts of the 2003 Cedar Fire on Southern California Childhood Asthma Rates

Student: Andrew Chavous (2015)

Faculty Mentor: Bryan McFadden, M.S.

CAS – Department of Interdisciplinary Studies

The purpose of this study is to look at correlations in emissions of toxic wildfire smoke and its impacts on childhood asthma. To show this correlation, research is being conducted on the Cedar wildfire, which burned in Southern California from October 25 to November 3, 2003. In total, there were fifteen casualties and over 280,000 acres burned. The smoke produced from the fire contained a harmful combination of carbon dioxide, aldehydes, sulfuric acid, volatile organic compounds, polycyclic organic material, and other toxic pollutants. The main contributor to negative health impacts, however, was particulate matter (PM). PM less than 10 microns in size can greatly impair respiratory function. The smaller the diameter of the matter, the more potential damage it has on the respiratory system. Measurements from the Cedar wildfire showed that approximately 90 % of the PM was less than 2 microns. This PM was detected not only near the fire's source, but spread over the Pacific Ocean and as far east as Las Vegas. Vulnerable populations for PM inhalation are both the young and old, and those with preexisting respiratory conditions. Various remotely sensed (satellite and aerial) datasets will be used to map the extent of the smoke plume during the fire event. This information will be compared to geocoded medical records of childhood asthma cases. The goal is to correlate at a finer level of spatial detail the impacts of fire on childhood asthma prevalence.

The Representation of Africans as the “Other” in American Cinema

Student: Dennis Kontor-Kwateng (2015)

Faculty Mentor: Nathaniel Frederick II, Ph.D.

CAS – Department of Mass Communication

This research examines the subtext in American film, by observing the construction of African characters within the context of depictions of Western values personified often by the American military. The African characters are represented as the “other” when these depictions are approximated against Western themes. A textual analysis involves a close reading of three films and the identification of discursive themes within each film. This research argues that these films simplify complex social, economic, and political issues in African conflict and present biased accounts that perpetuate xenophobia of African diaspora. The two films released post-9/11 are *Black Hawk Down* and *Tears of the Sun*; these films were also analyzed in comparison with two films released pre-9/11: *Out of Africa* and *White Mischief*.

Maupassant and the Bataille General Economy

Student: Keith Mushonga (2016)

Faculty Mentor: Scott Shinabargar, Ph.D.

CAS – Department of World Languages and Cultures

In “The Necklace” and “The Seat-caner,” French writer Guy de Maupassant, a master of the short story, tells the story of two women who try to penetrate the upper echelons of 19th-century French society, but find themselves repressed by the demon of patriarchy. The women resort to using money and sexuality as ways of increasing their negotiating power; however, their quest for social mobility ends tragically. I argue that the women are sexually repressed and consequently try to use money as a means to gain the attention of men. By using the philosopher George Bataille’s idea of the General Economy, which he elaborates in “La Part Maudite” (“The Cursed Share”), George Bataille asserts that any form of economic exchange is an attempt to gain power and that sexuality is subtly embedded in that rapport. The seat-caner grows up poor and ostracized from society; she is barred from socializing with young boys. She thus sacrifices herself by spending a lifetime accumulating wealth, hoping to win an amorous liaison with a bourgeois man who, in the end, shamelessly rejects her. Loisel, however, desires to live a fairytale; she creates an illusion of poverty out of her stable economic situation. She borrows a “river of jewels” in order to seduce flocks of men at a ball, in an attempt to gain authority over the men, but when she loses the jewels, she must work to restore the excess she has misplaced, hence suffering the repercussions of Bataille’s General Economy.

Investigation of a Streptococcal Phosphatase, an Unexpected Potential Iron Sensory Mechanism

Supported by a grant from the Winthrop University Research Council and an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Jesse McLaughlin (2015)

Faculty Mentor: Nicholas Grosseohme, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Iron serves an important role in the catalytic production of cytotoxic reactive oxygen species. Because of the harmful nature of these intermediates, bacteria have evolved mechanisms for minimizing iron-based toxicity. An example of this mechanism is the Regulator of Iron Transport (RitR) in *Streptococcus pneumoniae*. RitR has been identified as a strong repressor of pneumococcal iron uptake (piu) transporter synthesis, though its regulatory network has yet to be fully characterized. RitR interacts with a eukaryote-like Serine-Threonine kinase phosphatase pair, Stkp and PhpP, respectively. These three proteins have been implicated in roles of iron uptake, oxidative stress relief, and DNA repair. We hypothesized that, in the event that there is an abundance of internal iron and further extracellular signaling, a sensory mechanism preventing the further intake of iron existed in a PhpP-RitR interaction. We also hypothesized that internal iron ions bind to PhpP, thus altering the nature of the PhpP-RitR interaction such that RitR remains bound, actively repressing the piu operon and preventing unnecessary sequestration of iron. To date, we have successfully cloned PhpP, expressed it in *Escherichia coli* cells, and purified it via a series of selective precipitation methods and chromatographic procedures. Once purified, experimentation involving PhpP, pNPP (a phosphatase substrate used to mimic the natural substrate of PhpP, phosphorylated RitR), and iron solutions was conducted via spectrophotometric methods to characterize the effect of iron on the enzymatic activity of PhpP. We are currently conducting further spectrophotometric experiments to provide further characterization of the iron regulatory network of RitR in *Streptococcus pneumoniae*.

“Chant d’été”: An Original Poem in the Style of Charles Baudelaire

Student: Mary Bordonaro (2018)

Faculty Mentors: Anna Igou, Ph.D. and Scott Shinabargar, Ph.D.

CAS – Department of World Languages and Cultures

(FREN 250 – Igou)

Why does poetry matter? Poetry touches the deepest parts of the human experience, and when reading Baudelaire’s “Chant d’automne,” I felt as though it had touched my heart in an indescribable way. Charles Baudelaire was a nineteenth century French poet who gained world renown through his own writing and translations of the works of Poe and is seen by many as the father of modern poetry. “Chant d’automne” is a part of Baudelaire’s book *Les Fleurs du Mal* and is written using a very traditional structure; however, the themes, imagery, and tone of the poem create a modern feel for the reader. When writing “Chant d’été,” I mimicked Baudelaire’s stanza length, rhyme, and meter while drawing upon my own feelings and experiences in order to individualize the poetic content. Baudelaire exemplifies his grief and dismay at the arrival of autumn through nature imagery, metaphor, and an emphasis on the senses. I incorporated these aspects into my own writing. I drew upon my childhood at the beach, using warm, coastal imagery, as opposed to the cool, shadowy imagery of Baudelaire. Writing this poem showed me the differences between French poetry and English or American poetry, especially the use of the alexandrine, a type of meter that has not been prominent in English literature since before Shakespeare’s time, when iambic pentameter gained overwhelming popularity. The juxtaposition between Baudelaire’s formal structure and alexandrine meter and his modern, introspective poetic content drew me to “Chant d’automne,” and eventually inspired my own original poem.

Horn Concerto No. 1, by Richard Strauss

Student: Sarah De Oliveira (2018)

Faculty Mentor: Tomoko Deguchi, Ph.D.

CVPA – Department of Music

Richard Strauss, a late Romantic and early Modern era composer, was born in Munich, Germany, on June 11th, 1864. Son of Franz Strauss, one of the world’s most renowned hornists and composers, Richard Strauss was born a music prodigy. By the age of twenty, he had already written two symphonies, two solo compositions, and other works. Through his father’s connections, Strauss was able to receive the best music education that the time period had to offer. Richard composed his Horn Concerto No. 1 in E-flat Major on March 4th, 1885, at the young age of eighteen years old. He starts this solo with a bold musical statement. For the second movement, he slows the tempo down to an adagio with a reflective feel, still bringing quotes from his initial bold statement, but this time with a little bit of regret. He closes the work with a very fast tempo third movement, still bringing back his bold horn call. The piece ends very triumphantly. Though his father’s connections were what started Strauss’ career, Richard had a strange relationship with his authoritative father. In my lecture recital, I will explore Strauss’s relationship with his father while connecting and comparing the movements and statements of his Horn Concerto as Strauss’s declaration of independence from his father’s authoritative grasp.

Developments in Chromium Emission Spectroscopy with a Tungsten Coil Atomizer

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences

Student: Katja Hall (2016)

Faculty Mentor: Cliff Calloway, Ph.D.

CAS – Department of Chemistry, Physics, and Geology

Tungsten coil atomic emission spectrophotometry (WCAES) is a dependable way to visualize chromium emission. The WCAES spectrophotometer is smaller than commercial inductively coupled plasma optical emission spectrophotometers (ICP-OES). The WCAES system uses a commercially available tungsten bulb as the emission source, interfaced to a programmable, constant-current power supply, and Ocean Optics CCD spectrophotometer to detect emission signals. The WCAES requires less power, no water-cooling and much less argon gas than commercial ICP-OES. Incorporating a smaller aluminum housing for the atomizer and modifying the WCoil control software to allow multi-step temperature ramping and automated solvent removal provides more precise control over the atomizer temperature than any other commercially available atomizer. The added control over temperature allows the WCAES to thermally separate metals for emission measurements. Chromium(III) and chromium(VI) provide a unique test case for the improved capabilities. Chromium(VI) is regarded as a highly toxic form of chromium compared to chromium(III). Using the thermal ramping and temperature control of the WCAES system provides a low-cost alternative to conventional methods using ion chromatography interfaced to ICP-OES.

Rachmaninov and the Journey of His “Vocalise”

Student: Colton Guy Nelson (2015)

Faculty Mentor: Tomoko Deguchi, Ph.D.

CVPA – Department of Music

Sergei Rachmaninov was a Russian Romantic and 20th-century composer who had a unique ear for complex and mature harmonies, exhausting the extreme ranges and limitations of what his colleagues and contemporaries already embraced, while challenging the harmonic vocabulary of composers such as Chopin and Debussy. This paper analyzes and provides a brief history of Rachmaninov's work "Vocalise," as well as its multiple transcriptions, with an emphasis on the alto saxophone edition. Performance issues, ensemble issues, and technique regarding the alto saxophone edition will also be introduced and extrapolated upon.

The Artistry and Athleticism of a Dancer: Distinguished Characteristics of Trained Dancers and Their Effects on Performance Enhancement

Student: Myah Manuel (2015)

Faculty Mentor: David Schary, Ph.D.

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

Artistry and athleticism are integrated throughout dance training and performance. Dance, in all forms, demonstrates cohesion between creativity and physicality. This allows dancers to emotionally and physically identify themselves with their training at a higher level compared to other athletes and artists. The mental connection with movement, in conjunction with the specificity of dance technique, uniquely influences the dancer's psychological profile and performance quality. Research suggests that there are distinguished characteristics specific to dancers, including perfectionism, competitiveness, negative body image, advanced multitasking abilities, and profound creativity. Understanding the dancer's characteristics and how they affect performance quality is beneficial when constructing methods and techniques used to enhance performance.

Adipose-Derived Stem Cell Differentiation Triggered by TGFβ

Supported by an NIH-INBRE grant from the National Center for Research Resources and the National Institute of General Medical Sciences and a South Carolina EPSCoR/IDeA Grant for Exploratory Research (GEAR) in collaboration with the Medical University of South Carolina

Student: Victoria Gray (2016)

Faculty Mentor: Heather Evans-Anderson, Ph.D.

CAS – Department of Biology

(BIOL 471 – Evans-Anderson)

Adipose-derived stem cells (ADSCs) are a multipotent mesodermal population of cells that are more abundant than bone marrow-derived mesenchymal stem cells and are easy to harvest from lipoaspirate generated from liposuction of fat cells. Increasing evidence shows that both MSCs and ADSCs have the ability to become vascular cells via differentiation. We are investigating the differentiation of ADSCs into vascular smooth muscle cells (VSMCs). VSMCs play a critical role in blood pressure regulation, angiogenesis, vessel wall maintenance, and influence endothelial cell behavior. The differentiation of ADSCs to VSMCs will be triggered by transforming growth factor beta. TGF-beta signaling activates expression of a large set of VSMC-specific genes that produce smooth-muscle-specific proteins such as alpha smooth muscle actin and calponin. To stimulate VSMC differentiation, ADSCs are treated with differentiation media containing TGFβ and cultured for ten days. At days four and ten, treated cells will be analyzed for VSMC differentiation markers and compared to control, non-treated cells. To verify VSMC differentiation, cells will be tested for smooth muscle markers by immunohistochemistry, using VSMC-specific antibodies for alpha smooth muscle actin and calponin. In addition, quantitative RT-PCR will be used to determine gene expression levels using VSMC-specific primers for calponin and alpha smooth muscle actin, which will be normalized to GAPDH. Once we have confirmed that ADSCs have differentiated into VSMCs, we will then examine specific signaling pathways downstream of TGFβ that regulate the differentiation process.

The Kundiman

Student: Alexis Croy (2016)

Faculty Mentor: Tomoko Deguchi, Ph.D.

CVPA – Department of Music

In this paper, I will focus on Filipino art songs, or Kundiman, which were composed during the turn of the 20th century. I will explain the stylistic aspects of the music and the performance practice of two pieces, “Ang Maya,” by Jose Estrella and “Mutya ng Pasig,” by Nicanor Abelardo, as well as their place in Filipino media and culture, including traditional and modern settings. Alongside each piece, I will discuss the history of the libretto as well as the composer's biography and his previous works. Some of the most prominent of Filipino Kundiman comes from folklore, such as “Mutya ng Pasig,” while other pieces come from Spanish poetry, such as “Ang Maya.”

Cognitive Flexibility and Resilience: Relationships among Intolerance of Uncertainty, World Assumptions, and PTSD Symptoms

Supported by a grant from the Winthrop University Research Council

Student: Brady Nichols (2015)

Faculty Mentor: Sarah Reiland, Ph.D.

CAS – Department of Psychology

Trauma exposure can produce symptoms of post-traumatic stress disorder (PTSD), such as re-experiencing symptoms (e.g., flashbacks, nightmares), avoidance of trauma-related cues, hyper-arousal, and negative changes in thoughts and moods (American Psychiatric Association, 2013). While it has been well established that event characteristics significantly contribute to PTSD risk and resilience (e.g., Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), there is mounting evidence that cognitive factors might also play an important role (e.g., Foa, Steketee, & Rothbaum, 1989). The current study examined the relationships among event characteristics, intolerance of uncertainty (IU), negative beliefs about the world and one's self, and post-traumatic stress (PTS) symptom severity in a sample of 214 undergraduate students. As expected, cognitive factors explained PTS variance above and beyond that of event characteristics alone, and both IU and negative beliefs were significant predictors of PTS symptom severity. When PTS symptom clusters were examined separately, cognitive variables most strongly predicted the hyper-arousal and negative cognitions symptom clusters. These findings support the role of cognitions in responses to trauma and suggest that targeting IU might be a tool to aid in the prevention and treatment of PTSD.

Benjamin Ryan Tillman: Shattering the Illusion of Winthrop's Most Infamous Founding Father

Student: Andrew Harris (2015)

Faculty Mentor: Eddie Lee, Ph.D.

CAS – Department of History

(HIST 590 – Lee)

Since the founding of Winthrop at the close of the nineteenth century, through the civil rights struggle, and into the twenty-first century, Senator Benjamin Ryan Tillman's legacy has shaped the timeline of this institution. After forcing his way onto the board via legislation muscled through the governor's desk, the marks of Senator Tillman have been apparent on the social history of the nation, state, and university. In the last year or so (Summer 2014), the argument over the proper name of the Main Building on campus, officially Tillman Hall, has become a topic of conversation – and debate – among students and faculty alike. My research has demonstrated that Benjamin R. Tillman was a foul, racist man who did not respect women, his environment, or those around him. Although Tillman's historic presence in the upstate and here at Winthrop cannot be ignored, I argue that there is no need for future glorification of such a vile individual, someone who legitimately believed that African Americans, ethnic minorities, and women lacked the ability to lead. The overwhelming evidence from primary sources gathered at Winthrop and Clemson archives supports my assertions in Tillman's own hand. My research weaves historical narrative and modern perspective into a biting commentary on the Benjamin Tillman legacy at Winthrop University.

27TH 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 yearly 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 for the 27th Annual Undergraduate Juried Exhibition, Rutledge Gallery, made by juror Jennie Carlisle, production curator at *Elsewhere* in Greensboro, North Carolina. The exhibition will be on display April 13 – June 26, 2015 (reopening August 17 – August 28, 2015).

Artist

Dallas Austin
Dallas Austin
Dylan Bannister
Lindsey Bargar
Lindsey Bargar
Dylan Bauver
Brian Bojanowski
Anna Brenner
Anna Brenner
Anna Brenner
Anna Brenner
Cody Cannon
Connor Clinch
Meredith Dallas
Nicole Davenport
Toye Durrah
Toye Durrah
Drew Edwards
Ashley Felder
Charles Hickey
Charles Hickey
April Jones
Caroline Kalayjian
Caroline Kalayjian
Katie Law
Ashley Llewelyn
Rebekah Taylor McGuirt
Elli McNall
Heidi Nisbett
Heidi Nisbett
Abigail O'Daniel
Abigail O'Daniel
Aaron Padgett
Aaron Padgett
Magy Payne
Magy Payne
Jessie Rogers
Jamie Seymour
Jordan Sommer
Jordan Sommer
Sarah Stokes
Sarah Stokes

Title

Home 1
Seller's Lament
Identity Withheld 4
Thoughts
Torment
Wise Eyes
UB40 (David Bowie)
Herstory 1
Herstory 2
Herstory 3
Herstory 4
Censorship
The Sum of Everything
Fracture
Into the Great Unknown
Self As Caravaggio
Self as Kablo
Upstairs
Sentiment for Evanescence
A Stablis Animae
Advent Wreath Ken
Play Dead
Reinterpret Your Vessel
What One You Hiding in the Bags Under You Eyes?
The Mermaid
A Midnight Dream
I Should Have Expected This
The Fabric of Life: A Gift For My Ancestors
Chicken
Sam
Somnambule
Untitled
Vase I
Vase II
Clean
I Can't Hear You Anymore
I Am A Blind Man
Two Birds
Expecting Company
Sitting Alone at the Kitchen Table
Aqua Bottle
Robust Bottle

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 Award Recognition Ceremony 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 a nationally competitive award is often transformative in a student's life and can be as important as the outcome. ONCA's Eighth Annual Award Recognition Ceremony celebrates nationally competitive award applications for scholarships including the Truman Scholarship, National Science Foundation Fellowships, the Fulbright, and the Benjamin A. Gilman International Scholarship to study abroad.

Scholars who applied for these and other 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 midterm 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.

Assistant Professor of English
Director, Office of Nationally Competitive Awards (ONCA)
Winthrop University

Office of Nationally Competitive Awards (ONCA)
Eighth Annual Award Recognition Ceremony 2014-2015
Saturday, April 25, 2015

ONCA AWARD NOMINEES AND WINNERS 2014-2015

Benjamin A. Gilman International Scholarship Program: The Gilman scholarship 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: Ahmaad Alston (Pending)
- Winthrop University Nominee: Anna Bello (**Winner**)
- Winthrop University Nominee: Alanna Brooks (**Winner**)
- Winthrop University Nominee: Mykah Buff (Pending)
- Winthrop University Nominee: Felicia Chisholm (Pending)
- Winthrop University Nominee: Kila Crook
- Winthrop University Nominee: Jenn Fant (Pending)
- Winthrop University Nominee: Deborah Frasier (Pending)
- Winthrop University Nominee: Shivam Patel (Pending)

The Barry M. Goldwater Scholarship and Excellence in Education: The Goldwater scholarship fosters, encourages, and rewards math, science, and engineering majors of outstanding potential with support for the completion of their undergraduate studies. Each scholarship covers eligible expenses for undergraduate tuition, fees, books, and room and board, up to a maximum of \$7,500 annually.

- Winthrop University Nominee: Kyle McDaniel (Pending)
- Winthrop University Nominee: Noah Weber (Pending)

Benjamin Franklin Travel Grant: A man of the Enlightenment, philosopher and scientist Benjamin Franklin was also a great diplomat and friend of France. This travel grant is named after him and aims at giving students enrolled in an American university an opportunity to discover France. It is open to sophomore, junior, and senior students who are enrolled in a double major, including one major in French and one major in another discipline. Consideration will also be given to students enrolled in a minor/certificate in French and majoring in another subject.

- Winthrop University Nominee: Luis Valle Burguete (Pending)

Bridging Japan Scholarships: The Japan-US Friendship Commission, an independent federal agency promoting mutual understanding between the United States and Japan, in an effort to highlight public/private partnerships, initiated the Bridging Project scholarship program. The goal of the Bridging Project is to promote study abroad in Japan by larger numbers of American undergraduate students. The winners will receive awards of up to \$4,000 to assist with their living expenses while they study in Japan during the Fall 2015 semester or the 2015-2016 academic year.

- Winthrop University Nominee: Kimberly Tipton (Pending)

Carnegie Junior Fellows Program: Each year, the endowment offers approximately 10-12 one-year fellowships to uniquely qualified graduating seniors and individuals who have graduated during the past academic year. They are selected from a pool of nominees from close to 400 participating colleges. Carnegie junior fellows work as research assistants to the endowment's senior associates.

- Winthrop University Nominee: Peter Nagovnak

The Elie Wiesel Prize in Ethics: The Elie Wiesel Essay Contest was established in 1989 as an annual competition designed to challenge college students to analyze the urgent ethical issues confronting them in today's complex world. Students are encouraged to write thought-provoking personal essays that raise questions, single out issues, and are rational arguments for ethical action. There is a \$5,000 first prize, \$2,500 second prize, \$1,500 third prize, and two \$500 honorable mentions for personal essays on ethics.

- Winthrop University Nominee: Ashley Causey (**Finalist**)

Fulbright Award for Study/Research or Teaching English Abroad: One of the most widely recognized academic honors, the Fulbright awards provide support for graduate students and young professionals to study abroad. Awards include full grants for an academic year of study or research, travel grants, and teaching assistantships in English.

- Winthrop University Nominee, Graduate Study Abroad: MaryRuth Lown
- Winthrop University Nominee, English Teaching Assistant Abroad: Hayden Clement

The Hispanic Scholarship Fund: HSF/College Scholarships are designed to assist students of Hispanic heritage to obtain college degrees. Scholarships are available on a competitive basis to graduating high school students, community college transfer students, undergraduate students, and graduate students. Award amounts generally range from \$500 to \$5,000.

- Winthrop University Nominee: Luis Valle Burguete (Pending)

Killam Fellowships Program: The Killam Fellowships Program allows undergraduate students from Canada and the United States to participate in a program of binational residential exchange. Killam Fellows spend either one semester or a full academic year as exchange students in the host country. This program, administered by Fulbright Canada, is supported by the American Killam Trusts and Foreign Affairs and International Trade Canada. It is an integral part of the Foundation's multidimensional strategy to foster mutual understanding between Canada and the United States of America.

- Winthrop University Nominee: Cameron Washington (Pending)

Metropolitan MuSe Museum of Art Summer Internship: This program awards forty-one individuals interested in pursuing careers in the arts and museum fields ten-week, six-month, nine-month, or twelve-month internships in one of the world's largest museums. Each accepted intern works closely with a supervisor on a special and/or ongoing project. Training is integral to the interns' experience; in addition to developing practical work skills through their departmental placements, interns participate in the MuSe (Museum Seminars) Series and interact directly with the Museum's diverse audience by leading Highlights Tours and Gallery Conversations and assisting at the Information Desk. All accepted college interns are also assigned Museum staff mentors to support their experiences throughout their internships.

- Winthrop University Nominee: Cathryn Smith (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: Kendra Bufkin (Pending)
- Winthrop University Nominee: Jordyn Kessler (Pending)

National Society of Collegiate Scholars: NSCS offers nearly a million dollars in scholarships each year to help members attain their goals and commend them for their outstanding academic excellence as well their leadership and service achievements.

- Winthrop University Nominee: Christine Davenport, Amy Shopkorn Student Affairs Scholarship (Pending)
- Winthrop University Nominee: Sarah Stewart, Integrity Award, Universium Award, Induction Award (Pending)

National GEM Consortium Fellowship: GEM offers M.S. and Ph.D. students outstanding opportunities and access to dozens of the top engineering and science firms and universities in the nation. The GEM Fellowship was designed to focus on promoting opportunities for individuals to enter industry at the graduate level in areas such as research and development, product development, and other high-level technical careers. GEM also offers exposure to a number of opportunities in academe.

- Winthrop University Nominee: Kendra Bufkin (Pending)

Phi Kappa Phi Graduate Fellowship: Every year, the Honor Society of Phi Kappa Phi awards fifty-seven 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: Leah Brown (Pending)
- Winthrop University Nominee: Cassie Graham (Pending)

Phi Kappa Phi Study Abroad Scholarship: Phi Kappa Phi Study Abroad Grants are designed to help support undergraduates as they seek knowledge and experience in their academic fields by studying abroad. Thirty-eight \$1,000 grants are awarded each year.

- Winthrop University Nominee: Hannah Hustad (Pending)
- Winthrop University Nominee: Shivam Patel (Pending)

Sigma Tau Delta Senior Scholarship: Students who are currently in their senior year of undergraduate study are eligible to apply for this scholarship of up to \$4,000. Applicants must demonstrate both academic achievement and campus, community, or chapter service and explain the relevance of their programs of study to fostering the discipline of English, including literature, language, writing, and literacy.

- Winthrop University Nominee: Brierly Harris (Pending)

Sigma Tau Delta William C. Johnson Scholarship: This scholarship of up to \$5,000 is named in honor of Sigma Tau Delta's Executive Director and recognizes academic excellence and outstanding service to the Society at the local, regional, and/or national level.

Applications should demonstrate both academic achievement and campus, community, and chapter service; applicants should explain the relevance of their programs of study to fostering the discipline of English, including literature, language, writing, and literacy.

- Winthrop University Nominee: Brierly Harris (Pending)

Sigma Tau Delta Junior Scholarship: Students who are currently in their junior year of undergraduate study are eligible to apply for this scholarship of up to \$3,000. Applicants must demonstrate both academic achievement and campus, community, or chapter service and explain the relevance of their programs of study to fostering the discipline of English, including literature, language, writing, and literacy.

- Winthrop University Nominee: Rachel Burns (Pending)

Sigma Tau Delta Study Abroad Scholarship: Sigma Tau Delta awards these scholarships to active undergraduate members for the purposes of studying for an academic term or year in a certified, undergraduate program outside the country in which the nominating chapter is located. Applicants should demonstrate academic scholarship and chapter service; they should also explain the relevance of their study abroad programs and activities to fostering the discipline of English, including literature, language, writing, and literacy.

- Winthrop University Nominee: Rachel Burns (**Winner**)

Sigma Tau Delta Summer Program Scholarship: These scholarships are for active undergraduate members, including seniors who are about to graduate at the time of application. The scholarship is to be used for the purposes of attending a special summer program in the U.S. or abroad, one which furthers the applicant's engagement with the mission of Sigma Tau Delta. Qualifying summer programs should be at least three weeks in length and no longer than three months. Applicants should demonstrate academic scholarship and chapter service, and they should explain the relevance of their summer programs to fostering their engagement in the discipline of English, including literature, language, writing, and literacy.

- Winthrop University Nominee: Rachel Burns (Pending)

The Sunbelt Rentals Scholarship: The Sunbelt Rentals Scholarship is a means of recognizing the work done in the classroom, campus, and community by students within the Big South Conference. Two scholarships are awarded in January at a value between \$2,000 and \$4,000 each. A committee made up of Big South Conference administrators, Sunbelt Rental executives, and institutional representatives from the Big South Conference institutions is responsible for determining the award winners.

- Winthrop University Nominee: Kila Crook
- Winthrop University Nominee: Ian Deas (**Winner**)
- Winthrop University Nominee: Shanae White

Truman Scholarship: The Truman provides up to \$30,000 in funding to students pursuing graduate degrees in public service fields. The Foundation also provides assistance with career counseling, internship placement, graduate school admissions, and professional development. Scholars are invited to participate in a number of programs.

- Winthrop University Nominee: Ashley Causey
- Winthrop University Nominee: Lauren Goodwin

ONCA STUDENT SUCCESS STORIES

Ahmaad Alston is pursuing a major in international business, with minors in Spanish and international studies. The goals that Ahmaad has set for himself are to be an international economist and later a CEO of his own organization, which will conduct business worldwide. The award he applied for is the Gilman scholarship.

Alanna Brooks is a biology major with a minor in Spanish. She is a member of the Culture Club, Club Med, and a STEM scholar student. Alanna enjoys working with animals and plans on going to veterinary school after college in order to obtain a Doctorate in Veterinary Medicine. Thanks to the Gilman Scholarship, she is studying abroad in Costa Rica in the spring semester of 2015, where she is taking Spanish and science courses, as well as studying different species of animals. This experience will greatly help Alanna to improve her communication and social skills and will also allow her to explore a different country with a rich diversity.

Mykah Buff is a junior-transfer integrated marketing communication major who has been at Winthrop since fall 2014. His future goals consist of graduate school and working in the field of marketing and public relations. Mykah applied for the Benjamin A. Gilman Scholarship, which he hopes will defray costs associated with his plans to study abroad in Ireland next fall.

Kendra Bufkin is a chemistry major with a concentration in biochemistry. At Winthrop, she is a Ronald E. McNair, Eagle STEM, CHEM-STEM and Gamma Beta Phi Scholar. After graduating from Winthrop, she plans to go to graduate school to get her Ph.D. in Chemistry. She recently applied for the NSF Graduate Research Fellowship (NSF-GRFP) and GEM Award.

Luis Valle Burguete is a sophomore integrated marketing communication and French double major. Luis applied for the Benjamin Franklin Travel Grant and the Hispanic Scholarship Fund in order to fund his study abroad during the fall of 2015 at the American Business School Paris. Luis plans to move to New York City after graduation to pursue a career in advertising.

Rachel Burns is a junior English major with minors in international studies and history. She will be studying abroad at Kingston University in London during the spring 2015 semester and hopes to attend a creative writing program there in the summer. Rachel plans to teach English abroad for a few years after she graduates, before beginning work on an M.F.A. in creative writing. She applied for the Sigma Tau Delta Junior Scholarship, Study Abroad Scholarship, and Summer Program Scholarship.

Ashley Renee Causey is a junior special education major. This year, Ashley had a busy year working with ONCA. She has had the opportunity to apply for the McNair Scholars Program, the Truman Scholarship and the Elie Wiesel Ethics Essay Contest. She was accepted into the McNair Scholars Program and made it to the semi-final round for the Elie Wiesel Ethics Essay Contest. In the future, Ashley plans to work as an educational equity coordinator. She hopes to work with districts to help improve and develop strategies that promote culturally relevant teaching.

Felicia Chisholm is an English major with a concentration in secondary education. Her minor is religion. Upon obtaining her bachelor's and master's degrees, she will teach English at the high school level. While at Winthrop, she has received the Certificate of Academic Excellence for Dean's List for two semesters. Through her involvement with the Career

and Civic Engagement Department's Alternative Spring Break program in her sophomore year, she has been chosen to be the leader for this year's program, during her junior year. Additionally, her poem, "Of Treachery," won her the Assistant Editor's Choice award for Winthrop's literary magazine, "The Anthology", during the spring 2015 semester. She applied for the Benjamin A. Gilman International Scholarship to aid in her study abroad experience in Florence, Italy.

Hayden Clement is a senior at Winthrop University and a member of the English honors society Sigma Tau Delta. He majors in English with a literature and language concentration and minors in medieval studies. After he graduates, he intends to work toward a diploma from Oxford Seminars that shows his instruction in teaching English as a second language so that he may apply for work internationally and help others in their global understanding. In fall 2014, Hayden applied for a Fulbright ETA grant to send him to Norway for 10 months. Hayden loves adventuring to foreign places and meeting new people in their native cultures, so he figures this stint of time would be a wonderful way to get his foot in the water and learn what teaching English as a career would really be like.

Kila Crook is a psychology major and a sociology minor. After obtaining her bachelor's degree, she plans to attend graduate school and wishes to pursue a career doing research in the field of psychology. She applied for the Gilman and Sunbelt Rentals scholarships.

Christine Davenport is currently a junior exercise science major at Winthrop. She plans on applying to MUSC or USC to complete the Doctor of Physical Therapy program and become a physical therapist. She currently serves as one of the service learning coordinators for the Honors Program, and recently presented research at the Experimental Biology 2015 meeting. Through ONCA, Christine was able to apply for the NSCS Amy Shopkorn Student Affairs Award.

Ian Deas is a senior biology major who serves as student body president of Winthrop's Council of Student Leaders and as the student representative to the Winthrop Board of Trustees. In addition to his student government involvement, he has been active in community service while at the university. His list of community volunteer work includes Boyd Hill SCOPE, Brother's Keeper, Project Rebound, Rolling in Rock Hill, MLK Day of Service, Wounded Warrior Project, and reading to students at Ebenezer Elementary School. After graduation from Winthrop this spring, Ian plans to pursue a Ph.D. in pharmacology at Vanderbilt University, where he is interested in studying drug safety. After a career in research, he plans to teach at the college level to inspire a new generation of young scientists. Ian won the Sunbelt Rentals scholarship.

Jenn Fant is a sophomore French MAT5 major who recently applied for the Gilman Scholarship in order to go to France for an academic year. She hopes that, through studying abroad, she will be able to speak fluently in her chosen language, see an improvement in her knowledge of another culture, and start to build a future in education of the French language. Later in life, she would like to use her study abroad experience to become a translator to fully delve into being bilingual.

Deborah Frasier is a junior who is majoring in history and double minoring in Spanish and social sciences. After she graduates, she plans on volunteering with AmeriCorps and ultimately joining the Peace Corps. She applied for the Benjamin A. Gilman International Scholarship.

Lauren Goodwin is a junior social work major. She plans to attend graduate school after graduation to get her master's in higher education. Lauren is a member of Phi Kappa Phi

Honors Society and applied for the nationally competitive Truman Scholarship.

Cassie Lucille Graham is a senior Olanta, South Carolina native double majoring in dance and English writing. She enjoys writing creative regionalist nonfiction and will start working toward her M.F.A. in creative nonfiction at Queens University (Charlotte, N.C.) in May. She aspires to become a published author. Cassie applied for the Phi Kappa Phi Graduate Fellowship scholarship.

Brierly Harris is a double major in English and history from the Class of 2015. She is an officer in both departmental honor societies as well as the student representative on the CAS Curriculum Committee. Brierly worked with ONCA to apply for two Sigma Tau Delta scholarships this past fall. After graduation, Brierly will be pursuing an M.A. in English at Portland State University (Oregon).

Jordyn Kessler is a senior biology major and McNair Scholar at Winthrop University. She applied for the National Science Foundation's Graduate Research Fellowship. She is currently studying the social behavior of hamadryas baboons at Riverbanks Zoo & Garden, and intends to continue studying primate behavior after she graduates from Winthrop, while earning her Ph.D.

MaryRuth Lown graduated in May 2014 with a Bachelor of Music Education degree and K-12 choral certification. Currently employed as a voice teacher at Clover High School in Clover, South Carolina, she applied to attend graduate school at the University of Glasgow for a Master of Historical Performance degree through the UK Partnership Fulbright Program. She is a new member of the Oratorio Singers of Charlotte, chorus of the Charlotte Symphony, and a choral scholar at Myers Park United Methodist Church in Charlotte, North Carolina, and hopes to take her love for performance and research to the university level in the future.

Kyle McDaniel is a junior conservation biology major who plans to attend graduate school to get his Ph.D. in Molecular Ecology. He was selected as a McNair Scholar, received the Gilman scholarship for study abroad in 2014, and has been nominated for the Goldwater research scholarship in 2014 and 2015.

Peter Nagovnak is a senior political science major and Spanish minor. He is also the co-captain of the Winthrop men's tennis team and recipient of the 2014 Winthrop University Griffin-Guettler Award for the highest GPA among student athletes. With the help of Dr. Bickford and his political science professors, Drs. Lipscomb and Van Aller, Peter applied for a junior fellowship position with the Carnegie Endowment for International Peace. He is hoping to one day work in a place where he can actively help the world move toward an economically, socially, and ecologically sustainable future.

Shivam Patel is a junior theatre major with emphasis in musical theatre and a minor in computer science. He plans to study abroad next fall in England and graduate Winthrop University with a bachelor's degree by next spring. After undergraduate studies, Shivam plans to perform in regional and professional theatres while pursuing a Master's in Acting. Shivam is a Palmetto Fellow and Winthrop Fellow recipient, and Treasurer of the theatre honors society, Alpha Psi Omega. He applied for both the Phi Kappa Phi Study Abroad Grant and the Gilman Scholarship for study abroad.

Cathryn Smith is a senior art history major with a minor in medieval studies. She hopes to one day teach at a university level, or help curate an art museum. While studying at Winthrop University, Cathryn has been given the opportunity to travel to Europe, and has

represented the art history program during the 25th Mint Museum Symposium with her research surrounding Baroque anatomical artwork. Following graduation, she has plans to attend graduate school to further her interest in medieval studies.

Cameron Washington is a sophomore biology and French dual major with a minor in chemistry. He intends to go to graduate school to become a genetic counselor and later earn an M.D. or Ph.D. He is an Eagle STEM Scholar and is involved with the WU Honors Association, Le Cercle Français, and WU Symphony & Chamber Orchestras. He will engage in undergraduate research this summer under the mentorship of Dr. K. Kohl, studying the role of heterochromatin in meiotic crossover formation. He has applied for the Killam Fellowship to fund his education while studying in Sherbrooke, Québec this fall.

Noah Weber is a third-year computer science student here at Winthrop. He currently plans to attend graduate school in order to pursue a research career in computer science. Noah has recently finished his application for the Barry Goldwater award, and plans to apply for more scholarships in the future.

Shanae White is a human nutrition major who entered Winthrop as a transfer student, coming in from the University of Technology, Jamaica. It was a very big transition, but the faculty and staff made it much easier than it otherwise might have been. Shanae is an aspiring registered dietician, with the goal of becoming a certified diabetes educator and working with children with diabetes. Upon graduating this spring, it is her intention to enroll in Winthrop's Dietetics Internship, as well. Shanae applied for the Big South Conference's Sunbelt Rentals Scholarships. As a proud part of the Winthrop community, she is a member of the Tau Sigma Honor Society for transfer students, a peer tutor with the Academic Success Center, and a peer mentor with the Resources for Academic Achievement (REACH) program.

MCNAIR SCHOLARS

The Winthrop McNair Scholars Program prepares 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. The program began in fall 2009 with its first federal grant.

Winthrop's program is funded through 2018 by a renewable TRiO grant from the U.S. Department of Education (PR/Award No.: P217A130111). \$220,000 in federal funding is provided each year for programming and materials that will help 30 eligible, outstanding students complete research and prepare for graduate study. In 2014-15, federal funds represent approximately 70% of program costs. Winthrop and the Winthrop Foundation will contribute the remaining 30% of the budget with more than \$95,000 in cash and in-kind matches.

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. Several of Winthrop's Scholars have earned awards for their research, including five listed here. Being a McNair Scholar is a prestigious, nationally-recognized honor resulting in Scholars being actively recruited by graduate programs across the country. For more information, visit www.winthrop.edu/mcnair or e-mail mcnair@winthrop.edu.

Cheryl Fortner-Wood, Ph.D., Director

2014-15 Winthrop McNair Advisory Board Members

Adolphus Belk, Ph.D., Professor of Political Science
Kareema Gray, Ph.D., Assistant Professor of Social Work
Rose Gray, M.A., Director, TRiO Student Support Services (SSS) Program
Wenonah Haire, D.M.D., Executive Director, Catawba Cultural Preservation Project
Willis Lewis, Ph.D., Associate Professor of Economics
Karen Stock, Ph.D., Associate Professor of Fine Arts
Takita Sumter, Ph.D., Professor of Chemistry
Will Thacker, Ph.D., Professor of Computer Science
Sarah Wicks, McNair Scholar, Chemistry
Kim Wilson, Ed.D., Instructor of Biology and Director, Program for Research Incentives in Science and Mathematics (PRISM)
Brad Witzel, Ed.D., Professor of Education
Cheryl Fortner-Wood, Ph.D. (ex officio), Director, McNair Scholars Program and Associate Professor of Psychology
Gloria Jones, Ph.D. (ex officio), Dean, University College

Thanks also to Dr. Joe Rusinko (MATH) and Dr. Nick Grossoehme (CHEM) who have also served on the Board.

The following Winthrop McNair Scholars participated in the 2014 Winthrop McNair Summer Research Experience May 12 – July 3, 2014. They presented their research at the S.C. TRiO McNair Research Symposium on June 23, 2014, at the University of South Carolina. These students also presented their research at the Southeastern Association for Equal Opportunity Programs and Personnel (SAEOPP) McNair/SSS Scholars Research Conference and competed with fellow Scholars from all over the country. Ordinals listed in parentheses [e.g., (1st)] mark students whose presentations earned first-, second-, or third-place honors in their SAEOPP categories.

Leah Brown, Mentor: Merry Sleight, Ph.D.
Cross-Cultural Comparison of Time Perspective, Shame and Guilt Proneness, and Regret (Poster)

Ian Deas, Mentor: Julian Smith III, Ph.D.
*The Circadian Fluctuation of Melatonin in *Stenostomum virginianum* (Life Sciences, Oral)*

Alex Foster, Mentor: Brad Tripp, Ph.D.
A Cross-Racial Study of Attitudes Toward and Beliefs about Homosexuality (Poster)

Lauren Green, Mentor: Matthew Stern, Ph.D.
Brain-Penetrating Histone Deacetylase Inhibitor RG2833: A Potential Malignant Melanoma Growth Suppressor (Life Sciences, Oral)

Emily Hokett, Mentor: Sarah Reiland, Ph.D.
Cognitive Flexibility as a Dominant Predictor of Depression Symptoms Following Stressful Life Events (Poster)

Brittany Johnson, Mentor: Stephanie Milling, Ph.D.
Integrating Principles for Choreographic Evaluation into Education: One Proposed Model for Dropout Prevention (Education, Oral)

Jordyn Kessler, Mentor: Janice Chism, Ph.D.
*Interactions of a Maturing Female *Hamadryas Baboon* (Life Sciences, Oral)*

Olivia Manley, Mentor: Nicholas Grosseohme, Ph.D.
*Cloning of Nickel Uptake Regulator (NUR) Mutants from *S. coelicolor* (Life Sciences, Oral)*

Diamond Rose Melendez (3rd), Mentor: Aaron Hartel, Ph.D.
The Reaction of O-Silylated Cyanohydrin Anions with Epoxides as an Alternative for the Enantio- and Diastereoselective Preparation of Aldols (Poster)

Justin Moore, Mentors: Clarence Coleman, Ph.D. and Harold Manasa, M.A.
Transfer Pricing Equity: An Examination of Reported Revenue versus Expected Revenue (Poster)

Denise Peppers (1st), Mentor: Nicholas Grosseohme, Ph.D.
Purification and Characterization of Nickel Uptake Regulator (NUR) and Single NUR Mutants (Physical Sciences, Oral)

Kristin Ramirez, Mentor: Janet Wojcik, Ph.D.
Physical Fitness Components and Posture Screening in Female Competitive Dancers (Poster)

Shalace Rose (1st), Mentor: Janet Wojcik, Ph.D.
The Health Habits and Physical Activities of Student Truck Drivers (Poster)

Sarah Wicks (2nd), Mentors: Robin Lammi, Ph.D. and James Hanna Jr., Ph.D.
Synthesis and Evaluation of Symmetric Biphenyltetrols as Aggregation Inhibitors for Alzheimer's Amyloid-beta Peptide (Life Sciences, Oral)

The following Scholars did not participate in the 2014 Winthrop McNair Summer Research Experience, but did present their McNair research at the 2014 SAEOPP conference.

Amanda Cavin (1st), Mentor: Carol Marchel, Ph.D.
How Do Teachers Define Teacher Quality?

Stanley Kennedy, Mentor: Marleah Bouchard, Ph.D.
How Different Definitions of Homelessness Affect Resources for K-12 Public School Children

WISE SCHOLARS

The Winthrop Initiative for STEM Educators (WISE) program is supported by a \$1.2 million grant through the National Science Foundation Robert Noyce Scholarship Program. The primary focus of the WISE efforts is to recruit, support, and mentor science and mathematics majors choosing to pursue teaching as a career. The program currently has two primary outreach activities. The WISE Scholars are graduate and undergraduate students committed to teaching in high-need schools and are provided 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 research in a disciplinary group, engages in local schools for service learning, and promotes the formulation of individual research questions for more extensive investigation through a variety of other avenues.

The following WISE Interns submitted abstracts for their scholarly work:

Lucas Boncorddo

Lindsay Bradley

Kendra Bufkin

Tyra Douglas

Katja Hall

Lauren Lintz

Alesha Love

Olivia Manley

Diamond R. Melendez

Kyle McDaniel

Denise Peppers

Mikala Smith

Leigha Stahl

Jessica Michala Tesney

Jessica Zinna

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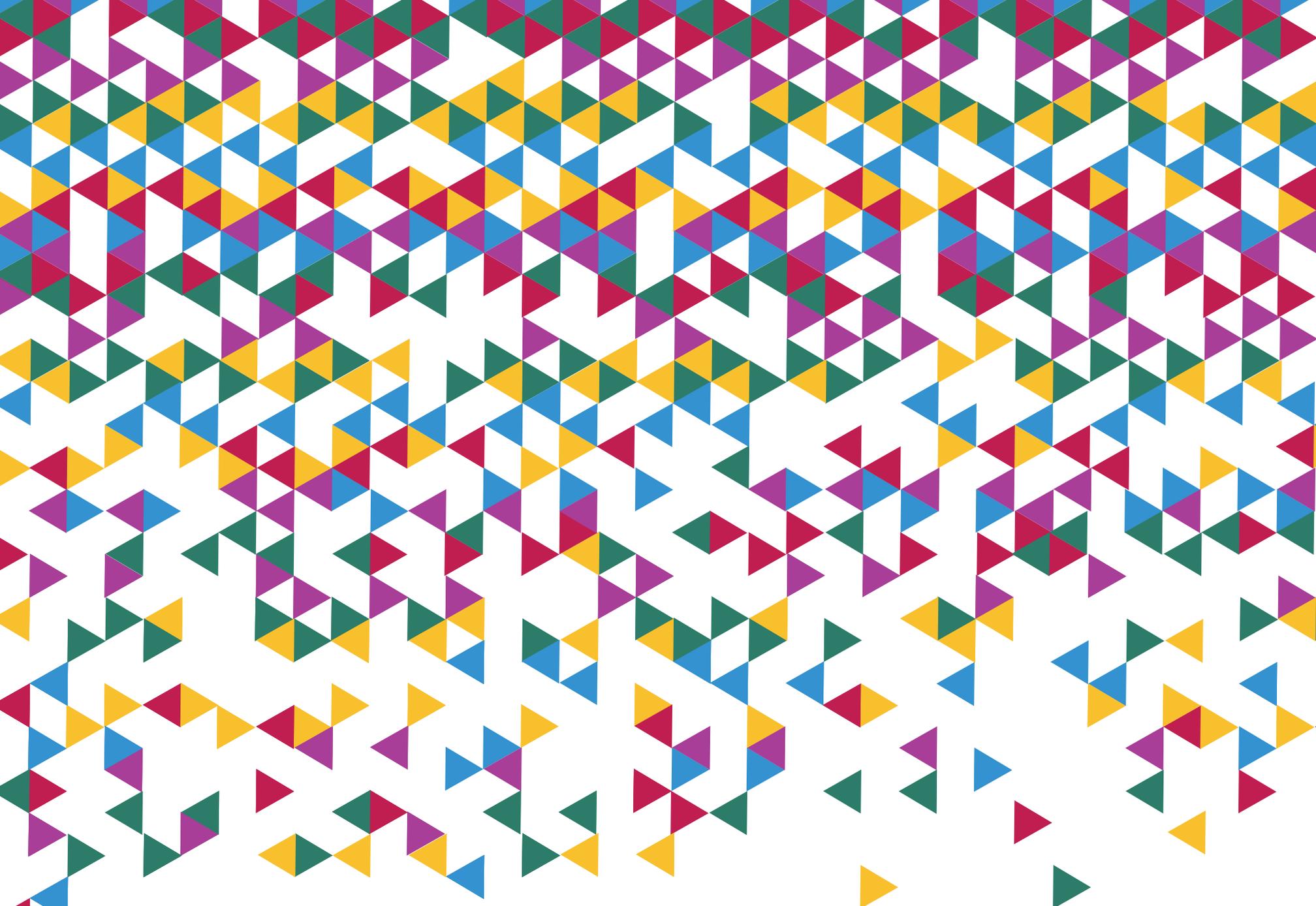
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