

WINTHROP UNIVERSITY

**UNDERGRADUATE SCHOLARSHIP AND  
CREATIVE ACTIVITY 2016**

**"Somewhere, something incredible is waiting to be known."** Carl Sagan

**“Creative activity could be described as the type of learning process where teacher and pupil are located in the same individual.”** Arthur Koestler, Hungarian-British author

University College and Winthrop University proudly present *Undergraduate Scholarship and Creative Activity 2016*. This is the fifth annual university-wide compilation of undergraduate work, christened with a new title that is more representative of the full range of students' scholarly and creative efforts. This year's book chronicles the accomplishments of students and faculty mentors from 25 academic departments and programs, spanning all five colleges of the university: College of Arts and Sciences (CAS), College of Business Administration (CBA), College of Education (COE), College of Visual and Performing Arts (CVPA), and University College (UC).

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

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

We hope you enjoy our compilation! Please note that much of the work described here will be presented, performed, or displayed during the Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE) on April 22, 2016. 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 icons on the cover are meant to represent the diversity and similarity between the research and content contained in this book. Stylistically they are the same, but they all represent different things and disciplines. The icons denote different subjects including the arts, education, sciences, and humanities. They are arranged in such a way that they would appear as a collective group, much like the content of the *Winthrop University Undergraduate Scholarship and Creative Activity 2016*.

**Amber Thompson** (2016)



# TABLE OF CONTENTS

Winthrop University Undergraduate Research Initiative	5
Publications	7
Honors Theses	10
Public Presentations and Performances	23
28th Undergraduate Juried Exhibition	61
Department of Fine Arts Senior Exhibition	64
Department of Design Senior Exhibitions	67
Department of Theatre and Dance Festivals and Showcases	68
Additional Projects	71
Office of Nationally Competitive Awards (ONCA) Applicants	81
McNair Scholars	84
Winthrop Initiative for STEM Educators (WISE) Scholars	86
Student Index	87
Faculty Index	90





# 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:**

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

Nicholas Grossoehme, Ph.D., College of Arts and Sciences

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Bradley Tripp, Ph.D., Sociology and Anthropology

Scott Werts, Ph.D., Environmental Sciences and Studies

Kristi Westover, Ph.D., Biology



# PUBLICATIONS

## Social Support and Cognitive Flexibility Linked to Resilience to Depression

*Journal of Psychological Inquiry*, 2016, Under review

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Black Doctoral Network Conference, Atlanta, Georgia, October 2015; Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

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

Faculty Mentor: Sarah Reiland, Ph.D.

CAS – Department of Psychology

This study examined the relationships among cognitive factors, perceived social support (PSS), and depression symptoms in 251 undergraduate students. Previous research in this population has shown that cognitive inflexibility and negative world beliefs are associated with greater depression symptoms. We examined the additional influence of PSS on both cognitions and depression. Regression analyses revealed that cognitive variables were more strongly related to depression than PSS was. Additionally, cognitive variables partially mediated the relationship between PSS and depression symptoms. Preliminary data from a pilot sample of 15 older adults with cognitive impairments suggest that social support may be particularly helpful for increasing resilience in older adults. This study demonstrates that social support might have an important effect on both cognitions and depression.

## “Black Thanksgiving”

*50-Word Stories*, December 2015, <http://fiftywordstories.com>

**Student: James W. Davidson Jr.** (2017)

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

CAS – Department of English

Thanks to our consuming culture, the notorious Black Friday generates more and more competition among merchants each year. As such, competing companies have continued backing up start times for sales. My mother posted a list of “dirty” companies who make their employees work on Thanksgiving Day to support sales. Unfortunately, she is employed by one of them. My neighbors are among the many consumers who spend time in lines on Thanksgiving for special deals. Add it all up, and the idea for “Black Thanksgiving” was born.

## Love Me Tinder or Mis-Match.com: Free versus Paid Online Dating Sites

*Charlotte Agenda*, December 2015, [www.charlotteagenda.com](http://www.charlotteagenda.com)

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Emily Grom** (2016)

Faculty Mentor: Darren Ritzer, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Ritzer)

Nearly 50 million individuals in the U.S. have used an online dating website or app, making it a \$1.8 billion industry. Our study assessed the expectations of people who chose to use free dating sites versus dating sites that required a fee. We hypothesized that individuals who used free dating websites would be more likely to prefer casual relationships (i.e., “hooking up”) to committed relationships. Participants ( $n = 221$ ) recruited from college classes and social media responded to an online survey that measured dating site usage, ideal partner characteristics, and risk taking. Fifty-three percent of participants had used online dating websites or apps. For free sites, 70 % of participants expected to see their dating options and then date as many people as possible. Only 28 % of people expected to meet their perfect match on a free site. Six percent of participants who used free sites expected to only hook up. Sixty percent of paid site users expected to meet their perfect match and less than 1 % expected to just hook up. The more free sites an individual used, the more frequently that individual reported engaging in risky behaviors, such as drinking and having unprotected sex. Men used free dating websites more than women. In sum, we found that people who were not necessarily seeking long-term relationships were more likely to use free sites and these users engaged in more risky behaviors. From a marketing perspective, a better understanding of the expectations and characteristics of users is quite valuable.

## “Fumbled Generations”

*Mulberry Fork Review*, 2016, In press, [www.mulberryforkreview.com](http://www.mulberryforkreview.com)

**Student: James W. Davidson Jr.** (2017)

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

CAS – Department of English

When we studied John Cheever’s “Reunion” in fiction class, I remembered my last conversation with my father. Usually I had to call him, and I remember the excitement when he called me. It was short lived once I realized his motive. After our conversation, we never spoke again. When I first wrote the story, I experimented with heavy use of fragmented sentences, concentrated primarily on feeling and the internal war of a mother’s advice versus self-exploration. The early absence of the father, the later attempt of trying to create a relationship with him, and the dawn of fatherhood collide with the father’s selfish intent. Unfortunately, the fragmented sentence experiment did not produce the desired result. So, I decided to rewrite the story as the phone conversation takes place.

### “Did Ingmar Bergman ever exist?”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student: Patrick Kay** (2016)

Faculty Mentor: Evelyne Weeks, M.A.

CAS – Department of English

This poem is a featured article from the Editor-in-Chief in *The Anthology*, 2016. It utilizes three figures of old (Ingmar Bergman, Audre Lorde, and Christ) and questions the validity of historical existence in the face of personal experience.

### “Sherbet”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student: Lindsey Monroe** (2015)

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

CAS – Department of English

(WRIT 351 – Hoffman)

“The most offensive thing my mom has ever said to me followed her gifting me with a collection of Thoreau and a bowl of orange-lime sherbet. It all spawned from the actuality of me, my sister’s love of pissing off my parents, and the avoidance of an honest answer.”

“Sherbet,” a creative nonfiction essay, explores the relationship between my mother and me, my sexuality, the way that I define myself (“actual Lindsey”), and the way I present myself by omission (“pretend Lindsey”) to make others comfortable.

### “Street Lunch”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

**Student: Addie Crawford** (2017)

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

CAS – Department of English

(WRIT 307 – Hoffman)

A short fiction piece about a guy who just wants his lunch.

### “Post-Burial Eulogy”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

**Student: Skyler A. Teal** (2016)

Faculty Mentor: Mary E. Martin, Ph.D.

CAS – Department of English

(ENGL 328 – Martin)

In this poem, initially written for an assignment in ENGL 328: Healing Arts in Medicine, I explore the intersection of the intense thought and emotion that I experienced when I attended my grandfather’s funeral. A theme that runs throughout the piece is uncertainty about both life and death.

### “Awkward Questions and the Dichotomy of Spoken Language and Written Word”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

*Winner, Editor-in-Chief's Award, The Anthology, 2016*

**Student: Lindsey Monroe** (2015)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

“Awkward Questions and the Dichotomy of Spoken Language and Written Word” is a poem that explores feelings through Derridian jargon. It came into being because someone extraordinary came into being, and she inspired me. My favorite dichotomy is that of emotion and logic, and hers is written language and spoken word, both of which are at play in this poem.

### “Feline Master”

*The Anthology: Winthrop University's Art and Literary Magazine, 2016*

**Student: James W. Davidson Jr.** (2017)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

When I worked shift work, my cat would come up to me in the morning after nightshift. He jumped on my chair and purred wildly. After I fed him, he disappeared. One morning, I realized that it was the only time the cat displayed affection toward me. I jotted down a quick poem about the experience. After several months and multiple revisions, the poem is forthcoming in *The Anthology*.

### “A Baker’s Dozen”

*The Anthology: Winthrop University’s Art and Literary Magazine, 2016*

**Student: Skyler A. Teal** (2016)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

I composed this short prose piece as a comment on a friend’s Facebook post that mentioned the rare occurrence of a full moon rising on Friday the 13th. In my somewhat playful response, I consider the implications of my southern heritage and the concept of owning or claiming land.

### “Losing Her god and Singing in May”: A Creative Piece

*The Anthology: Winthrop University’s Art and Literary Magazine, 2016*

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Felicia L. Chisholm** (2017)

Faculty Mentor: Evelyn Weeks, M.A.

CAS – Department of English

This poem is a detailed look into the life of a female who has been worshipping her ability to live a double life. Its intensity and penetratingly explicit illustration heighten as she unexpectedly comes face to face with the internal force that has been dictating her decisions all along. She longs to be purified of the evil within, but to no avail. Ultimately, she must maintain her dainty facade while loathing the very breath she breathes.

### “Temporary”

*The Anthology: Winthrop University’s Art and Literary Magazine, 2016*

*11th Annual Department of English Graduate/Undergraduate Research Conference, Winthrop University, March 2016*

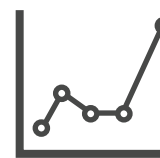
**Student: Laurie Hilburn** (2016)

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

CAS – Department of English

(WRIT 507 – Hoffman)

I’ve been in a wheelchair for the past six months. But I am not wheelchair-bound. I am wheelchair-often as opposed to wheelchair-assured; I am wheelchair-sporadically, when the pain floods, when I step onto the floor and feel nothing but air rush around me as my knees buckle and I collapse onto the ground. The spinal cord injury came with a car accident, a moment in time that came as fast as it went, but the paraplegia is what continues to swerve, to crash, to burn against my life. The doctors say it is a *temporary* paralysis; my spinal nerves were not severed, but they were damaged and inflamed, and the surgeries showed how the nerves shut down in order to heal, to give my legs some time to recover from the excruciating pain that likes to scream from below my waist. My mobility assistance mechanism, so official in its declaration of disability, waits at my bedside. *Victoria, you can’t walk today*, it says to me. *Just sit down*. I don’t want to, but I do. In another six months, I won’t need wheels anymore. Then, I’ll have leg braces and a walking frame—then, I’ll just be *mildly* disabled. Then, the doctors say, I’ll have my legs back altogether; there will be muscle atrophy, but with continued physical therapy and patience, I’ll be back to keeping up with my girlfriend as I was before. *Before*. “Temporary” is a creative short story about disability, sex, and love.



# HONORS THESES

The Honors Program at Winthrop University is designed to enrich the college experience for highly talented and motivated students. Through interactions with outstanding faculty and peers, a vital community of scholars is created that embraces the pursuit of knowledge for the enhancement of intellectual and personal growth. Founded in 1960, Winthrop's Honors Program is one of the oldest in the nation. Then President Charles S. Davis, realizing the importance of an enriched education for high-achieving students, appointed faculty member John S. Eells as the founding director of our Honors Program. Eells became a member of a national organization that was formed as a clearinghouse for information on honors activities, the Inter-University Committee on the Superior Student (ICSS). The ICSS received funding from the Carnegie Foundation, the National Science Foundation and the U.S. Office of Education to help establish honors programs at colleges and universities 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 350 students from each of the degree-granting colleges of the university. To graduate with an Honors Program Degree, a student must complete 23 hours of honors courses, which includes an honors thesis, while maintaining at least a 3.30 grade point average. The honors thesis is the culminating experience for an Honors Program student, in which he or she works collaboratively with a faculty director and two faculty readers to produce a project that evaluates knowledge, concepts and methodology, examines major issues, integrates complex information, and develops and appropriately defends an argument. While most students complete the honors thesis during the course of the senior year, some students complete the project earlier in their academic careers. The Honors Program students and I would like to thank the faculty members who have worked as honors thesis directors or readers throughout this process. Their expertise, guidance and commitment should be highly commended.

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

Director of the Honors Program

## 2015–2016 Honors Advisory Committee

Kathy Lyon, Ph.D., Chair, Psychology

Judy Britt, Ph.D., Curriculum and Pedagogy

Adriana Cordis, Ph.D., Accounting, Finance, and Economics

Michelle Dubert-Bellrichard, M.S.L.S., Library

Adam Glover, Ph.D., World Languages and Cultures

Jason Hurlbert, Ph.D., Chemistry, Physics, and Geology

Jeffrey McEvoy, D.M.A., Music

Clara Paulino, Ph.D., Interdisciplinary Studies

Leslie Bickford, Ph.D., ex officio, Director, ONCA

Gloria Jones, Ph.D., ex officio, Dean, University College

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

## Technology Use and Pretests in College Math Courses

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Lynnique Johnson** (2016)

Honors Thesis Committee: Mary Pat Sjoström, Ph.D.; Kristen Abernathy, Ph.D.; Kimberly Hope, M.M.

CAS – Department of Mathematics

In mathematics education, identifying the optimal method for assessing student knowledge is an ongoing challenge for instructors and can be the determining factor for student understanding. College mathematics professors often do not administer pretests at the beginning of their courses to assess the prior knowledge of students. Though it is not required for professors to know the level of knowledge their students have, it could be helpful for students to know their own performance before learning new material or taking a graded exam. Students would know what skills they are not proficient in and revise their studying to address those gaps in understanding. For future math educators, knowing how to assess students in math is important, since every student learns differently and educators want to ensure students understand content material with minimal rote memorization and formula use. In this thesis, I will evaluate the results of a pretest from an introductory College Algebra course and the results from a survey about the students' self-analysis of their performance.

## Individualized Instruction for First Graders in Poverty

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Julia Lusk** (2017)

Honors Thesis Committee: Bettie Parsons Barger, Ph.D.; Scott Rademaker, Ph.D.; Carol Marchel, Ph.D.

COE – Department of Curriculum and Pedagogy

Within the field of education, Hagans and Good state that children in poverty have fewer opportunities to engage in literacy-enriching activities. They go on to say that children in poverty are at a disadvantage for language development and reading, as compared to their peers from families of mid- to high socioeconomic status (SES). Unfortunately, students who struggle with reading in early grades are at significantly greater risk to struggle academically, creating a large gap in skills. Research shows that children learn more efficiently across subjects when their learning is individualized. Children in poverty need individualized instruction from a highly qualified teacher, or an assistant or volunteer who is under close supervision from the host teacher. This study explores the impact of balanced, individualized literacy instruction, with meaningful reading experiences, guided by relevant assessment data. Three students in poverty met weekly for 30 minutes with a researcher for individualized literacy instruction. The findings are highlighted in this action-research study.

## The Effect of Thinned Trabeculae on Bone Mechanical Properties, a 3D Printed Model Study

*Southern Regional Honors Council Conference, Orlando, Florida, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016; Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2015*

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

**Student: Margaret Arielle Black** (2017)

Honors Thesis Committee: Meir Barak, Ph.D., D.V.M.; Laura Glasscock, Ph.D.; Matthew Stern, Ph.D.

CAS – Department of Biology

Trabecular bone structure is complex and unique; no two tissues are the same. This introduces a significant problem when trying to measure trabecular tissue strength (the maximum load before structure failure). Since mechanically testing a sample to find its strength involves loading until failure, each sample can be tested only once and thus the precision of trabecular bone tissue strength measurements tends to be low. As trabecular bone tissue strength is an important indicator for poor bone quality (e.g., osteoporosis), an accurate and precise measurement of its strength has clinical importance. Here, we are using a novel technique, namely 3D printing, to reproduce a large number of identical trabecular bone structure replicas. In this study, we tested in compression ( $n = 30$ ) a cubical 3D-printed sample reconstructed from the metacarpal head of a chimp. The same sample was tested again after we had manipulated the model and thinned the trabeculae to simulate the onset of osteoporosis (decrease of 9.1 % in bone volume). Our results demonstrate that the original "healthy" trabecular structure is significantly stronger than the "osteoporotic" one (4.13 MPa and 2.20 MPa, respectively). This study demonstrates that 3D printing is a novel and valuable tool for testing the mechanical properties of trabecular structures and the prediction of their failure. Furthermore, the trabecular models were exported into a finite element modeling software (Strand 7) to visualize the strain and stress distributions. The mapping of such data will provide insight into which areas will break first, leading to tissue failure.



### **The Twilight's Moon: A Staged Reading in Three Acts**

*Staged reading, Blackbox theatre, Winthrop University, 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jesse Pritchard** (2016)

Honors Thesis Committee: Annie-Laurie Wheat, M.F.A.; Dustin M. Hoffman, Ph.D.; Kelly Richardson, Ph.D.

CVPA – Department of Theatre and Dance

In *The Twilight's Moon*, everyone has secrets. Between the two married couples and their interconnected relationships to one another, the audience will delve within the imaginative, realistic world of adultery, feeling the backlash it can create on a marriage. The implication of homosexuality brought to light reflects upon the variety of reactions one may take in regards to the concept. This play has endured five vigorous revisions, informal presentations, and a formal presentation of two performances to an impartial audience and the actors involved. From a two-act to a three-act play, characters changing along with their motives, this play has grown into the form that it is currently, one that explores the nature of relationship within a marriage and the risks one takes to keep it...and betray it.

### **Shakespeare's Wily Women: Female Subversion Through Liminal Spaces in *Measure for Measure* and *King Henry IV, Part Two***

*Southern Regional Honors Council Conference, Orlando, Florida, April 2016*

**Student: Sara Elizabeth Parnell Wilcox** (2016)

Honors Thesis Committee: Matthew Fike, Ph.D.; Leslie Bickford, Ph.D.; Gloria Jones, Ph.D.

CAS – Department of English

As Mikhail Bakhtin writes in *Rabelais and His World*, "Shakespeare's drama has many outward carnivalesque aspects: images of the material body's lower stratum, of ambivalent obscenities, and of popular banquet scene." Here, Bakhtin gives a clear picture of how the carnivalesque acts in William Shakespeare's works. Russ McDonald discusses Shakespeare's ability to create a safety valve that relieves the tension between a governing body and the public, stating, "by permitting a small degree of opposition to be expressed or enacted in the controlled space of the public playhouses, the government employed the theater as a kind of safety valve, an outlet for releasing political pressure before it increased to an explosion." Both Bakhtin's carnivalesque and McDonald's safety valve provide release of tension sanctioned by a greater authority so as to ensure order in society as a whole. However, what happens when these subversions of power directly challenge the assumed hierarchy of power over and over? In order to work toward change in the socio-sexual hierarchy that governs Early Modern society, female characters such as Isabella and Mariana in *Measure for Measure* and Doll Tearsheet in *King Henry IV, Part Two* commit such microsubversions against oppressive, male controlled systems. Using feminist and New Historical approaches to prostitution in Early Modern England, this analysis examines the gendered hierarchies in William Shakespeare's *Measure for Measure* and *King Henry IV, Part Two* and how these women achieve differing degrees of empowerment through their subversion of male political and patriarchal power.

### **Study Abroad: Enabling Employment at Home from Experiences Afar**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Christian Eisenstein** (2016)

Honors Thesis Committee: Barbara Burgess-Wilkerson, Ph.D.; Keith Robbins, Ph.D.; Emma Riddle, Ph.D.

CBA – Department of Management and Marketing

More students are electing to study abroad than has been the case in years past, and with this changing trend, certain shortcomings in the programs are being brought to light. The intentions of the international scholars and those of their program directors are beginning to vary more starkly; the former hope to explore international boundaries as a path toward maturity and independence, while the latter view the experience in terms of language competency and as a path toward a specific career goal. An opinion survey will be distributed to test this claim and to obtain a consensus on what the current expectations are and the extent to which they are being met. From the responses, conclusions may be drawn with respect to the study's primary research questions: 1) Do study abroad programs adequately emphasize professional tools and opportunities? 2) If students do not feel their experiences were organized optimally, what should be changed? 3) Lastly, if these programs do fulfill their designated roles effectively, what professional alternatives should be considered? The survey will be distributed to a population of approximately 50 individuals from college-level institutions who have studied abroad at least once. Preliminary results suggest that, while chances to develop one's self professionally are often made available, they fail to meet expectations and are inadequate for establishing a career path toward a specific goal; though, in comparison, they do provide rich cultural encounters that lead to maturity and independence.

### **A Mathematical Model of Cardiovascular and Respiratory Dynamics in Patients with Transposition of the Great Arteries**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Corey Riley** (2016)

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

CAS – Department of Mathematics

Transposition of the Great Arteries (TGA) is a congenital heart defect in which the pulmonary artery and the aorta are transposed, causing oxygen-poor blood to bypass the lungs and be recirculated throughout the body. In many cases, an atrial and/or ventricular septal defect also forms to allow the oxygen-rich and oxygen-poor blood to mix in the heart, temporarily sustaining the patient's life. In this paper, we create a model of cardiovascular and respiratory dynamics for a patient with TGA by extending a current model of normal heart function. The goal of this research is to predict blood-oxygen levels in critical organs such as the brain for patients with TGA and one or more septal defects. While we know a patient cannot survive long-term with TGA, an accurate prediction of blood-oxygen levels under a variety of defects and mixing circumstances can potentially help to establish optimal times for performing corrective surgery.

### **Understanding the Role that EF24, a Curcumin Analog, Plays in Promoting Anti-cancerous Activity in Colon Cancer Cells that Highly Express the High Mobility Group A1 (HMGA1) Transcription Factor**

*South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016*

**Student: Ashley Williams** (2016)

Honors Thesis Committee: Takita Sumter, Ph.D.; Nicholas Grossoehme, Ph.D.; Robin K. Lammi, Ph.D.

CAS – Department of Chemistry, Physics and Geology

(CHEM 551, 552H – Hanna)

Cancer is a highly aggressive disease, accounting for nearly one of every four deaths in the United States. Studies show that an unhealthy diet can contribute to the development of cancer, leading to the investigation of dietary substances, such as curcumin, to aid in cancer prevention or treatment. Curcumin is a polyphenolic compound found in a dietary spice, and has been identified as a potent anti-inflammatory agent and antioxidant. Preclinical studies involving curcumin have shown its ability to inhibit carcinogenesis in various types of cancer, including colorectal cancer; however, its clinical applications have been hindered due to toxicity and a low bioavailability following administration. EF24, a curcumin analog, has shown potential as an anti-cancer agent; however, its mechanism of action is largely unknown. EF24 acts, in part, by inhibiting NF- $\kappa$ B, a transcription factor whose activity is regulated by the high mobility group A1 (HMGA1) proteins. The high mobility group A (HMGA) family, comprised of HMGA1 and HMGA2 subtypes of proteins, has been studied over the past few decades due to their role in the development and metastasis of cancer. A recent study has shown that HMGA2 activity is suppressed by EF24, yet HMGA1 has not been investigated for its potential inhibition by this curcumin analog. This research project will explore the role of HMGA1 in the context of EF24 activity. The results of this study will expand upon the community's understanding of the EF24 mechanism of action, while concurrently investigating potential mechanisms of drug resistance.

### **Cheating Influences on Young Adults' Perceptions of Cross-sex Friendships**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Caroline Roark** (2016)

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

CAS – Department of Psychology

Cross-sex friendships are defined as platonic relationships between people of the opposite sex. We examined cross-sex friendships and romantic relationships in conjunction. We also examined how past experiences with cheating impacted young adults' attitudes toward their own and their romantic partners' cross-sex friendships. We hypothesized that those who had been cheated on in their romantic relationships would be less receptive toward cross-sex friendships than adults who had not experienced cheating. 159 young adults responded online to established scales that measured relationship commitment and relationship satisfaction. Participants were asked to

respond to the scales while picturing their closest cross-sex friends and to respond again with their romantic partners' cross-sex friends in mind. Last, participants responded to questions that assessed their past experiences with cheating in the context of romantic relationships. The results supported our hypothesis: compared to adults who had never been cheated on, participants who had been cheated on in a romantic relationship were less comfortable with their partners having cross-sex friends. All young adults, whether they had cheated on a partner or had a partner cheat on them, reported being very accepting of having cross-sex friendships of their own. Experiencing cheating in a romantic relationship alters the victims' own behavior with their cross-sex friends and their perceptions of their romantic partners' cross-sex friendships. These findings contribute to our growing understanding of the complicated connections between romantic relationships and cross-sex friendships.

### **Race Relations and Media Influence: A Qualitative Examination of Media Influencing a Rift in Cultural Relations**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016*

**Student: Cathleen Rice** (2016)

Honors Thesis Committee: Guy Reel, Ph.D.; Mark Nortz, M.Ed.; William Click, Ph.D.

CAS – Department of Mass Communication

The freedoms of life, liberty and the pursuit of happiness written in the American Constitution have given many ethnic groups the opportunity to migrate to America. The "melting pot," the name by which America has been known to its immigrants, has always had problems mixing the races. However, I argue, within the last seventy-five years, a breach in relations among the races has been negatively influenced by the media. This thesis analyzes the motives behind media outlets, the way people interpret the information reported, and how news has negatively affected certain ethnic groups. As gatekeepers of information and the watchdogs of government, journalists use processes such as agenda setting, by determining which news is gathered and which audiences the news is directed toward and against. Best said by pioneer journalist Walter Lippmann, "Journalism, by being selective about the kind of information it presents, is also responsible for this limited view of the world." Through an informational method of research collected from Winthrop University student surveys, an in-depth analysis of local broadcast news, cable news, online newspaper and responses of prejudices publicly exposed on social media, my hypothesis is supported. Specifically channeling the way crimes are reported, this thesis shows the rifts in cultural relations, by giving examples and explaining the role media outlets play in their portrayal of impartial news by using common stereotypes and prejudices as a method of unethical reporting.

## Effects of Consumer Socialization through Instagram on Purchasing Intentions and Brand Perceptions: A Systematic Literature Review

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Kaitlyn O'Brien** (2016)

Honors Thesis Committee: Sabrina Habib Williams, Ph.D.; Hemant Patwardhan, Ph.D.; Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

Through the observation of and interaction with peers, media, and company marketing efforts, individuals gain knowledge and develop attitudes, skills, and beliefs. This process, known as consumer socialization, influences how individuals behave as consumers. Peers have been shown to be more influential in the consumer socialization process than other sources of influence, due to the perceived trust that exists between consumers even when there is no existing relationship. This process of peer learning often takes place through observation of shopping and purchasing behaviors and through word-of-mouth. With the digital shift, word-of-mouth consumer socialization has shifted to online formats, particularly in the way of social media. This is often referred to as electronic word-of-mouth or eWOM. Through the analysis of previous studies, this thesis aims to understand the impact of consumer socialization via eWOM within social media platforms on consumers' purchasing intentions and brand perceptions. Specifically, this study looks at how Instagram, which has grown to over 400 million users since its launch in October 2005, plays a role in consumer socialization. In addition, current gaps in knowledge are identified and future research recommendations are made.

## Achilles Tendon Stiffness and Strength In Mice: Is It Sex Dependent?

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

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

Honors Thesis Committee: Meir Barak, Ph.D., D.V.M.; Laura Glasscock, Ph.D.; Julian Smith III, Ph.D.

CAS – Department of Biology

The Achilles tendon is the strongest and thickest tendon in the entire body; it attaches the soleus and gastrocnemius muscles to the calcaneus. Since the Achilles tendon has a limited blood supply and is subjected to high stresses, it is extremely vulnerable to injury. It is a well-known fact that male athletes are more prone to injuring their Achilles tendons than are female athletes. The goal of this study is to find the stiffness and strength of mice Achilles tendons (serving as an animal model) and to determine whether these properties are significantly different between males and females. It is hypothesized that the females' Achilles tendons will have greater ability for extension, resulting in lower stiffness and higher strength compared to males' tendons. To this end, Achilles tendons of 39 mice (14 males and 25 females) were tested in tension until failure and their stiffness and strength were measured from the resulting load deformation curves. Evaluating differences in mechanical properties of the Achilles tendon between the two sexes may help us to better understand why males are more likely to suffer Achilles tendon injuries such as ruptures.

## An Overview and Analysis of Place Branding with Music Icons

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Katherine Rhoden** (2016)

Honors Thesis Committee: Padmini Patwardhan, Ph.D.; Marilyn Sarow, Ph.D.; Hemant Patwardhan, Ph.D.

CAS – Department of Mass Communication

Music plays an undoubtedly important role in the branding of products and services, but how are music icons used to brand places? Many cities around the globe market themselves as being the location of a music icon, whether it's the home, birthplace, or final resting place of the musician. This study explores the use of music icons in the branding of places as part of the overall branding strategy. After an extensive review of the concept of place branding, including its history and basic strategy options, this research will focus on the difference between strategic and organic branding used to market places. Subsequently, the study will provide three case studies on music-branded places in the southeastern United States, including Graceland (Memphis, Tennessee); Augusta, Georgia; and Pigeon Forge, Tennessee, to explore the application of these strategies. The cases will be used to analyze the organic or strategic nature of the branding; the characteristics of the places in relation to the music; the characteristics of the target in relation to the icon's music; the point at which the branding began; and the places' attention to other attractions. The research will explore these topics while providing an explanation as to why music is so vital to the branding, marketing, and overall culture of places. The study contributes by offering a closer look at an often under-researched topic in branding literature, with the cases serving as guidelines for future successful place branding campaigns.

## "End of October": A Creative Piece

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Connor Renfro** (2016)

Honors Thesis Committee: Dustin M. Hoffman, Ph.D.; Jane Smith, Ph.D.; Evelyn Weeks, M.A.

CAS – Department of English

"End of October" is a short novelette in which narration and point of view are muddled in order to create a contemporary Southern Gothic story. Jack, a mortician and the central character, a man who has had limited interaction with the real world, becomes obsessed with the suicide of a local baseball hero. Trying to unravel the mysteries around Stephen Kohler's death leads Jack to confront suppressed memories from his past, calling into question his relationship to his parents and to his sister. While the story spends most of its time tuned into Jack's sensibilities (which become increasingly unreliable), there are sequences that tap into other characters in the town, showing how a small town mourns death. At the end, Jack is forced to synthesize all the lessons he has learned as a result of his misadventures in a twisted take on the traditional epiphany: the final image is of Jack and his sister holding hands as they agree to face the uncertain future together.

### **Biophysical Characterization of Nur from *Streptomyces coelicolor***

*251st National Meeting of the American Chemical Society, San Diego, California, March 2016; SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015*

*Supported by grants from Research Corporation and the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

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

Honors Thesis Committee: Nicholas Grossoehme, Ph.D.; Takita Sumter, Ph.D.; Patrick Owens, Ph.D.

CAS – Department of Chemistry, Physics and Geology

*Streptomyces coelicolor* is a soil-dwelling bacterium that is able to produce several antibiotics. Recently, nickel accumulation within this organism has been shown to prevent the production of the antibiotic undecylprodigiosin. The transcriptional repressor important in regulation of nickel uptake is the homodimeric Nur, a member of the Fur family. Nur contains two metal-binding sites per monomer. Our research seeks to determine the role of each of these metal-binding sites. The affinities of Nur for metal and for DNA have been determined through techniques such as metal titrations, spectroscopic assays, mutational studies, and fluorescence anisotropy. Such studies have unveiled that one metal-binding site acts as the main regulatory site of the protein, while the other may confer promoter specificity. Biophysical characterization of Nur has contributed a better understanding of nickel regulation and conditions influencing antibiotic production within *S. coelicolor*.

### **Realism Gone Awry: Analyzing the Corruption of Democracy in Russia**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Cody Knight (2016)**

Honors Thesis Committee: Michael Lipscomb, Ph.D.; Stephen Smith, Ph.D.; Christopher Van Aller, Ph.D.

CAS – Department of Political Science

(PLSC 490H – Lipscomb and Smith)

A brief survey of realist political thought within the context of international relations finds that realism posits that the ultimate mandate of a state's foreign policy objectives is the protection of its own sovereignty and national interests. However, research reveals that there exists a fault in this logic, due to the failure of realist theorists to define the phrase "national interest" in concrete terms. The lack of explicit parameters to this phrase provides a nearly limitless roster of potential "interests" for a state to pursue, without any guidelines as to what concerns best serve a state's welfare. This paper finds that this open-ended aspect of realist theory provides for the ultimate failure of democracy within the Russian Federation, due to a lack of international support for domestic liberalization efforts through Mikhail Gorbachev's plans for *perestroika*. In exploring this theory, I first provide empirical evidence attesting to the lack of democratic efficacy in the Russian state; then, I present the conflicts present between various interpretations of realist thought, and finally, I examine the historical context via a case study of three interactions between

Mikhail Gorbachev and the G7, in which the United States and other members failed to provide for financial assistance. In determining that the failure of domestic reform by the U.S.S.R. proved favorable to assisting in efforts of market liberalization, I find that the strategic interest of rejecting assistance to a state with conflicting interests historically diminished long-term global interests by providing framework that yielded to autocratic Russia.

### **The Principle of Symmetry**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jesse Perl (2016)**

Honors Thesis Committee: Michael Lipscomb, Ph.D.; Stephen Smith, Ph.D.; David Meeler, Ph.D.

CAS – Department of Political Science

(PLSC 490H – Lipscomb and Smith)

With the advent of new technologies such as remote weaponry, there is an increased asymmetry between nations that have advanced weapons capabilities and those that do not. This has led to an increase in asymmetrical challenges, which current Just War Theory has yet to address. The asymmetry caused by new technologies, particularly remote weaponry, has given need to a new principle, the principle of symmetry, to balance these new challenges. The principle seeks to ensure that nations which are under attack have justifiable means for defense, and requires that nations attack to ensure this through the utilization of weapons, which will lead to just defense. This principle builds upon other principles, seeking to act as a supplement to missing literature for Just War Theory. Once established, this theory then grounds the principle of symmetry in Christian thought, to further develop Christian Just War Thought. The principle of symmetry is grounded in natural law and characteristics of God. This creates a framework for future technologies that create an imbalance in warfare to be addressed through current Just War Theory.





## Parent-Child Relationships and Perceptions of God

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Sara Tennant** (2016)

Honors Thesis Committee: Merry Sleight, Ph.D.; Cheryl Fortner-Wood, Ph.D.; Dale Hathaway, M.Div., M.A.

CAS – Department of Psychology

Sigmund Freud believed that people's perceptions of God were projections of their father figures, and recent theorists have argued that perceptions of God may instead be based on mother figures. In this study, I investigated whether adults' feelings about their parents predicted their feelings about God. Participants were adults recruited through classrooms and social media. They responded to an online scale that assessed their cognitive and emotional perceptions of God. I also used several items from this scale to measure perceptions of the primary mother figure and the primary father figure for each participant. I created new questions for the survey to obtain demographic data, to determine whether each participant believes in God, to find out how much participants' religious beliefs affect their lives, and to understand whom participants consider to be their primary mother and father figures. Responses related to mother and father items were individually correlated with responses to God items, in order to assess whether feelings about one or both parents were predictive of feelings about God. I hypothesized that participants' thoughts and feelings about God would reflect perceptions of their parental figures; for example, I predicted that participants who "truly feel deeply and intensely valued by God" would also feel deeply and intensely valued by one or both of their mother and father figures.

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

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the South Carolina INBRE Developmental Research Project (DRP) Program and the Winthrop University Research Council*

**Student: Kathryn Steverson** (2016)

Honors Thesis Committee: Matthew Stern, Ph.D.; Laura Glasscock, Ph.D.; Kathryn Kohl, 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 nontraditional, 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 and absence of mLIF and murine embryonic fibroblast feeder cells.

## Salinity and Temperature Tolerance of Environmental Isolates of *Escherichia coli*

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Shiannea Gathers** (2016)

Honors Thesis Committee: Matthew Heard, Ph.D.; Victoria Frost, Ph.D.; Kristi Westover, Ph.D.

CAS – Department of Biology

Recent studies have shown that *Escherichia coli* (*E. coli*) is able to survive in sandy oceanic beach environments. We were interested in understanding how *E. coli* survives in these dynamic ecosystems. Oceanic beaches have several important environmental stressors, including light, temperature, salinity and nutrient availability, which can influence the survival of *E. coli*. In this study, we examined how two of these stressors, temperature and salinity, affect the growth and survival of *E. coli*. To do this, we utilized a factorial laboratory experiment. In our factorial approach, we exposed six different environmental isolates of *E. coli* (collected from Folly Beach, South Carolina) to varying levels of temperature and salinity. To assess how salinity affects *E. coli* growth, we exposed our six isolates to salt concentrations varying from 0-8 ‰ and determined the number of colony-forming units (CFUs) after an incubation period of 24 hours at 37 °C. To assess how temperature affects *E. coli* growth, we exposed our six isolates to temperatures ranging from 4-50 °C and determined the number of CFUs after 24 hours. Our findings show that growth and survival of *E. coli* were inhibited in salt concentrations greater than 5 ‰ and in temperatures that were less than 20 °C or greater than 47 °C. We also determined that there were interactive effects between salinity and temperature, but that salinity has a stronger influence on *E. coli* growth and survival. Collectively, our findings suggest that temperature and salinity are significant factors that can influence the growth and survival of *E. coli* in oceanic beach ecosystems.

### Development of an Aqueous Synthesis for Zinc Oxide Nanoparticles with Biologically Benign Capping Agents

*South Carolina EPSCoR Conference, Columbia, South Carolina, January 2016; 251st National Meeting of the American Chemical Society, San Diego, California, March 2016*

**Student: Jessica Zinna** (2016)

Honors Thesis Committee: Maria Gelabert, Ph.D.; Robin K. Lammi, Ph.D.; Jason Hurlbert, Ph.D.

CAS – Department of Chemistry, Physics and Geology

(CHEM 551, 552H – Hanna)

Zinc oxide has been used extensively for ultraviolet absorption in sunscreens, window coatings, and pigments. Zinc oxide nanoparticles have a wide variety of optoelectronic and catalytic applications, due to intrinsic semiconductor properties and photonic capabilities. Additionally, zinc oxide nanoparticles have been shown to have antimicrobial properties when tested against several bacterial strains, where the efficacy increases with decreasing particle size. However, with more widespread use, concern about the health hazards associated with nanomaterials has also increased. Traditional syntheses for zinc oxide nanoparticles involve the use of reagents and solvents that are not ideal for human consumption. Zinc oxide nanoparticles synthesized under these methods may contain residual toxic contaminants that can be adsorbed onto the samples. The present study aims to develop a fully aqueous synthesis of zinc oxide nanoparticles by using commercially available reagents and polysaccharide capping agents for control of particle size. The development of a mild and commercially feasible synthesis of this material opens up the possibility of applications for water purification methods that are safe for human consumption.

### Origins of U.S. H3N2 Canine Influenza A: Phylogenetic Analysis of the NS1 Gene

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Michael Chen** (2016)

Honors Thesis Committee: Kristi Westover, Ph.D.; Matthew Stern, Ph.D.; Julian Smith III, Ph.D.

CAS – Department of Biology

Influenza A viruses (IAV) are known to carry gene segments from humans and animals, including equine, avian, and swine signals. Previous studies have documented the mutations responsible for equine IAV into dogs and known gene reassortments responsible for swine IAV into the 2009 H1N1 human pandemic. Recent H3N8 U.S. canine influenza A (CIV) sequence signatures are of H3N8 equine origin and H3N2 avian origin. The hypothesis that recent U.S. canine NS1 sequences have an origin in Southeast Asia and are of an avian origin is tested. Complete Influenza A NS1 and NS2 nucleotide sequences, for which there are complete genomes available, were collected using the Influenza Research Database and GenBank at the National Center for Biotechnology Information. Sequences were aligned using CLUSTALW implemented in MEGA 6.0, and phylogenies were constructed using the neighbor-joining algorithm. Through analysis of the phylogenetic trees, similarities and differences among the influenza hosts and origins can

be identified. For U.S. canine influenzas, the phylogenies indicate a Korean origin with roots in avian lineages. Understanding the gene reassortments along with host-specific mutation rates and phylogenetic origins can help in determining how the virus jumps from one host to another and how it has evolved from previous pandemics/epidemics. This information may help predict future host shifts and be used for preventative measures, such as the development of vaccines and other treatments to stop possible future pandemics.

### Mutation Rates of Influenza A NS1 Antigenic Regions among Canine, Swine, and Avian Hosts

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Steven Patrick** (2016)

Honors Thesis Committee: Kristi Westover, Ph.D.; Julian Smith III, Ph.D.; Matthew Stern, Ph.D.

CAS – Department of Biology

Influenza A is a virus composed of eight single-stranded, negative sense RNA molecules of approximately 14,000 nucleotides in total length; this virus is a member of the family *Orthomyxoviridae*. There are 18 recognized subtypes for the hemagglutinin (HA) protein and 11 recognized subtypes for the neuraminidase (NA) protein. There are currently two subtypes that commonly infect and circulate among humans: H1N1 and H3N2. There are known antigenic regions in many of the eight segments including the NS1 gene. Largely, these represent cytotoxic T-cell lymphocyte (CTL) epitopes, which recognize virus proteins and eliminate them. I will test the hypothesis that there are differences in mutation rates associated with these regions, which may indicate evidence of viral escape. In addition, these sites will be examined from different hosts, including canine, swine, and avian sequences, to test host-specific differences. I will collect complete Influenza A NS1 nucleotide sequences, for which there are complete genomes available, using the Influenza Research Database and GenBank at the National Center for Biotechnology Information. Sequences will be aligned using CLUSTALW implemented in MEGA 6.0. Nonsynonymous mutation rates ( $p_n$ ) will be compared to synonymous mutation rates ( $p_s$ ) in antigenic versus non-antigenic regions from different hosts. If  $p_n$  rates are greater than  $p_s$  rates, this may indicate response to selection pressure for viral escape. Identification of mutation rates in specific CTL epitopes may be useful in vaccine development for different hosts.

## **Kangaroo Mother Care, Skin-to-Skin Contact, and Breastfeeding in Neonatal Intensive Care Units**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016*

**Student: Cecilia Anne Ralyea** (2016)

Honors Thesis Committee: Julian Smith III, Ph.D.; Laura Glasscock, Ph.D.;  
Karen Kedrowksi, Ph.D.

CAS – Department of Biology

(BIOL 450H – Smith III)

Through the use of secondary research, this paper explores the integration of Kangaroo Mother Care (KMC or KC), general Skin-to-Skin Contact (SSC), and breastfeeding in Neonatal Intensive Care Units (NICUs). KMC is the care of newborn infants, involving skin-to-skin contact between mother and child, often supplemented with exclusive breast feeding. This interaction between mother and child has many benefits for both: infants can have increased neurodevelopment, better homeostasis, regulated sleep cycles, and higher oxygen saturation levels, while mothers feel relief and confidence. Parents also develop a deeper relationship with their child's caretakers. Despite these benefits of KMC, SSC, and breastfeeding, there are several obstacles preventing their full integration in NICUs, where premature and ill babies receive care. Both parents and staff lack knowledge of SSC and KMC in particular. Staff's lack of knowledge is sometimes accompanied by a negative attitude towards these practices because they can be a hassle and transfer can be risky. Furthermore, the hospital environment often does not encourage parent comfort and privacy, so parents can be uncomfortable participants. To overcome these hindrances and encourage KMC, SSC, and breastfeeding when safe, staff and parents need to be educated, and the hospital needs to produce a more conducive environment.

## **Expression of Heart-Specific Constructs in *Ciona intestinalis* Embryos**

*South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE) and by NIH Grant Number 1R15H*

**Student: Katlyn Brumley** (2016)

Honors Thesis Committee: Heather Evans-Anderson, Ph.D.; Matthew Stern, Ph.D.;  
Silvia Wozniak, 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 evolutionarily 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 the heart of *C. intestinalis*. 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 *C. intestinalis* embryos is altered if the PI3K/AKT signaling pathway is disrupted. *C. intestinalis* 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 *C. 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 has been successful and we have generated transgenic juveniles. Currently, we are optimizing the inhibitory drug treatments and will monitor heart growth by fluorescence microscopy.

## **A Wall Away from Paradise: Creating a Chapbook**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Rachel Burns** (2016)

Honors Thesis Committee: Dustin M. Hoffman, Ph.D.; Evelyne Weeks, M.A.;  
Amanda Winar, M.A.

CAS – Department of English

My project will focus on two components: an exploration of a resurgent mode of publication, the chapbook, and the ways in which this medium can contribute to my professional development as a writer. The goal of this work is to prepare myself for the wider publishing world by gaining a deeper understanding of a specific form. For the research portion of my project, I will explore the purpose, history, and modern usage of the chapbook form, by reading both old and new examples of this genre. I propose that, because of contemporary readers' short attention span and lack of time to devote to reading, chapbooks fulfill the role novels and larger collections once played. From the conclusions drawn during my research, I will be able to use this knowledge for my own creative work. For the development section of this project, I will create, edit, and compile prose and poetry pieces into a chapbook of my own, in order to practice working with this new form and to show my understanding of its contemporary context. In order to integrate the two parts of my project, I will write an introduction explaining the significance of the medium. At the conclusion of this project, I will have a collection of my writing, which I can both formally present and submit for publication.

## **Parental Behavior and Child Temperament Predict Persistence toward Goals**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Emily Rounds** (2016)

Honors Thesis Committee: Donna Nelson, Ph.D.; Merry Sleight, Ph.D.; Kathy Lyon, Ph.D.

CAS – Department of Psychology

Previous studies have discussed the importance of parent-child relationships and the potential impact that they could have on child outcomes. The purpose of this study was to expand the research investigating links between parental behavior and child well-being to explore the influence of parenting on a child's persistence toward goals and his or her level of "grit," defined as working strenuously toward challenges, and maintaining effort and interest long-term, despite adversity. We also sought to investigate the possibility that the child's temperament may moderate the impact of parenting on child persistence and "grit." We expected that children with highly emotional character would be at greatest risk for suffering unfavorable consequences if they experienced low levels of positive parental behavior. Nineteen male and 40 female undergraduate students participated in our study. Our findings suggest that the temperament of a child can moderate the impact of parental behaviors on child outcomes related to tenacity and dedication to long term goals. Participants low in emotionality reported comparable levels of persistence and "grit," regardless of the type of parenting they experienced while growing up. In contrast, more emotional participants exhibited lower levels of perseverance as emerging adults if they experienced less support, encouragement and involvement from parents. These findings suggest that positive parenting educational programs would prove especially helpful for families that include highly emotional children.

## **Attachment Style and Accessible Memories Influence Optimism about Romantic Relationships**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

**Student: Marissa Grant** (2016)

Honors Thesis Committee: Donna Nelson, Ph.D.; Merry Sleight, Ph.D.; Darren Ritzer, Ph.D.

CAS – Department of Psychology

Relationship researchers have often relied on attachment theory as a framework for understanding. Individuals differ in their characteristic attachment behaviors. For example, one dysfunctional style known as attachment avoidance involves an aversion to interpersonal intimacy and reliance on others. Avoidant tendencies have been linked to negative perceptions of interpersonal interactions and difficulties in intimate relationships. Our aim was to explore mechanisms whereby those with avoidant tendencies may become more optimistic about relationships. We hypothesized that those high (versus low) in attachment avoidance would exhibit more pessimistic expectations and attributions about interpersonal conflicts, but that a positive recollection intervention

would counteract those effects. Twenty-two male and 59 female undergraduates responded to the "Experiences in Close Relationship Scale-Short Form (ECR-S)" to measure attachment. Participants then recalled either a neutral event or a previous time in which they experienced great happiness in a romantic relationship. Next, they read scenarios that described romantic relationship difficulties and then responded to questions to assess their level of optimism about the relationships. Our results showed that, in the neutral recall condition, those high (versus low) in attachment avoidance reported less optimism and made more pessimistic attributions about negative relationship behaviors. Those effects disappeared in the positive recall condition. Our findings suggest that moment-to-moment optimism can be influenced by efforts to control accessible memories. Furthermore, state-like optimism can result in more favorable interpretations and expectations about relationships, regardless of attachment style.

## **The Adventuring Party in *Dungeons & Dragons*: An Exploratory Study**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Krysten Hudson** (2016)

Honors Thesis Committee: Darren Ritzer, Ph.D.; Merry Sleight, Ph.D.; Christina Stiles, M.L.A.

CAS – Department of Psychology

Many studies have been conducted investigating online role-playing games (RPGs) and the people who play them; however, little research has been done examining their predecessor: tabletop RPGs (TRPGs). TRPGs, such as *Dungeons & Dragons*, *Pathfinder*, *Savage Worlds*, and others have regained popularity in the past several years; however, what little research has been done on them focuses on individual personality type. The role of the group, or adventuring party, in TRPGs, though it plays a crucial role in the platform, has yet to be explored. This exploratory study examined the creation of an adventuring party, the relationship between players and the characters they play, and how players work together to interact with a fictional world during gameplay. Participants in this study formed a focus group and played through several scenarios using the rules from *Dungeons & Dragons*, 5th edition. The researcher acted as the game master (GM), controlling the setting and the non-player characters (NPCs). Each session concluded with a post-action review led by the researcher, in which the participants discussed the events of the session and potential questions for future research. Observing the creation of an adventuring party offered not only a closer look at TRPGs, but also a chance to look at group functions in a casual setting. Although the interactions of a single adventuring party cannot be generalized to the TRPG community as a whole, this study raised some interesting questions about the interactions of adventuring parties and the implications for other group settings.



## Personality Constructs and Leadership Styles

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Zane Repp** (2016)

Honors Thesis Committee: Darren Ritzer, Ph.D.; Merry Sleight, Ph.D.; Heather Anschuetz-Jeffers, Ph.D.

CAS – Department of Psychology

Narcissistic and Psychopathic Personality Disorders influence nearly every aspect of people's lives. They have both received extensive amounts of research with regard to their effects on leadership. Generally, both personality disorders have been found to be harmful to social environments in the workplace, with Narcissism tending to be the more destructive one. Those with these personality disorders have reported engaging in more counterproductive work behavior than those without either disorder. This research built on a past study that found those with Narcissistic and Psychopathic disorder made significantly different choices than those without the disorders. This research aimed to further delineate the aspects of Narcissism that were more closely associated with violence, aggression, and psychopathy. To do this, Narcissism was subdivided into the categories of Admiration and Rivalry, with Rivalry expected to be the trait of Narcissism most closely associated with aggression. Self-esteem was expected to play a moderating role.

## Reading on Target: A New Literacy Strategy for Improving Reading Comprehension

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Katelyn Dodd** (2017)

Honors Thesis Committee: Carol Marchel, Ph.D.; Cheryl Mader, Ed.D.; Bettie Parsons Barger, Ph.D.

COE – Department of Curriculum and Pedagogy

Reading is a key skill for students to be successful in life. According to a study done by the American Educational Research Association, a student who cannot read on grade level by third grade is four times less likely to graduate than one who scores proficient in third grade. There are five parts of reading that students must master – phonemic awareness, phonics, fluency, vocabulary, and comprehension. This research is about the effects of a new literacy strategy designed to target reading comprehension through vocabulary improvement. This strategy, known as "Reading on Target," utilizes a graphic organizer focused on increasing student vocabulary. This organizer addresses three aspects of vocabulary – definition, proper use of the word, and importance of the word. Research shows that developing new vocabulary positively impacts reading comprehension and the overall reading level of the student. Reading on Target has been tested with a group of fourth-grade students who scored below grade level on standardized tests at the end of third grade. Initial data indicate that Reading on Target positively impacted the reading comprehension and overall reading level of the participants.

## Effects of Using Music in a Special Education Classroom

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jennifer Altman** (2017)

Honors Thesis Committee: Carol Marchel, Ph.D.; Bradley Witzel, Ed.D.; Kerrin Hopper, M.A.

COE – Department of Curriculum and Pedagogy

A recent comparison of fifteen-year-olds across the globe from the Program for International Student Assessment indicated that students in the United States are falling behind in learning mathematics. Among the lowest scoring groups in the U.S. are students with identified disabilities, who score significantly below their same-age peers. It is important for the U.S. to improve mathematics instruction for all students, especially those with disabilities. As a method of intervention, music is used in the classroom as a tier two intervention. This paper uses teacher action research to explore the effects of using music as an intervention in a special education classroom. Six fourth-graders with disabilities at Hunter Street Elementary School received music intervention that included steady beat, rhythm, and pitch to support mathematics instruction once a week for twelve weeks. Formative assessments indicated that the songs used for multiplication facts improved the students' abilities of recall. Students showed improvement in their abilities to solve mathematical problems on multiplication and division after eight weeks of music intervention.

## On Bond Percolation in the Infinite Knight Graph

*11th Annual Regional Mathematics and Statistics Conference, University of North Carolina, Greensboro, November 2015; Southern Regional Honors Council Conference, Orlando, Florida, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Kristin Hinson** (2016)

Honors Thesis Committee: Thomas Polaski, Ph.D.; Kristen Abernathy, Ph.D.; Trent Kull, Ph.D.

CAS – Department of Mathematics

For a graph  $G = (V, E)$ , let  $G_p = (V, \text{Bin}(E, p))$  where  $\text{Bin}(E, p)$  keeps edges from  $E$  with probability  $p$  independently (and discards an edge with probability  $1-p$ ). For a locally finite graph  $G$  (i.e.  $|V|$  is infinite and the degree of each vertex is finite), let  $C(p)$  be the event that  $G_p$  contains an infinite path. Our objective is to identify  $p_c$ , the critical probability, which has the property that if  $p > p_c$ , then  $\Pr(C(p)) = 1$  and if  $p < p_c$ , then  $\Pr(C(p)) = 0$  (that  $p_c$  exists is a standard fact in the study of bond percolation). Now suppose we take  $G$  to be the infinite knight graph, which has vertex set in the integer grid such that  $(x_0, y_0) \sim (x_1, y_1)$  if and only if  $|x_1 - x_0| + |y_1 - y_0| = 3$  and  $x_0$  is not equal to  $x_1$  and  $y_0$  is not equal to  $y_1$ . We allow  $B$  to be the subgraph created by placing the knight at  $(0, 0)$  and only allowing the knight to move horizontally two units and one unit vertically from each position. We are interested in the case when  $H$  is taken to be the union of  $B$  and the graph created by reflecting  $B$  over the line  $y = x$ . In this case, we obtain a nontrivial upper and lower bound on  $p_c$  for  $H$ , the former via coupling with bond percolation on the integer grid and the latter by an appropriate union bound.

### **“More witnesseth than fancy’s images”: Reimagining Gender Roles and Power Structures in *A Midsummer Night’s Dream***

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Skyler A. Teal** (2016)

Honors Thesis Committee: Amanda Hiner, Ph.D.; Gloria Jones, Ph.D.; Jane Smith, Ph.D

CAS – Department of English

(ENGL 305 – Fike)

Many critics of Shakespeare’s imaginative comedy, *A Midsummer Night’s Dream*, have focused on its male-dominated political and social hierarchies (e.g., the patriarchy) and the ways in which they affect the female characters in the play. Additionally, new historical scholars have considered the reign of Queen Elizabeth I as both influential to and implicative of some of the play’s underlying messages about the patriarchy, considering the play as both a product and a reproduction of Elizabethan society at large. What is key to these interpretations, and what much of the criticism on the play appears to lack, is an explicit discussion of the role that binary oppositions have in constructing the gender-specific social norms that Shakespeare brings into question. Keeping in mind that *A Midsummer Night’s Dream* is an exploration of the extent to which life itself is a work of human imagination like a theatrical performance or a dream, I deconstruct the analogy that feminist critics of the play frequently uphold in their analyses, male::dominant::female::submissive. In turn, I argue that Shakespeare’s work reflects protofeminist ideals insofar that the playwright stresses the importance of imaginary boundaries, or binary oppositions, in the construction of gender roles, thus signifying the instability of the dichotomous relationships that establish social dominance. I further contend that Shakespeare “plays” with and questions the concept of difference, the awareness that the feminine must be defined in opposition to the masculine if either sign can be said to point to a definitive signified outside of the human imagination.

### **Reaction of Protected Cyanohydrins with Epoxides as an Alternative for the Enantio- and Diastereoselective Preparation of Aldols**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: James R. Dean** (2016)

Honors Thesis Committee: Aaron M. Hartel, Ph.D.; James M. Hanna Jr., Ph.D.; Nicholas Grossoehme, Ph.D.

CAS – Department of Chemistry, Physics and Geology

(CHEM 551, 552H – Hanna)

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, especially those of Evans and related strategies, have allowed for significant enantio- and

diastereoselectivity in the reaction. These methods, while extremely useful, have several drawbacks, including poor atom economy, use of expensive auxiliaries, and 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 approach for the stereoselective formation of aldols. The scope and limitations of the method have been investigated with respect to epoxide and cyanohydrin structure. The *tert*-butyldimethylsilyl (TBS) ethers of several aryl cyanohydrins were 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 tetrabutylammonium fluoride (TBAF) to form the desired aldol products. Yields up to 90 % for the two-step process (alkylation-desilylation) were achieved.

### **Developments in Chromium Emission Spectrophotometry with a Tungsten Coil Atomizer: Separating Chromium Oxidation States**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Katja Hall** (2016)

Honors Thesis Committee: Cliff Calloway, Ph.D.; Maria Gelabert, Ph.D.; Patrick Owens, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Tungsten coil atomic emission spectrophotometry (tungsten coil AES) is a known, reliable method for quantitative atomic determinations. Recent design upgrades to this technology have increased its potential to perform more sophisticated atomic determinations, such as simultaneous oxidation state detection. A potential application for this new feature is the simultaneous detection of trivalent and hexavalent chromium in water samples. Both chromium oxidation states are naturally present in water, but their toxicities are vastly different. This difference in toxicity makes it necessary to develop experimental methods to distinguish between the two in order to determine the safety of drinking water. Trivalent chromium is the most stable form of chromium; it is nontoxic and has various biological functions in humans, including immune function and insulin binding. Hexavalent chromium, the second most stable form of chromium, is toxic to humans. The separation of chromium oxidation states is an ideal test case for tungsten coil AES due to the large difference in the electronic environments of trivalent and hexavalent chromium. This difference in electron environments should have an effect on the minimum temperature required to volatilize each respective sample. The minimum volatilization temperature is the physical property that will be exploited in experimentation by the creation of temperature ramps that will allow for two separate emission signals. It was established that the minimum volatilization current for trivalent chromium is 7.48 A and that for hexavalent chromium is 7.60 A. Temperature ramps are currently being developed for separation of the two oxidation states.

## **Autoimmunity as Told through Three Autoimmune Diseases: Systemic Lupus Erythematosus, Rheumatoid Arthritis, and Multiple Sclerosis**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016*

**Student: Zachary Masters** (2016)

Honors Thesis Committee: Laura Glasscock, Ph.D.; Matthew Heard, Ph.D.; Matthew Stern, Ph.D.

CAS – Department of Biology

The immune system protects us from harm, but when it goes awry, the immune system can begin to cause us harm. One of the most difficult immune system abnormalities to deal with is autoimmunity. The causes of this are varied, but all lead to our own bodies being attacked by the very things that keep them protected. There are many diseases that arise from autoimmunity and in this literature review I will be exploring three of them: systemic lupus erythematosus, rheumatoid arthritis, and multiple sclerosis. These three diseases are excellent models to examine autoimmunity because of the various means by which they cause this abnormality and their effects on the body. I will explore the various pathogeneses, mechanisms, and current research on these diseases in the hopes that they will be demystified to the general public.

## **Medical Tourism in Malaysia**

*Southern Regional Honors Council Conference, Orlando, Florida, March 2016*

**Student: Anna-Kay Green-Woolcock** (2016)

Honors Thesis Committee: Keith Benson, Ph.D.; Michael Matthews, Ph.D.; Barbara Pierce, Ph.D.

CBA – Department of Management and Marketing

With the rising cost of healthcare in the United States, and changes in health insurance plans, health consumers are becoming more frugal in terms of receiving health services at a lower cost. Subsequently, medical tourism has become more prevalent in terms of travelling around the globe in order to receive similar care, or even better quality of care, in other countries, at a more affordable cost than in the home country. Malaysia is one of several major destinations in the medical tourism industry that is rapidly developing, reportedly experiencing an influx of more than half a million medical tourists annually, due to its low healthcare costs and well developed medical infrastructure. The objective of this research study is to determine the influencing factors that lead residents of the United States to choose hospitals in Malaysia as their medical tourism destinations. These factors will be ranked according to importance, which will assist in developing recommendations that may help improve the current healthcare system, and retain healthcare consumers.

## **Effectiveness of Prehospital Administration of Antibiotics for Instances of Severe Sepsis**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Brooke Tracy** (2016)

Honors Thesis Committee: Jason Hurlbert, Ph.D.; Victoria Frost, Ph.D.; Meir Barak, Ph.D., D.V.M.

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

Prehospital intervention for conditions with high mortality, such as acute coronary syndrome (ACS), myocardial infarctions (MI), and strokes (CVA), has greatly improved patient care and, ultimately, patient outcomes. Sepsis is a life-threatening condition with a reported mortality higher than that those of MI and CVA. Current guidelines do little to suggest a universal approach to prehospital treatment and evaluation of potentially septic patients. This review of current published research aims to investigate potential determinants for septic diagnosis and determine optimal prehospital treatment protocols. The best diagnostic measurement available to EMS personnel is a serum lactate concentration determination. Following diagnosis, the current formalized treatment protocol for sepsis is fluid resuscitation and supplemental oxygenation. This review has found that early initiation of antibiotic treatment is an important factor in determining patient outcomes, which suggests that prehospital use of antibiotics would prove beneficial to diagnosed septic patients. With an increasing number of patients using emergency medical services (EMS) for medical transportation, it is a viable option for EMS personnel to begin antibiotic therapy, having had proper education for both evaluation and subsequent treatment of patients prior to hospital admission. This review identifies both the benefits and concerns of prehospital usage of antibiotics, in addition to the problem of ineffective diagnostic education received by EMS personnel regarding sepsis



# PUBLIC PRESENTATIONS AND PERFORMANCES

## Finding a Factual Victim in Funny Fiction

*Water in the World Conference, Winthrop University, November 2015*

**Student: Jennifer J. Oliver** (2017)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

In the hilarious work, *Skinny Dip*, author Carl Hiaasen declares openly that the book is a work of fiction in his acknowledgements. However, throughout the story, he boldly presents the facts of the ruin of the Everglades in Florida, USA. Hiaasen capitalizes on the entertainment factor required by modern American readers to educate them about the pollution of the wetlands. While spinning an elaborate, humorous tale of deception and death, he folds in the serious news about the destruction of the Florida Everglades. One of the main characters of the plot is Chaz, a husband who is an egotistical, adulterous, lying state biologist. Chaz believes his wife witnessed falsified data on water samples he has taken from the Everglades. He reasons she must be eliminated. He then proceeds to grab her by the ankles while on deck of their cruise ship, and fling her overboard. Chaz's corrupt partner, Earl Edward "Tool" O'Toole, whose hobby is to collect roadside crosses left in memory of victims from automobile accidents, is rough, tall, hairy, scary, amoral and bad-tempered from suffering chronic pain due to a bullet still stuck in his backside. Joey, the enraged and embittered wife who survived the attempted murder, muses that Chaz had betrayed her as he, a biologist, had betrayed the wetlands. "Perhaps for someone so soulless...it wasn't much of a reach...from killing a place to killing a person," Hiaasen writes pointedly. Joey later exacts her revenge upon Chaz, but not before Chaz suffers from an erection he has sustained from a double dose of Viagra, a double dose of rejection from two women who promised and then denied sex, and a double dose of two failed murder attempts. While effectively entertaining his audience, Hiaasen reveals the true victim, the wetlands, perhaps with his readers not knowing they have been educated and persuaded to believe the Everglades are of value. His witty and smartly written book subtly comments on human nature, but he also loudly condemns the "murder of the Everglades."

## Power and Position: Exploring the Historical Role of First Lady through the Lens of Modern Chinese History

*Southeastern Women's Studies Association (SEWSA) Conference,  
Winthrop University, April 2016*

**Student: Andrew McIver** (2016)

Faculty Mentor: Catherine Chang, Ph.D.

CAS – Department of History

(HIST 554 – Chang)

Because the wives of male leaders figure so prominently into the 20th and 21st centuries, the role of First Lady provides a place to explore modern constructs of female power and agency, and perhaps more importantly, the way that female exercise of power is viewed by the public. Yet, very little research has emphasized this uniquely gendered exercise of power, and what little scholarship has been conducted is primarily situated on the historical role of American First Ladies. I place my research at the intersection of modern Chinese history and contemporary women's studies, and through a survey of newspapers, interviews, comics, and biographies, I explore the role of First Lady in the context of Chinese history and the ways in which the images of First Ladies, particularly Madame Chiang Kai-shek, shifted as the public began to criticize powerful women more heavily than their similarly powerful husbands. Outward from this gendered discrimination radiated a powerful and still resonant stereotype, the Dragon Ladies of Asia. In light of the diminished role of First Ladies in contemporary Asian politics, I argue that we must upend the gendered conversation surrounding power and question the images, metaphors, and language that we use to describe it.

## The Role of Different Types of Social Capital on First Generation Students' Academic Self-Concept and Success

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student: Lauren Goodwin** (2016)

Faculty Mentor: Monique Constance-Huggins, Ph.D.

CAS – Department of Social Work

(SCWK 550C – Constance-Huggins)

Social capital has been shown to have a significant impact on one's ability to overcome life's challenges to be successful. This includes overcoming challenges on college campuses. First generation students are often faced with major challenges on college campuses; however, little is known about the extent to which they use social capital to address these challenges. This study examines differences in social capital use between first generation and non-first generation students among a sample of 66 college students at a small liberal arts college. Results suggest that first generation students tend to rely more on bridging social capital and less on bonding social capital than non-first generation students. Implications for improving academic success for first generation students are discussed.

### **“Dignity in keeping with his position”: The Interpellation of Stevens through the British Estate Apparatus in Kazuo Ishiguro’s *The Remains of the Day***

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Stephen Ateca** (2016)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 300 – Bickford)

Kazuo Ishiguro’s *The Remains of the Day* has received a large amount of critical attention since its release in 1989. However, most of it has been very historically narrow, relegating it to Thatcherism in the 1980’s or to the end of the British colonial empire around the same time. In my research, I look at the broader implications of Stevens’s role as butler. Using several concepts originally defined by French Marxist philosopher Louis Althusser, “ideology,” “ideological state apparatus,” and “interpellation,” I argue that Stevens is motivated to serve the racist Lord Darlington faithfully because he believes in an ideology of England’s greatness, and subsequently, loses his individuality. Stevens almost realizes that he has lost his individuality by living his life as a footnote to Lord Darlington’s; however, he resolves the narrative by commenting on how he can better serve his new master. That moment of irony causes readers to consider how they themselves are similar to a butler. Average people have no say in the large affairs of society, and so, work for those who have power, in hopes that some good will be done through it. They must fulfill the duties of their roles to the best of their abilities, just like Stevens. My article is important to the scholarship of the novel because it shifts the discussion from specific moments in history to broader implications for people in the past, present, and future.

### **Shakespeare’s Iago and Antisocial Personality Disorder**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Emily Beck** (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Previous studies of Iago overlook a powerful tool of psychological diagnosis, the *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. The paper uses this resource to argue that Iago suffers from antisocial personality disorder. Indeed, he displays three of seven antisocial character traits: deceit, recklessness, and aggression. Thus, Iago’s manipulation of and violence against other characters are symptoms of mental illness. If his malignity emanates from a psychological disorder, then Iago emerges as one of Shakespeare’s most well-rounded villains. Although the *DSM-5* does not justify his actions, accurate psychological diagnosis does render him more human and understandable.

### **Shifting Privilege of Psychological Types in the Writing Center: A Relationship-Oriented Discourse**

*Southeastern Writing Center Association Conference, Columbus, Georgia, February 2016*

**Student: Andrew McIver** (2016)

Faculty Mentor: Jane Smith, Ph.D.

CAS – Department of English

(ENGL 433 – Smith)

Tutoring is inherently a social exercise; writing center theory evidences the importance of collaboration in the tutoring process. My goal is not to devalue the collaborative process or the research surrounding it; rather, I suggest an alternate view, one that might flip the way current tutorial theorists approach a collaborative writing process. At present, approaches to the theory and practice of tutoring writing privilege both extroversion over introversion and “thinking” over “feeling.” In fact, these approaches are representative of a privileging of psychological types that Susan Cain, in her book *Quiet: The Power of Introverts in a World That Can’t Stop Talking* calls a long-developing cultural shift toward the “Extrovert Ideal.” This shift toward a more extroverted, logical, problem-solving approach to writing tutorials is detrimental to improving long-term writing ability for students, and furthermore, it begins to devalue the importance of developing relationships with students and their writing, as opposed to just a relationship with the problems found in students’ writing. Flipping the privilege would be impossible and arguing that would be too extreme of a solution. However, a viable solution would be to shift the emphasis back toward tutoring as a more introverted, feeling process, and through an exploration of Jungian psychology of personality and current tutorial research on empathy in learning, I conclude that effective learning happens in the moment when students feel that they matter. Introverted-feeling tutors, by definition, are particularly geared toward creating the intensive interaction (and collaboration) that creating this meaningful relationship requires.

### **“Which from the vineyard to the garden leads”: Isabella and Mariana as Agents of Subversion in the Bed-trick Scene in Shakespeare’s *Measure for Measure***

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016*

**Student: Sara Elizabeth Parnell Wilcox** (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

While Isabella’s participation in the bed trick in *Measure for Measure* has received attention, much remains to be said about Mariana’s role. For example, Byron Nelson considers Isabella’s actions in the scene to be tainted by association with the role of prostitutes. More generally, Jonathan Dollimore demonstrates that sex workers’ transgressions directly challenge and subvert power. The logical extension of these critics’ points is that Isabella and Mariana are subversive in ways heretofore applied only to sex workers. Therefore, this paper argues that these two women’s actions



in the bed trick scene, by participating in what Mikhail Bakhtin calls the “carnavalesque,” not only echo the sexual economy but also subvert the roles of powerful men who represent state ideology. Although both women conspire together to commit the bed trick, Mariana’s performance is the primary act of subversion because she actively manipulates Angelo by forcing him to take her virginity and possibly impregnate her. As a result, she is able to make him honor the terms of their earlier betrothal. Mariana’s act would be impossible without the carnivalesque spirit that exists in sexualized spaces such as the garden, the play’s greatest image of fertility. Sexualized space in the bed-trick scene, however, participates in a larger framework of the carnivalesque in sexualized spaces where prostitutes are present. Both Isabella and Mariana succeed in their subversion to varying degrees, and Shakespeare’s incorporation of the carnivalesque into *Measure for Measure* underscores the autonomy of two female characters whose voices have been previously underestimated.

### **“No worse a name than Jove’s own page”: As You Like It as a Critique of Pederasty**

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Katlyn Walden** (2017)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Rosalind, the heroine of Shakespeare’s *As You Like It*, was historically played by a boy and engages in cross-dressing herself. For her alter-ego, she chooses the name Ganymede. Critics like Mario DiGangi and Amanda Rudd have questioned the choice of the name Ganymede, but until now analyses have generally concluded that it was chosen because of its association with homoeroticism, without further addressing how the play protests the act. Given that Shakespeare was involved extensively in the theater world, I will argue that the choice of the name Ganymede, the process of performing, and the actions of the characters in *As You Like It* actually critique a small subset of Elizabethan theater: pederasty. The myth of Ganymede was often used to justify sexual relationships with adolescent boys. Pederasty existed in every social class in Elizabethan England, but especially in the theater world and in poetry (this paper explores Shakespeare’s reference to the homoerotic relationship between Neptune and Leander in Christopher Marlowe’s *Hero and Leander*). *As You Like It*, however, critiques homoeroticism in two ways. First, retro-disguise returns the actor who plays Rosalind to a character more like himself, thus reminding the audience that he is a boy and negating the believability of a homoerotic relationship onstage. Second, the pretend relationship between Orlando and Ganymede critiques pederasty because Orlando remains indifferent to the disguised Rosalind. Given all this evidence, the play seems to promote the “ideal” family and to critique the institution in which Shakespeare achieved his success.

### **“Well, now, yer a hell of a t’ing, ain’ yeh?”: Collective Shaming and Individual Punishment in the Sexual Economy of the Bowery in Stephen Crane’s *Maggie: A Girl of the Streets***

*American Literature Association Annual Conference, San Francisco, California, May 2016*

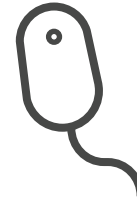
**Student: Sara Elizabeth Parnell Wilcox** (2016)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 323 – Bickford)

The existence of Stephen Crane’s Bowery was predicated on the rise of industrialized labor in the north that demanded a constant, laborious workforce. As a result, a capitalistically-driven society that prioritized the wants of the rich over the needs of the poor became the defining factor over a generation. Crane’s representation of the Bowery is a microcosmic view of the macrocosmic capitalist oppression that rules over the slums of New York in the late nineteenth century. Inside this microcosmic view, Crane shows how the repression of the proletariat creates the repression of women through an oppressive moral economy. As the inhabitants of the Bowery become the base for the capitalist superstructure of New York, the women of Rum Alley and similar tenements are the base for the sexual superstructure that governs the Bowery. Women lack the social and sexual agency that men in any class have; women only control their societal value through their sexual relation to men since they are the “means of production” for the “bourgeoisie” of the Bowery—they are the producers of babies. This paper aims to explore the lack of space Maggie is allowed when she rejects the accepted social order, the preservation of virginity until marriage, and how she is inevitably fated to die because she has rejected the bourgeoisie determined sexual economy.



## Not without Water

*Water in the World Conference, Winthrop University, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Paul Joseph Laffredo III** (2016)

Faculty Mentor: Gregory Bell, Ph.D.

CAS – Department of History

(HIST 350 – Bell)

A Macedonian ruler named Alexander the Great famously conquered Persia and established one of the largest empires in the history of the world during his short lifetime in the 4th century BCE. One factor that made this accomplishment possible was Alexander's ability to constantly move and supply his army as the Macedonians traveled from one completely unique geography to another. Alexander inherited a well-trained army from his father, King Phillip II of Macedonia, who had reorganized how the army supplied itself in order to make the Macedonians move more efficiently. Building upon his father's efforts, Alexander took this army and conquered the known world. Like his father, Alexander was conscious that logistics, or the movement and supply of the army, led to success in the field. In particular, Alexander was always careful to consider water. Primarily using data on water usage and consumption found in *Alexander the Great and the Logistics of the Macedonian Army* by Donald W. Engels, this paper examines the initial stages of Alexander's campaign, as his followers crossed into and conquered Asia Minor, and explores what he did with this army, in particular the role water played, as he moved and supplied his army across long distances in foreign territory.

## The Truth Has No Consequences: Another Oliver North Story

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Paul Joseph Laffredo III** (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The Oliver North – Iran-Contra Affair is a complex moment in history affecting three quarters of this planet, from Israel to Southeast Asia. Many historical connections are relevant to this study: the U.S.-Iran-Israel relationship and ties to Nicaragua; the networks involving South Korea, People's Republic of China, Guatemala, and Panama; and personal relationships among Oliver North, retired Major General Richard Secord and North's immediate supervisor, Admiral John Poindexter. This paper focuses on how North's actions and the actions of the National Security Council violated U.S. and international laws. Using National Security Archives documents, North's Congressional testimony and personal diaries, the Kerry Commission report, and congressional testimony from Poindexter and Richard Secord, I argue that North and the others violated the Economy Act and both Boland Amendments with virtual impunity.

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

*Joint 67th Southeast and 71st Southwest Regional Meeting of the American Chemical Society, Memphis, Tennessee, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE) and the Winthrop University Research Council*

**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 reported to have cholesterol-lowering activities. Recently, the Hanna laboratory reported that tosylhydrazones formed using 3-acylpyridine *N*-oxides could be cyclized into pyrazolopyridines. Reaction of an *N*-oxide tosylhydrazone with a proper electrophile formed an activated intermediate that allowed nucleophilic attack at C-2 or C-4 on the pyridine *N*-oxide; a subsequent base-promoted E2 elimination gave the desired product. We envisioned that this same method could be applied to form isoxazolopyridines from 3-acylpyridines. Previous investigations had determined that the *N*-oxide tosylhydrazones cyclized smoothly only when the attacking atom was *syn* to the pyridine ring. Therefore, we initially examined the cyclization of 3-pivaloylpyridine *N*-oxide oxime (**1**), since the bulky *t*-butyl group would ensure that the attacking oxime hydroxy group would be in the required position. Cyclization of **1** to 3-*t*-butylisoxazolo[5,4-*b*]pyridine (**2**) was accomplished using various electrophile/base combinations, the most effective of which was trisopropylbenzenesulfonyl chloride and diisopropylethylamine in dichloromethane, giving an 86 % yield of **2** (derived from attack at C-2); 3-*t*-butylisoxazolo[4,5-*c*]pyridine (derived from attack at C-4) was also formed in 9 % yield. We hoped we could apply these conditions to the cyclization of compounds where the oxime hydroxy group was *anti* to the pyridine ring, so we examined the cyclization of 3-acetylpyridine *N*-oxide oxime. Unfortunately, the standard reaction conditions afforded no detectable amounts of desired products. Altering the solvent polarity (i. e., use of acetonitrile or *N,N*-dimethylformamide) had no effect.

### **A Mathematical Model of Chronic Myeloid Leukemia with Chemotherapy Treatment**

*11th Annual Regional Mathematics and Statistics Conference, University of North Carolina, Greensboro, November 2015*

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

**Student: Lindsay Bradley** (2017)

Faculty Mentor: Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

Chronic Myeloid Leukemia (CML) is a prevalent type of cancer, in which the presence of cancer stem cells is well studied. In our research, we modify existing Gompertzian growth and Gyllenberg-Webb models to incorporate the body's natural defense cells, T cells, and study the dynamics of CML and the effects chemotherapy treatment has upon CML and healthy cells. We conduct a numerical analysis of a sub-model without treatment and show that a cure state is not possible without treatment. We then conduct a numerical analysis of the full model and present some preliminary results. We conclude with future work.

### **The Roots of Tarwater's Shame in Flannery O'Connor's *The Violent Bear It Away***

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Andrew McIver** (2016)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 300 – Bickford)

In interviews, Flannery O'Connor was often asked the ways in which her southern heritage contributed to her storytelling. In response, she remarked, "In order to overcome regionalism, you must have a great deal of self-knowledge. I think to know yourself is to know your region, and that it's also to know the world, and in a sense, it's also to be in exile from that world." To know your roots, and to know your heritage, yet also to be in exile from it is exactly the conflict she explores in *The Violent Bear It Away*, more specifically through her protagonist Tarwater. Though many scholars argue that Tarwater eventually succumbs to his prophetic destiny, I suggest that O'Connor's ending leaves room for ambiguity, and in that space, I argue for a reevaluation of both the ending and of Tarwater. Building onto the overwhelming canon of Biblical criticism on the novel, this analysis attempts to fill the relative critical silence surrounding the ecological narrative that underlies the Biblical one. Tarwater's acting out of his doubt about his prophetic destiny most often happens in or against the natural environment, and in the end, Tarwater's destruction of the natural environment is the ultimate defiance of his prophetic destiny. Thus, Tarwater finds himself far from his prophetic roots and incapable of participating in the prophetic vocation. This weaving of Biblical and ecological narratives, the interactions and inversions that result, are some of the most interesting, most meaningful, critically unexplored sources that propel O'Connor's final novel.

### **Lost in Transition: How Antonio and Bassanio Navigate "A Most Dangerous Sea" of Friendship in *The Merchant of Venice***

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016*

**Student: Andrew McIver** (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

*The Merchant of Venice* depicts the ideals of Renaissance male friendship and the ways in which fraternal bonds influence the interaction between the main characters, Antonio and Bassanio. Reading homosexuality into that relationship, however, overlooks the play's historical and ideological contexts. Critics are of varying opinions. Some remark that Antonio's and Bassanio's friendship oversteps the bounds of Renaissance male friendship, while others suggest that Antonio's and Portia's struggles for Bassanio's affection imply homosexuality. Using essays on friendship by Michel de Montaigne and Francis Bacon for historical context and critical studies by Alan Bray, Bruce Smith, and A. L. Rowse on Renaissance homosexuality versus male friendship, this paper argues that Antonio's and Bassanio's friendship is characteristic of the ideal Renaissance male friendship. More specifically, their relationship reveals an ideal in transition, when Bassanio moves away from fraternal affection as romantic love of Portia becomes his priority. Ultimately, male friendship wanes in relation to the ideal of marriage. Thus, Antonio's relationship with Bassanio enters a new phase as he loses some of his status as a merchant and does not participate fully in the comic ending.

### **"The Whole Weary Thing Again": Ishmael's Living Old Testament in *Moby Dick***

*11th Annual Department of English Graduate/Undergraduate Research Conference, Winthrop University, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Patrick Kay** (2016)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 323 – Bickford)

In "The Whole Weary Thing Again," I argue that Ishmael's experience aboard the *Pequod* is a reintroduction back to society that follows many of the (il)logical patterns seen in the Bible. The unbelievability of both Melville's text and Ishmael's narration is a purposeful exercise in recreating the wild tales of the Old Testament and reaffirming the Christian need for the New. Ishmael's initial aloof irony is rooted in a rejection of religion due to its natural inconsistency. Melville counters by asserting that inconsistency is fundamental to any genuine belief. I have found that Melville pleads with the reader to reject Hellenistic certainty and instead view God as truly Other.



## Behavior and Development of *Nezara viridula* Hatchlings

*South Carolina Entomological Society Annual Meeting, Columbia, South Carolina, October 2015*

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

*Winner of the Outstanding Undergraduate Student Presentation Award, South Carolina Entomological Society, October 2015*

**Student: Kelly LaRose** (2016)

Faculty Mentor: Paula Mitchell, Ph.D.

CAS – Department of Biology

*Nezara viridula* (L.) (Hemiptera: Pentatomidae) are true bugs with piercing, sucking mouthparts that are capable of spreading plant pathogens. It has been thought for a long time that 1st instar (i.e., hatchling) *N. viridula* do not need to feed. However, Esquivel and Medrano recently tested this idea and found that 1st instar *N. viridula* are capable of acquiring pathogens and therefore stated that 1st instar *N. viridula* do feed. Our objective was to show that 1st instar *N. viridula* are simply hydrating and not truly feeding, in the sense of requiring nutrients. Rearing trials were conducted to see how survivorship, aggregation, and development time were affected when only a water source or only a food source was available. An Electrical Penetration Graph (EPG) machine was then used to observe probing behavior of 1st instar *N. viridula* on a soybean leaf over a 9-hour period. By producing measurable waveforms, EPG detects what the 1st instar is doing while mouthparts are inserted into opaque plant tissue. The rearing trial results showed that there was no significant difference in aggregation, juvenile development time, or survivorship to adulthood between the food and water treatments. EPG results produced waveforms that correlate with known hydration waveforms from 5th instar *N. viridula*. Over 70 % of 1st instars' time with mouthparts inserted into plant tissue was spent hydrating. Both results indicate that 1st instar *N. viridula* are not feeding but simply hydrating from the soybean plants; nutrients are not required for survival during the 1st instar.

## Not a Sign of Weakness...

*11th Annual Department of English Graduate/Undergraduate Creative Showcase, Winthrop University, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Patrick Kay** (2016)

Faculty Mentor: Evelyne Weeks, M.A.

CAS – Department of English

(WRIT 316 – Weeks)

Four poems from this short collection were performed at the English Department's creative showcase, including "extraneous Canon," "Destitute Commute," "The Joy of Fragrance," and "To me it is a dead end."

## Modification of a Zone 4 Reaction on a Known Sphingosine Kinase Inhibitor to Improve Oral Bioavailability

*Pharmaceutical Sciences Conference, Chapel Hill, North Carolina, October 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Morgan Turnow** (2016)

Faculty Mentor: Christian Grattan, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Targeted therapy is a new and developing technique that has the ability to target a specific molecule and pathway, increasing the efficiency of attacking abnormal, cancerous cells. The sphingomyelin pathway is important in cell regulation, signaling, and determining a cell's fate. Inhibition of the sphingosine kinase enzyme (SK1) leads to a buildup of sphingosine and ceramide, two molecules directly linked to cell apoptosis. It also decreases the intracellular concentration of sphingosine-1-phosphate (S1P), a molecule linked to cellular proliferation. Therefore, our project objective is to develop inhibitors of SK1 in order to lower the intracellular concentration of S1P and generate apoptosis through the buildup of sphingosine and ceramide molecules. Smith et al. discovered an inhibitor that was successful at inhibiting SK1 *in vitro* but was unsuccessful *in vivo*. Therefore, this inhibitor must be modified to improve inhibition success *in vivo*. Microwave heating is used to synthesize successful modifications of the template inhibitor in Zone 4. It is hypothesized that the addition of polar substituents will increase the hydrophilicity and oral bioavailability of these compounds. There have been fifteen successful inhibitors synthesized, all proven using high-resolution mass spectrometry. The inhibitors will be tested *in vitro* to see their interactions with human SK1, as well as their inhibition success rates. It is projected that these inhibitors will be used in pharmaceutical drugs to aid in cancer treatment.

## Exploring the Ethics of Social Media News Curation

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jacob Hallex** (2016)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

(MCOM 412 – Reel)

This research explores the issue of how social media news consumption shapes consumers' world views. The role of media curation has been handed off from newspaper editors to large tech companies like Google, Facebook, and Apple. Social media posting and browsing habits help to inform tech companies what information users want to see. Using data collection and algorithms, the tech giants will present users with news stories they think will garner the most interaction. This curation can have detrimental effects on creating an informed electorate and cause unhealthy partisan thinking. Through the application of cultivation theory, this essay will explore the ethical implications of what happens when social media's algorithms exercise strong influence over our world view.

## Visible Light Promoted Reactions of Potassium Organotrifluoroborates to Carbonyl Compounds

*South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student: Davis P. Plasko** (2017)

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

CAS – Department of Chemistry, Physics and Geology

Visible light photoredox catalysis has become a significant area of organic chemistry research since 2008, when the Macmillan, Yoon, and Stephenson groups independently employed the redox properties of photoexcited  $\text{Ru}(\text{bpy})_3^{2+}$  in the development of novel approaches to several important synthetic transformations. This new paradigm has since been exploited in the creation of new synthetic pathways, allowing access to transformations not previously available. Our research group is interested in the application of this strategy to reactions of potassium organotrifluoroborates, which have been shown to be oxidized to organic radicals by excited-state iridium complexes. In our laboratory, using the addition of potassium benzyltrifluoroborate to benzaldehyde as a model system, we have found that the desired coupling is promoted by the use of visible light in the presence of a suitably ligated iridium catalyst, whereas in the absence of the catalyst, very little to no coupling occurs. This approach has potential advantages over typical reactions of organometallics with carbonyl compounds, due to the mild conditions employed and the functional group tolerance of potassium organotrifluoroborates. In this presentation, we will describe our progress in this area.

## Factors that Cause Instability in Couples

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

**Student: Rachel Broadway** (2017)

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 471 – Collins)

Our purpose was to determine whether depression, conflict, and alternative relationships lead to relationship instability. We hypothesized that instability would be predicted by more conflict, more depression, and fewer alternatives. Furthermore, we were interested in whether heterosexual participants and non-heterosexual participants differed in the three variables. We hypothesized that non-heterosexual couples would experience higher levels of depression, equal levels of conflict, and equal levels of relationship alternatives compared to heterosexual couples. We used a survey with five scales to measure relationship instability, conflict, alternatives of different partners, depression, and demographics. We found alternatives ( $\beta = 0.20$ ), conflict ( $\beta = 0.23$ ), and depression ( $\beta = 0.32$ )

to be significant predictors of instability,  $F(3,87) = 12.37, p < 0.05, R^2 = 0.30$ . We examined differences between heterosexual and non-heterosexual couples in the predictors of instability. We found heterosexual participants ( $M = 4.87$ ) indicated significantly fewer alternatives than non-heterosexual participants ( $M = 5.58$ ),  $t(143) = -2.97, p < 0.05$ . Heterosexual participants ( $M = 1.83$ ) also reported significantly less depression than non-heterosexual participants ( $M = 2.15$ ),  $t(139) = -2.15, p < 0.05$ . Heterosexual and non-heterosexual participants did not differ significantly on conflict,  $t(137) = -0.57, ns$ . These results increase awareness about the implications of each factor on relationships, while also improving psychologists' understanding of couples who are having relationship turmoil or are seeking help as a result of a breakup.

## Effect of Clay Chemistry and Particle Size Distribution on Carbon Storage from Two Forest Types in Piedmont Soils in the U.S.

*American Geophysical Union (AGU) Conference, San Francisco, California, December 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Asa Walvoort** (2016)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics and Geology

(GEOL 551 – Werts)

In most soils, there is a general positive correlation between clay and carbon content laterally through the landscape. Clay serves to both physically and chemically protect carbon from decompositional processes. However, in some of the highly weathered, naturally acidic soils, such as those located in the southern Piedmont area of the U.S., these trends do not necessarily hold true. We conducted two transects through a clay-rich soil dominated by montmorillonite and another through a soil dominated by non-active clays and iron oxides, in order to compare trends in both particle size distributions and carbon and nitrogen content, using both a laser particle size distribution system and an elemental analyzer. The montmorillonite-rich soils contain a higher pH due to the alkaline nature of the parent rock (gabbro) and reveal a negative correlation between clay content and carbon storage. The trends also hold true for the non-active clay soils, suggesting that the negative correlations are not necessarily linked to clay chemistry. The absence of a difference in nitrogen and carbon percentages within the different clays proves to be significant, because it shows that the clay chemistry is not solely responsible for a positive correlation between clay and carbon content. These results reiterate the complexity of carbon storage processes within the Piedmont soil system.

### **An Investigation of Standardized Testing in Regards to *No Child Left Behind***

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Crystal Thomison** (2016)

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

In January 2002, the controversial *No Child Left Behind Act*, or NCLB, was signed into law with bipartisan support. In the 13 years since its passing, NCLB has accumulated a range of controversy and criticism. This research investigates the impact of NCLB on student and teacher performance in the United States. Factors looked upon include: the increase of standardized testing in schools; the rewards and sanctions included in NCLB; national and state authority over schools; international education rankings; and whether NCLB goals were met. Research compiled from multiple publications, both scholarly and journalistic, and an in-depth interview with an expert on education policy were used to provide insight into the intricacies of government regulation on education and its effects.

### **Letters and Letters: Constructing and Reconstructing Language in *Hamlet***

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016*

*Winner of the William A. Sullivan Undergraduate Writing Award, Winthrop University Department of English, Spring 2015*

**Student: Annalise Eberhard** (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

In the early acts of the play, Hamlet is full of conviction: he views the spoken and written word as fleeting and insignificant forces. Yet, as the plot unravels, something causes a shift within Hamlet, transforming his early belief into one of stability and power. No longer is language arbitrary, but instead, it creates meaning, influences characters, and dictates life and death. For years, critics like John Paterson and D. K. C. Todd focused on how Hamlet manipulates others through his words and how his words act like screens for meaning to be discerned. While their studies certainly shed light on Hamlet's initial view of language, they fall short in explaining how Hamlet's unstable word actually becomes concrete. Few actually trace Hamlet's evolving view through the entire plot by examining specific moments in which language creates meaning. It is in these gaps where my research begins. As Hamlet touches the letter Rosencrantz and Guildenstern try to deliver, his view on the spoken and written word transitions from an abstractly unstable method of communication to a concrete, dangerous, and powerful force, thus allowing Hamlet to separate meaning from the meaningless. By tracing the word "word" over the course of the play, I was able to pinpoint moments of realization best reflecting Hamlet's transitioning point of view. Once used to isolate and manipulate characters, Hamlet's words influence his inability to take action against his circumstances. The ship scene occurring off-stage represents the climax of tension during Hamlet's

journey with language, since it is here that Hamlet quite literally holds his fate in his hands. The insincerity of the word reverses as the ship changes direction and heads back to Elsinore carrying Hamlet and his new-found knowledge. Hamlet's story must now survive through Horatio's own interpretation of the events; the words Hamlet once distrusted are now the only force solidifying and perpetuating his memory.

### **Response of Clay Chemistry to Extreme Heating during Fire Events: Applications to Archaeology**

*American Geophysical Union (AGU) Conference, San Francisco, California, December 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the Boland Endowment for Geology, Winthrop University, Summer 2015*

**Student: Lauren Lintz** (2016)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Fire in the natural environment has been shown to play a role in altering the mineralogy of the geologic material with which it comes in contact. Our work seeks to utilize the nature of these changes in mineralogy on a small scale to seek a relationship between fire intensity and clay mineralogy in the landscape. The Hopi Indian Tribe had a settlement named Chevelon located near Winslow, Arizona. Due to abundant ash deposits and the highly oxidized nature of some of the walls of this structure, it is thought this location was burned and subsequently abandoned near 1400 AD. To help understand the burning process, archaeologists created and intentionally burned the Homolovi structure, which is a modern day analogue to the Chevelon structure. Samples were collected from both structures to help find possible correlations that could explain the type of fire that occurred at the Chevelon site. Our research is using clay chemistry as a tool to investigate fire intensity in an archaeological context. Powder XRD and SEM were used to help identify clay mineralogy. Standards of the resulting minerals were then burned at temperatures simulating a high fire. The clay morphological changes of these minerals at increasing temperatures were studied and then compared to the samples from the Chevelon and Homolovi structures to get an understanding of both fire intensities. Our work suggests that there are progressive changes in O/Si ratios with temperature in silicates that may be useful in tracing temperature of the sediments during fire events.

## Optimizing Decellularization Protocols for the Production of Porcine Acellular Muscle Matrix Scaffolds

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institutes of Health IDEA Networks for Biomedical Research Excellence (NIH INBRE) and the Winthrop University Research Council*

**Student: Carolina Pham** (2018)

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Skeletal muscle tissue is one of the most common sites of traumatic injury in the human body. A variety of biomaterials that facilitate muscle regeneration are in development; however, few are able to provide the structural and biochemical cues present in the tissue's native scaffolding, its extracellular matrix. We hypothesized that the process of decellularization, which removes the cellular content of a tissue or organ while leaving the extracellular matrix intact, could be used to produce biomaterial scaffolds of a clinically relevant size from porcine skeletal muscle tissue. To test this hypothesis, we systematically evaluated the effectiveness of ten decellularization protocols, each of which used a different combination and/or order of decellularization agents. Qualitative histological examination, scanning electron microscopy, and quantification of DNA content of the different forms of the material produced revealed a spectrum of effectiveness among the methods tested. Each protocol yielded a different combination of a) removal of cellular content and b) retention of extracellular matrix content and architecture. At least two protocols appeared to produce scaffolds that are completely decellularized while retaining extracellular matrix elements and architecture. Future work will seek to quantify histological differences among and mechanical properties of the different forms of the material. Those forms exhibiting sufficient decellularization and retention of extracellular matrix will be termed Porcine Acellular Muscle Matrix (PAMM) and will be used in subsequent studies testing their ability to support the growth and differentiation of different populations of myogenic cells.



## Liberalism and Liberal Feminism: How Kantian Thought May Affect the Progressive Culture of Today

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jordan M. Thompson** (2015)

Faculty Mentor: Kristin Beise Kiblinger, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 495 – K. Kiblinger)

This project is concerned with the historical realities of Liberal Feminism. As a movement that holds as its cornerstone the equal rights of all women with men, Liberal Feminism harkens back to the founding paradigm of the American Revolution, the supposed self-evident truths of our unalienable rights that have been endowed upon us by our creator. Of course, Elizabeth Cady Stanton adds a slight but crucial modification in her “Declaration of Sentiments and Resolutions” that “all men and *women* are created equal,” but the sentiment remains. Humanity holds life, liberty, and the pursuit of happiness to be essential facets of its nature. While there are many liberal thinkers from the modern era who advertise such a paradigm, Immanuel Kant is a particularly interesting figure from the tradition to analyze when compared to a Liberal Feminist perspective. One can examine his moral philosophy to understand key Kantian concepts, such as the categorical imperative, the Kantian sense of autonomy, and the Kantian sense of freedom. After comparing such concepts to Kant’s political theory regarding what he calls active citizenship, even when considering the historical framework through which Kant is being influenced, the result overtly implies a lack of respect for women in general. If we can accept that Kant is an appropriate representative for the Liberal tradition in general, then it seems not only prudent, but obligatory to question Liberal Feminism’s alliance with Liberalism.

## Hell Hath Hamlet’s Father

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Mallory Crimi** (2017)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

This paper provides a meta-critical perspective on William Shakespeare’s *Hamlet* by evaluating conflicting interpretations of the ghost’s identity and provenance. Roy Battenhouse and Stephen Greenblatt believe that he is from purgatory, though Battenhouse considers it “paganesque” rather than Catholic. Others such as Roland Frye consider the ghost to be intentionally ambiguous. However, the religious nature of the ghost’s statements cannot be ignored. Those who say that he is not Catholic have to ignore the dozens of Catholic references, and those who claim that he is demonic have to disregard his concern for Gertrude. Because the ghost is fixated on vengeance yet also concerned for his widow, he is neither a saved soul nor a devil. Instead, he must be something in between: an unrepentant Catholic residing in hell.



### **“Better a witty fool than a foolish wit”: Feste in *Twelfth Night* and Erasmus’s *The Praise of Folly***

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Stephen Ateca** (2016)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

William Shakespeare was definitely familiar with Erasmus’s philosophy, and several of Shakespeare’s fools have been successfully compared to Folly. No previous study, however, links Folly and Feste. This paper argues that Shakespeare uses Feste to convey Folly’s sense that foolishness can lead to wholeness through the acknowledgement of emotion. The balance between reason and emotion is similar to C. G. Jung’s individuation, the process of bringing unconscious content to conscious awareness. Malvolio, the play’s joyless Puritan, fails to achieve either folly or individuation because he represses his emotions, which are synonymous with progress toward psychological well-being. Lacking folly, as Malvolio does, one can be neither truly wise nor fully human.

### **Marriage and Early Religious Socialization in Contemporary America**

*Southern Sociological Society Annual Meeting, Atlanta, Georgia, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: William White** (2017)

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

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

Using data from the Pew Research Center U.S. Religious Landscape Survey, this research examines how marital status relates to the religious socialization of children in America. There are conflicting findings in the literature on religious behavior among young adults, particularly young married couples with children. One part of the literature argues that families in early stages need social support and that increasing religious behaviors fill this gap. Another group of scholars has found that the religious behavior and family formation are separate. However, the American traditional family has been undergoing profound changes and an increasing proportion of children are no longer being raised in traditional families. For this reason, it is pertinent to investigate whether religious socialization of children differs among married and non-married parents. My analytic strategy is divided in two parts. I explore religious behavior between parents and non-parents, and among married and non-married parents. In the two analytical stages, I use multivariate logistic regression to assess relations among marital status and socialization of children, controlling for sex, age, income, religious affiliation, race and ideology. Results indicate that there are mild effects on socialization of children based on marital status; however religiosity appears to be a more effective indicator for the socialization of children by parents.

### **Sustainable Building Design: The Canopy**

*U.S. Green Building Council (USGBC) Natural Talent Design Competition, Triangle Branch, North Carolina, May 2015*

*Awarded 4th Place at the USGBC Natural Talent Design Competition, May 2015*

**Student: Taylor Farrell** (2016)

Faculty Mentors: William Furman, M.L.St. and Christopher Johnson, B.F.A., M.Arch.

CVPA – Department of Design and CAS – Department of Interdisciplinary Studies

Inspired by the surrounding tree canopy of the forest and its shadows, this visitor center incites people to enjoy the outdoors. Tall, abstract, tree-like columns and the foliage-like roof give direct references to the outdoors, and pushing up the ceiling and providing tall windows gives visitors the feeling of being in the surrounding woods. The goal of this USGBC national competition was to create a park center. Our submission included building techniques aimed at reducing building energy and water consumption, as well as improving overall interior environmental quality. This park center is designed to educate as well as inspire. An open natural museum provides visual education, while the multi-purpose room and adjustable classrooms provide interior space to learn. The close proximity of the natural environment and the exterior atrium allow for outdoor lectures and activities. While designing this space, we experimented with integrating the building into the land in relationship to the entrance of the park.

### **Evaluating Under Armour’s Customer-Based Brand Equity (CBBE)**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Katherine Rhoden** (2016)

Faculty Mentor: Hemant Patwardhan, Ph.D.

CBA – Department of Management and Marketing

(BADM 595 – H. Patwardhan)

Under Armour® is one of the world’s leading athletic brands, with sales of \$1.2 billion in the U.S. and over \$4 billion worldwide. It was named one of the World’s Most Valuable Sports Brands of 2014 by Forbes. The brand has achieved international recognition in the past decade for its success among other global competitors like Nike® and Adidas®. The purpose of this research is to analyze the Under Armour brand under its various dimensions and evaluate its equity. Various models for evaluating brand equity are discussed. The models determine value based on either concrete factors of the brand, as in Aaker’s model, or more abstract, image-based characteristics as in the models of Keller and Kapferer. Brand equity models from reputed industry organizations like Interbrand, Forbes and Millward Brown are also discussed. The models that source equity from the abstract characteristics rely on consumer perception rather than physical, monetary value. After researching various models, it was decided to follow Keller’s CBBE model to evaluate Under Armour’s equity, as Keller’s emphasis of the role of the consumer in the brand’s equity makes the model the most accurate in addition to the most sustainable. A quantitative survey was then designed and administered online to a sample of Under Armour’s target market. Results are analyzed according to the four components of CBBE: Identity, Image, Response, and Relationships. Appropriate recommendations for the brand follow.

### **Bottom's Ascent up Maslow's Hierarchy of Needs**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Anne Cushman** (2017)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

Nick Bottom in William Shakespeare's *A Midsummer Night's Dream* is considered, in the words of Harold Bloom, the "best sort of natural man." This paper furthers the case for Bottom's ideal humanity by examining his adventures in light of Abraham Maslow's Hierarchy of Needs. Despite the character's foolishness and low social status, his achievement of Maslow's highest stage, self-actualization, makes him both a social commentator and a representation of the ideal person. Bottom demonstrates Maslow's first four levels early in the play through his good health (physiological well-being), position as a weaver (safety), inclusion in a group of tradesmen (love), and role as a leader (esteem). The experience with the fairy queen Titania combines these four levels with self-actualization. As a result, Bottom is a changed and fulfilled man in the final act. The performance of "Pyramus and Thisbe" corresponds to the self-actualization he has achieved with the fairies and brings his experience to a fulfilling close. Bottom's unparalleled success not only places him morally higher than the audience in the play but also indicates that social class does not determine fulfillment or well-being.

### **The Measure of a Manager: Methods for Assessing the Ability of Baseball Managers**

*Joint Mathematics Meetings, Seattle, Washington, January 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Alison Tighe** (2017)

Faculty Mentor: Thomas W. Polaski, Ph.D.

CAS – Department of Mathematics

While much effort has been spent on using and combining various metrics to rate baseball players, very few attempts have been made to use in-game data to rate baseball managers. This project studies three potential methods to rate managers based on skills that "a good manager" should possess – specifically producing a productive line-up and using relief pitchers effectively – and that use widely available data. These methods may be aggregated to produce a model for managerial prowess. Data from the 2015 season will be used to rate managers according to the three specific methods and in aggregate, and popular managers over the last 15 years will be rated to see whether these rating methods correlate with popular opinion about their relative merits.

### **Divorce and Promiscuity in Adulthood**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Angela-Faith Thomas** (2016)

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

Children of divorce (examined in college) tend to have higher levels of promiscuity than those without. Through the current project, we hoped to enhance the previous research by examining the relationship between divorce, socioeconomic status (SES), and promiscuity. The research question of this study concerned how divorce and SES are related to the level of promiscuity in children of divorce. We hypothesized that children who came from divorced or separated parents would have a higher level of promiscuity than those whose parents were married, and that lower SES would be related significantly to promiscuity levels. Using the Sociosexual Orientation Inventory, we were able to examine the promiscuity level of 90 participants, of whom 65 were women, 22 were men, and 3 were unidentified. Both the SES of our participants and the marital status of their parents were determined by a few researcher-generated questions, including asking the socioeconomic class with which they identified and whether their parents were married. From our results, we concluded that divorce is significantly associated with a lower socioeconomic status; however, these variables do not predict an individual's promiscuity. Perhaps a significant relationship between SES, divorce, and promiscuity could be found if the limitations encountered were not present. With increased promiscuity comes the increased risk for unplanned pregnancy and sexually transmitted infections (STIs). Hopefully these issues can be prevented with a more comprehensive education on the reasons behind them.

## Synthesis of 2,2',6,6'-Biphenyltetrol via Suzuki Coupling Utilizing Bulky Phosphine Ligands

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Students:** Benjamin P. Hernandez (2018) and Jake Roberts (2017)

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

CAS – Department of Chemistry, Physics and Geology

Amyloid-beta peptide (A $\beta$ ) self-assembles into neurotoxic, beta-structured aggregates, which are the primary component of the extracellular senile plaques characteristic of Alzheimer's disease. A variety of small molecules have been shown to inhibit the aggregation process; typically, these contain aromatic groups and one or more hydrogen-bond donors to enable binding to A $\beta$ . We have previously identified biphenyltetrols (BPTs) as a class of molecules exhibiting promising inhibitory efficacy. Of our symmetrical BPT series, 2,2',6,6'-biphenyltetrol (2,6-BPT) was the final molecular structure to be synthesized. Previous efforts to prepare the sterically hindered 2,2',6,6'-tetramethoxybiphenyl intermediate through a typical Suzuki coupling afforded no product. These results prompted a search for an alternative method, and a copper-catalyzed homocoupling of 2,6-dimethoxyphenylboronic acid was found to conveniently give the required 2,2',6,6'-tetramethoxybiphenyl. However, obtaining reasonable yields of this intermediate required a stoichiometric amount of copper, which would likely complicate tests of inhibitory efficacy. We therefore have reinvestigated the Suzuki coupling, this time employing a catalyst designed for coupling sterically hindered substrates. Through a coupling reaction using the catalyst comprised of bis(dibenzylideneacetone)palladium(0) (Pd(dba)<sub>2</sub>) and the bulky phosphine ligand 2-dicyclohexylphosphino-2'-(*N,N*-dimethylamino)biphenyl, the 2,6-intermediate was obtained in 27 % yield after recrystallization. Demethylation of the intermediate afforded the desired 2,6-BPT in 20 % yield after recrystallization. Future efforts will include evaluation of 2,6-BPT for its efficacy as an amyloid-beta aggregation inhibitor.

## Social Networking Sites and Cheating

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

**Students:** Danielle Ellis (2016), Jessica H. Dickey (2017), and Maggie L. Montanye (2016)

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

Contemporary generations are using the Internet now more so than ever to communicate, formulate and maintain relationships online; the Internet may also be used to commit acts of infidelity. Docan-Morgan and Docan conducted a study to analyze which types of acts by significant others could be considered infidelity. From their findings, they defined Internet infidelity as acts or actions engaged via the Internet by someone in a committed relationship, outside of that primary relationship, that cause a breach of trust in the relationship. In the current

study, perceptions of potential acts of infidelity were examined in relation to Social Networking Site (SNS) use. We hypothesized that a higher frequency of SNS use would lead to a greater perception of superficial/informal acts of infidelity. These superficial/informal acts were defined by Docan-Morgan and Docan as emotional cheating, casual conversations such as joking around and catching up with others, compared to involving/goal-directed acts of infidelity, which were defined as types of physical cheating such as seeking intimate involvement with someone other than your partner. Participants were a convenience sample of 24 men and 151 women who completed a self-report online survey that examined topics relating to frequency of use of SNS, superficial/informal acts of infidelity, and involving/goal-directed acts of infidelity. We computed the correlation between frequency of SNS use and perceptions of superficial/informal acts of infidelity. As predicted, SNS frequency and perception of superficial/informal acts of infidelity were significantly correlated,  $r(164) = 0.15$ ,  $p < 0.05$ . In other words, the more frequently participants use SNS, the more likely they are to rate perceived superficial/informal acts as infidelity. The goal of this study was to analyze changing perceptions of the different types of infidelities due to the current shifts in technology use in intimate relationships.

## Studying the Hydrothermal Synthesis of Hydroxyapatite Ca<sub>5</sub>OH(PO<sub>4</sub>)<sub>3</sub>

*South Carolina EPSCoR Conference, Columbia, South Carolina, January 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the South Carolina EPSCoR/IDeA Program*

**Student:** Danielle Gasparik (2016)

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Hydroxyapatite (HA) is a calcium phosphate found naturally in human bone, teeth, and dentin. Studies on its optimization have shown promising results on orthopedic and dental applications involving replacement of bones or teeth. However, this material has not been synthesized with enough strength to fully replace the systems. Additionally, HA poses threats of infection since it is not an exact match to human bone and teeth. After preliminary experiments over a broad pH range, the 6-8 pH range was chosen, with calcium chelating ligand DTPA (diethylenetriaminepentaacetate). Silver was later added to the matrix, due to its natural antibiotic properties, in the form of silver nitrate. HA crystals tend to be acicular, or needle shape, and this is important to for their optical confirmation. Experiments were conducted by adding amounts of calcium nitrate, ammonium hydrogen orthophosphate, potassium hydroxide, DTPA and silver nitrate as applicable, with the aid of OLI Analyzer speciation software, into an autoclave, which was then placed into a convection oven at 200 °C for seven days. Product crystals were washed using water and ethanol, dried and viewed under an optical microscope. Visually, the majority of the identifiable crystals were acicular, and the sizes and habits varied with pH, with larger crystals near biological pH. X-ray powder diffraction data were collected, confirming that hydroxyapatite was synthesized with DTPA as the ligand. Addition of silver, however, produced elemental silver. Studies continue with greatly reduced amounts of silver, to see if phase-pure material may be obtained with silver antibacterial enhancement.

## Biological Evaluation of Novel Benzisoxazolo[2,3-a] Pyridinium and Quinolinium Tetrafluoroborates as Anticancer Agents

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from NCI and NIGMS of the National Institutes of Health and the National Science Foundation*

**Students:** Theresa Melendez (2017), McNair Scholar, and Jamie Murakami (2015)

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

CAS – Department of Chemistry, Physics and Geology

Ellipticine has been effectively used to treat various types of cancer. This aromatic, planar, antineoplastic drug works primarily by DNA intercalation and its derivatives represent promising options for cancer drug discovery. DNA intercalators are small molecules that can bind to DNA between base pairs, resulting in the inhibition of replication and providing a viable option for cancer treatment. Several novel benzisoxazolo[2,3-a] pyridinium and quinolinium tetrafluoroborate salts with structural characteristics similar to ellipticine were evaluated and shown to effectively kill colon cancer cells at single-digit micromolar concentrations. Previously, the benzisoxazolo[2,3-a] pyridinium compounds were evaluated as possible anticancer agents, and various R groups were tested on the structure to come to the conclusion that a methyl substituent is the most successful. To expand on this work, we evaluated the anti-cancer activity of benzisoxazolo[2,3-a] quinolinium tetrafluoroborate compounds bearing methyl substituents in the 1-methyl, 2-methyl, 3-methyl, and 4-methyl positions and tested them against HCT 116 human colon carcinoma cells. Our preliminary data indicated limited survival of colon cancer cells when treated with 50  $\mu\text{M}$  drug and the cytotoxicity assays used demonstrated an inverse correlation between concentration of drug and cell survival. These findings suggest that benzisoxazolo[2,3-a] quinolinium tetrafluoroborates are an effective lead for better understanding molecular cancer pathways, and additional studies will be aimed at detailed analysis of the DNA binding mechanism of these compounds and expansion of our drug library.

## Histone Deacetylase Inhibitor RG2833 Reduces the Viability of Human Malignant Melanoma Cell Lines SK-MEL-5 and SK-MEL-28 *In Vitro*

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Winner, 1st Place Poster Presentation at the SAEOPP McNair/SSS Research Conference, June 2015*

**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 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. 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 in melanoma cells also resulted in altered gene expression profiles and reduced cell proliferation and viability. In our studies, we employed three different and commonly used assays to measure cell viability: 1) SRB, which measures total cellular protein, 2) AlamarBlue<sup>®</sup>, which is reduced to a fluorescent product in live cells, and 3) CellTiter-Glo<sup>™</sup>, which generates a luminescent signal proportional to the amount of cellular ATP present. Interestingly, the choice of assay used to measure cell viability had a significant impact on the results, with the more sensitive assays yielding results that indicate a greater sensitivity of the melanoma cells to RG2833. Together, these results demonstrate the effectiveness of RG2833 in altering gene expression and 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.

## Synthesis of “Thiocrown 12” for the Stabilization of Cu<sup>+</sup> in Titration Experiments

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institutes of Health Idea Networks for Biomedical Research Excellence (NIH INBRE) and the Winthrop University Research Council*

**Student:** Margaret Whitley (2017)

Faculty Mentors: Nicholas Grossoehme, Ph.D. and James M. Hanna Jr., Ph.D.

CAS – Department of Chemistry, Physics and Geology

Isothermal Titration Calorimetry (ITC) is an ideal method to study binding reactions independently of spectral signatures. The biologically relevant oxidation state of copper, copper (I), is one such “spectroscopically silent” ion. Unlike traditional methods, ITC relies on the generation of a heat signature; as such, it is readily used to quantify thermodynamic properties of Cu<sup>+</sup> binding reactions. However, this metal is difficult to study under aqueous conditions due to its sensitivity to oxygen and disproportionation to Cu<sup>2+</sup> and Cu<sup>0</sup>. This project aims to use a cyclical tetrathioether, “thiocrown 12,” for the delivery of chemically stable cuprous ions to systems of interest. The thiocrown synthesized is desirable due to the four-coordinate, tetrahedral geometry that the cavity presents. Recognition of these qualities led this research to continue in the synthesis of the thiocrown. Through the reaction of “dibromopropanediol 3” with Na<sub>2</sub>S, the cyclized “thietane 9” product was obtained in high yield and purity. The product was confirmed by Gas Chromatography Mass Spectrometry (GC-MS) and comparison to literature <sup>1</sup>H-NMR. “Diiodide 10” was produced by reacting “thietane 9” with diiodopropane; however, the literature conditions for this reaction were unusable. To get around this, a system was optimized for the microwave synthesis of “diiodide 10,” significantly dampening the time needed for the synthesis. The most effective conditions were found to be 135 °C for 10 hours.



## Modeling the Dynamics of Glioblastoma Multiforme and Cancer Stem Cells

*11th Annual Regional Mathematics and Statistics Conference, University of North Carolina, Greensboro, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

*Winner, Outstanding Undergraduate Student Presentation Award, Regional Mathematics and Statistics Conference, Greensboro, North Carolina, November 2015*

**Students:** Stephen Steward (2017) and Maria Volstad (2018)

Faculty Mentors: Zachary Abernathy, Ph.D. and Kristen Abernathy, Ph.D.

CAS – Department of Mathematics

We extend the work of Kronik, Kogan, Vainstein, and Agur by incorporating the cancer stem cell hypothesis into a treatment model for Glioblastoma Multiforme. Cancer Stem Cells (CSCs) are a specialized form of tumor cell with normal adult stem cell properties. CSCs are believed to be one of the primary reasons for cancer recurrence, since they are more resilient to current treatment practices and are able to repopulate the tumor. We present a system of nonlinear ordinary differential equations that describes the interaction between cancer stem cells, tumor cells, and alloreactive cytotoxic-T-lymphocytes (CTLs). Under the assumption of constant treatment, we present conditions on the treatment amount that leads to a locally stable cure state. We also explore a more biologically accurate treatment schedule, in which CTLs are injected periodically. In the case of periodic treatment, we numerically establish treatment schedules that lead to cancer persistence, cancer recurrence, and cancer eradication. We conclude with a sensitivity analysis of our parameters and a discussion of biological implications.

## Effective Use of Geospatial Technologies for Campus Tree Management

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Veronica Williams (2016)

Faculty Mentor: Bryan McFadden, M.S.

CAS – Department of Interdisciplinary Studies

(GEOG 471 – McFadden)

In an effort to aid Winthrop's Tree Replacement Committee, a study utilizing global positioning systems, geographic information systems, and remote sensing technologies will be conducted to update the current campus tree inventory, which was originally procured in 2009 with the help of Winthrop geography students. By comparing the data from 2009, trees newly planted and removed will be detected and captured with geospatial evidence, by way of ground and map verification. Data collected will have the end goal of creating a digital, interactive tool that campus facilities staff may use for better supervision of tree management and upkeep. This tool will also include a reevaluation of current attribute information regarding each tree's individual species, age, and height, in hopes of generating a consistent data set to become a better reference for future tree management on Winthrop's campus.

## Informed, Uninformed, or Misinformed: Political Knowledge and Media Habits of the Millennial Generation

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students:** Jodi Lee (2018), Jessica Van Cleave (2018), Emily Daise (2017), and Cathyleen Rice (2016)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – P. Patwardhan)

This study examines political knowledge and media habits of the millennial generation as compared with older Americans. Using convenience sampling, a cross-sectional survey of American voters (millennials and older adults) will be conducted to analyze the role of demographics in political affiliation. In addition, different media sources and outlets the millennial generation uses to receive political knowledge and news will be studied. Further, the influence of media habits on political knowledge and affiliation will be explored. Definitions and measurement of key variables for this study are derived from previous literature. The primary contribution of this study is to shed light on how Generation Y obtains political news, the degree to which they retain it, and the influence this has on their political knowledge and affiliation. This, in turn, can help politicians and organizations that run political campaigns to develop better understanding of the media habits of the millennial generation and to reach younger voters more effectively.

## Raskolnikov and the Overman

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Caylie McGlade (2019)

Faculty Mentor: Scott Shinabargar, Ph.D.

CAS – Department of World Languages and Cultures

(HONR 232H – Shinabargar)

This paper draws parallels with Nietzsche's overman, as described in his work *Thus Spoke Zarathustra*, and the ideas of the extraordinary man in Dostoevsky's *Crime and Punishment*. In following the character Raskolnikov through his murder of an innocent woman and his struggle with believing that he is an extraordinary human himself, the paper explores the ideas of a higher being and whether this achievement is actually possible. It looks at how exactly Raskolnikov fails to achieve extraordinary status, both in his own eyes and in the eyes of Zarathustra, and compares Zarathustra's idealistic take on war and murder with the realism of the murders in *Crime and Punishment*. After an in-depth study of these factors, the paper concludes that achievement of the overman is not possible, at least in the complete sense.

### **In Vitro Evaluation of the Potent Anti-Cancer Curcumin Analog EF-24**

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2015*

**Student: Sommer Barber** (2017)

Faculty Mentor: Takita Sumter, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Curcumin is an active compound in turmeric, a component of curry spice, known for its anti-cancer effects, yet its rapid metabolism and low bioavailability make it a poor treatment option. Therefore, to optimize the effects of curcumin and counteract its bioavailability, analogs of the compound are used. EF-24 is a curcumin analog that effectively induces apoptosis in cancer cells. It is known to increase the miR-33b expression and consequently decrease the expression of HMGA2 in melanoma cells. Although the role of HMGA2 is unknown in colon cancer cells, in this study we found that EF-24 is also effective in killing HCT 116 colon cancer cells. As the concentration of the compound added to our cells increased, we saw a significant drop in viability. The untreated cells were 100 % viable and the cells treated with 16  $\mu$ M EF-24 were only 46 % viable. We now need to conduct a successful western blot in order to determine the effect of EF-24 on HMGA1 levels in our HCT 116 cells. If this experiment is successful, we would then like to discover which genes are involved in the interactions between HMGA1 and EF-24. While the mechanism of EF-24 in colon cancer cells is unknown, it does inhibit COX-2 and VEGF, which are cancer-promoting genes regulated by HMGA1. We hypothesize that EF-24 inhibits the expression of HMGA1, which is expressed at elevated levels in HCT 116 cells. The inhibition of HMGA1 would halt the expression of oncogenes COX-2 and VEGF, greatly reducing the proliferation of the cancer cells.

### **LGBTQ Emerging Adults: Their Experiences with Homelessness**

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015*

**Student: Jesse Grainger** (2016), McNair Scholar

Faculty Mentor: Brent Cagle, Ph.D.

CAS – Department of Social Work

Using a qualitative method, this study explored the experiences of emerging adults (ages 18-24) who are LGBTQ and homeless in the Charlotte/Mecklenburg area of North Carolina. Emerging adults who are homeless and identify as LGBTQ are shown to have different health and safety concerns compared to peers. Because of these unique factors, researchers suggest these individuals require specific social services that cater to their needs. Nine face-to-face interviews were conducted. Questions in this study were designed to explore participants' experiences with community-based outreach services and their overall experiences with homelessness. The study used a grounded theory approach to guide the collection and analysis of data. This paper addresses three major themes found within the data: unsafe shelter conditions for LGBTQ individuals, couch surfing, and resiliency.

### **The Effects of egg1473 Mutation on *Drosophila melanogaster* Fourth Chromosome Recombination Rates**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

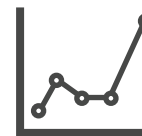
**Student: Andrew Williams** (2017)

Faculty Mentor: Kathryn Kohl, Ph.D.

CAS – Department of Biology

(BIOL 471 – Kohl)

Crossover events are beneficial for organisms because they create genetic variation that can be passed along to future generations. Additionally, proper crossing over is crucial for correct chromosome disjunction. Improper crossing over leads to nondisjunction and aneuploidy – the leading genetic cause of miscarriage and developmental disability in humans. Despite its clear importance, the molecular mechanisms behind meiotic crossover regulation are unknown. Since levels of heterochromatin, areas of densely packed DNA, are thought to be partly responsible for determining meiotic crossover distribution, we hypothesized that reducing heterochromatin levels on the heterochromatin-rich fourth chromosome of *Drosophila melanogaster* would affect crossover rates on that chromosome. To test this hypothesis, a mutation for the *eggless* gene, a gene encoding a protein necessary for heterochromatin creation, was used to decrease heterochromatin levels. Phenotypic markers on the fourth chromosome were used to visualize crossovers in the *eggless* mutant and wild-type backgrounds. To confirm crossover events, polymerase chain reaction-based molecular methods were successfully developed. The experimental *eggless* crosses are currently underway. When completed, these results will be compared to wild-type data to determine if genetic reduction of heterochromatin levels alters meiotic recombination rate on *Drosophila* chromosome four.



## Narcissism and Leadership Styles Correlation

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

**Students:** Claudia Salazar (2016), Luccil Harrison (2016), and Zane Repp (2016)

Faculty Mentor: Darren Ritzer, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Ritzer)

Our study examined how narcissism specifically affected people's responses to leadership scenarios on a college campus or in the workplace. It is reasonable to hypothesize that those scoring high in narcissistic traits and leadership scenarios would also practice narcissistic leadership styles and handle situations differently than those who do not score high on narcissistic traits. Our study takes two highly researched topics, narcissism and leadership, and examines them in conjunction. Participants were 92 young adults. Approximately 60 % of participants were Caucasian and the remainder represented other ethnicities. Sixty-three percent of participants self-reported past leadership experience. We created 12 hypothetical scenarios about situations an average college student might witness while on campus or in the workplace. Participants were asked to select which response option best described how they would act in that leadership situation. Participants then responded to the Narcissistic Personality Inventory and the Self-Report Psychopathy. The Scenario score and Narcissism score were significantly related. In other words, certain leadership behaviors correlate with narcissistic personality traits. In addition to this, those questions are believed to have some effect on narcissists because they specifically ask what the person taking the survey would do, as opposed to asking what someone else would do in that situation. Particular questions were more related to respondents' total scores and one could probably conclude that narcissists have a lack of recognition, which may be why the three questions were significant.

## Phylo-Group Diversity in *Escherichia coli* Collected from Oceanic Beaches in South Carolina

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2015; Water in the World Conference, Winthrop University, November 2015; National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Savannah Moritzky (2017), McNair Scholar

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

CAS – Department of Biology

*Escherichia coli* (*E. coli*) is a common bacterial species that can persist in many environments found around the world. One environment where it can be found is an oceanic beach, where it can serve as an indicator of both fecal and microbial pollution. While the majority of strains of *E. coli* are non-pathogenic to humans, some phylo-groups are associated with virulent strains and could cause disease. Therefore, it is of critical concern that we determine where this *E. coli* is coming from and whether it is potentially harmful to human health and well-being. In this study, we attempted to

answer this question by using a newly developed molecular technique, which allows us to identify to which phylo-groups environmental isolates of *E. coli* belong. Classification into phylo-groups can help us to infer the source of the pollution. For this analysis, we collected sand samples from Folly Beach, South Carolina. In our analysis, we identified environmental isolates of *E. coli* that differ from the lab strain and belong to two distinct phylo-groups: phylo-group A, which is likely from human fecal contamination, and phylo-group B1, which is likely from a domesticated and/or wild animal source. A similar technique was used for virulence factors; a band was identified that may correspond to a virulence factor, but further analysis is needed. Collectively, our findings indicate that multiple types of *E. coli* are able to persist in these environments and that more research is needed to determine whether these strains are of public health concern.

## Synthesis and Evaluation of Unsymmetrical Biphenyltetrols as Aggregation Inhibitors for Alzheimer's Amyloid- $\beta$ Peptide

*Joint 67th Southeast and 71st Southwest Regional Meeting of the American Chemical Society, Memphis, Tennessee, November, 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Students:** Jake A. Roberts (2017), Andrea L. Taylor (2017), Matthew J. Hurtt (2018), and Benjamin P. Hernandez (2018)

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

CAS – Department of Chemistry, Physics and Geology

Amyloid- $\beta$  peptide ( $A\beta$ ) self-assembles into neurotoxic,  $\beta$ -structured aggregates, which are the primary component of the extracellular senile plaques characteristic of Alzheimer's disease. A variety of small molecules have been shown to inhibit the aggregation process; typically, these contain aromatic groups and one or more hydrogen-bond donors to enable binding to  $A\beta$ . 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.,  $IC_{50} = 1X$ ); 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 may also be successful inhibitors. 2,3',4',5'-BPT, 2,3,3',4'-BPT, and 2,2',3,5'-BPT were therefore 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  $A\beta$  aggregation as a function of time. Preliminary results indicate that neither 2,3,3',4'-BPT nor 2,2',3,5'-BPT were effective inhibitors; however 2,3',4',5'-BPT appeared to be a promising inhibitor of  $A\beta$  aggregation (preliminary  $IC_{50}$  approximately 2X).

## How Do Family Background and Self-Esteem Affect an Individual's Perception of Gender-Role Portrayal in Online Advertisements?

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Cera Crowe (2017), McNair Scholar**

Faculty Mentor: Aimee Meader, Ph.D.

CAS – Department of Mass Communication

The purpose of this study is to understand the relationship of family background and how it affects self-esteem and the perception of gender roles in online imagery. This study focuses on how our history serves as a lens to see gender roles. Schema Theory, created by Robert Axelrod, is a model suggesting that people have a “pre-existing assumption about the way the world is organized.” Furthering this theory is Bem’s Gender Schema Theory, which proposes that one’s sexual self-concept affects how one structures items in memory. These theories, applied to the understood roles and activities that we see our parents perform, should relate to how we see people in the media take on certain roles and activities in online advertisements. The method for collecting data is a survey broken down into questions of demographics, family history, self-esteem, and ten randomized advertisements portraying traditional, decorative, and non-traditional gender roles for both men and women. If we can begin to understand the relationship between family background and advertisement effectiveness, then advertisers can see the real cultural values and changing gender-role identities in consumers.

## Social Media Use and Relationships

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students: Simone Mayers (2016) and Taylor Richardson (2016)**

Faculty Mentor: Tara Collins, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Collins)

Social media sites (SMS) appear to be a popular form of communication between young adults on college campuses and researchers found that, during relationship conflicts, young adults often seek rebound sex as an outlet for coping. We aimed to explore the use of SMS to seek out rebound sex among young adults. We hypothesized that there would be a positive relationship between how often participants reported using SMS or public venues and how likely they would be to use them to seek out rebound sex. We also hypothesized that participants would use SMS more than public venues to seek out rebound sex. To test this, we created an online survey with four questionnaires completed by 115 participants, including men (10 %) and women (83 %) over the age of 18 years (63 % were 18-21), most of whom were students from a southeastern university. We found that there was a significant positive relationship between how often participants reported using social networking sites,  $r(n = 112) = 0.19, p < 0.05$ , messaging apps,  $r(n = 106) = 0.48, p < 0.05$  and hookup sites/apps,  $r(n = 98) = 0.44, p < 0.05$  with how likely they would be to use that

SMS to seek out rebound sex. We also found that respondents were significantly more likely to use public venues ( $M = 2.30$ ) than SMS ( $M = 1.56$ ) to seek out rebound sex,  $t(102) = -7.40, p < 0.05$ . Overall, findings of this study continue to add to and shine light on the effect social media has on our sexual behaviors and romantic relationships with others.

## Recellularization of Porcine Acellular Muscle Matrix Scaffolds

*National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the South Carolina INBRE Developmental Research Project (DRP) Program and the Winthrop University Research Council*

**Student: Ariba Naz (2016)**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

The fields of tissue engineering and regenerative medicine are poised to provide innovative solutions for patients suffering from the loss of functional tissue to injury and/or disease. Current methods for repairing damaged skeletal muscle are inadequate, as they require a patient’s healthy tissue to be harvested in an attempt to repair or replace damaged tissue. A preferable alternative would be to use the tissue engineering paradigm and combine a suitable biomaterial with a source of patient-specific myogenic cells to generate a construct that could facilitate the repair/regeneration of the tissue. In concurrent work, we are producing and characterizing a novel biomaterial scaffolding system we refer to as Porcine Acellular Muscle Matrix (PAMM), which is produced through the decellularization of sheets of porcine skeletal muscle. We hypothesized that PAMM scaffolds that are lyophilized, rehydrated, and sterilized are biocompatible and can support the growth and differentiation of different populations of myogenic cells. Our results demonstrate that PAMM scaffolds can be efficiently recellularized with murine C2C12 myoblasts. Histological analysis of recellularized PAMM scaffolds shows that the seeded myoblasts penetrate the entire width of the scaffold, and the alamarBlue® viability assay confirms the viability of the cells in/on the scaffold. Thus, the processing, lyophilization, rehydration, sterilization, and cell-seeding procedures are adequate for us to begin using PAMM scaffolds to 1) test the myogenic potential of different stem cell populations in a three-dimensional *in vitro* model and 2) test the ability of unseeded or cell-seeded PAMM scaffolds to support muscle regeneration *in vivo*.



### **Creating a Microcosm to Examine Salinity Tolerance of *Escherichia coli* in Beach Sand**

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2015; Water in the World Conference, Winthrop University, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Leigha Stahl (2017), McNair Scholar**

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

CAS – Department of Biology

*Escherichia coli* (*E. coli*) is a gram-negative bacteria species that thrives in a variety of environments around the world. Due to its widespread prevalence, it is commonly used as an indicator for fecal pollution and other pathogens. One place where it is not often sought is oceanic beaches, because *E. coli* is inhibited by salt. However, recent research has shown that *E. coli* often thrives in sand at many oceanic beaches. To determine how it persists in sand, we created a microcosm simulating the intertidal zone of an oceanic beach. Using this microcosm, we examined how varying levels of salinity (0-6 %) affect the persistence of *E. coli* in these sandy environments. We found that there was a negative correlation between increasing salinity and the most probable number of *E. coli* colony forming units, which suggests that *E. coli* is being inhibited by salinity to a degree. However, we still found that *E. coli* was able to persist at all salt concentrations, including those that exceed normal oceanic salinity. Collectively, our findings suggest that *E. coli* may be able to 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.

### **Establishing a Novel 3D Tissue Culture System to Study Osteogenesis In Vitro**

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2015; National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE) and the Winthrop University Research Council*

**Students: Laura Gibbs (2016) and Lisa Baird (2016)**

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

The invention of 3D printers has made the process of engineering patient-specific prosthetic limbs less complex and more cost-efficient. While this represents a huge step forward for individuals who are in need of these limbs, several problems arise due to the non-biological nature of the prosthetics. In order for recipients to obtain limbs that will mature and grow as they do, the fields of tissue engineering and regenerative medicine must make major advances in their ability to deliver clinical-scale composite tissues. This requires an improved understanding of how different types of cells behave in a three-dimensional system. However, for decades, the *in vitro* study of cells,

including bone cells, has been based on traditional two-dimensional cell culture. We hypothesized that 3D-printed scaffolds could provide a cost-efficient model to study osteogenesis in a three-dimensional *in vitro* system. To test this hypothesis, we printed three-dimensional scaffolds to the precise dimensions of sheep trabecular bone, functionalized the scaffolds with collagen I and hydroxyapatite coatings, and seeded them with a murine osteoblast cell line. Our results showed that 1) the scaffolds are biocompatible with the osteoblasts, 2) osteoblasts can adhere to and proliferate on the scaffolds, and 3) approximately 50 % of seeded cells are incorporated into the scaffold during an initial round of seeding. Our results suggest that this method, with further optimization, can serve as a useful model to understand the regenerative potential of bone cells and/or populations of stem cells with osteogenic potential in a three-dimensional system.

### **Flame On: A Study in Overcoming Matrix Effects Using the Standard Dilution Analysis Technique**

*Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Atlanta, Georgia, March 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE) and by URECA (Undergraduate Research and Creative Activities), Wake Forest University*

**Students: Katja Hall (2016) and Emily Watson (2017)**

Faculty Mentor: Cliff Calloway, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Standard Dilution Analysis (SDA) is a novel spectroscopic calibration method that can be applied to most instrumental techniques that are capable of monitoring two wavelengths and will accept liquid samples. It combines traditional methods of calibration curve, standard addition and internal standard, therefore correcting for matrix effects and fluctuations due to changes in sample size, orientation or instrumental parameters. SDA analysis requires only about 200 seconds per sample with flame atomic emission spectrophotometry (AES). The preparation of a series of standard solutions and the construction of a universal calibration graph are not required. The analysis is performed by combining two solutions in a single container: the first contains 50 % sample and 50 % of a standard mixture (the analyte + the internal standard) and the second contains 50 % sample and 50 % solvent. Data are collected in real time as the first solution is diluted by the second solution. The analyte concentration in the sample is determined from the ratio of the slope and the intercept of the resulting plot. Phosphate is a well-known interferent in the determination of calcium in complex samples, such as vitamin tablets and calcium supplements. It is often recommended to add a complexing agent or matrix modifier for the determination of calcium by atomic spectrophotometry. Calcium has also been shown to produce non-linear standard addition plots in the extrapolated region when phosphate is present. The SDA method has been applied to the determination of calcium in over-the-counter vitamin and calcium supplements containing phosphate, using an inexpensive flame atomic emission spectrophotometer. Accuracy and precision are better than those observed for external calibration, standard addition or internal standard methods of analysis, even in the presence of significant concentrations of phosphate.



## Why Not Both? A Case for Collegiate Writing Centers to Utilize Both General and Specialist Peer Tutors

*Southeastern Writing Center Association Conference, Columbus, Georgia, February 2016*

**Student: Kathryn Burt** (2018)

Faculty Mentor: Jane Smith, Ph.D.

CAS – Department of English

(WRIT 500 – Smith)

In recent years, students' writing abilities at the college level have declined. One of the responses to this has been the implementation of writing-across-the-curriculum (WAC) programs, which require the exposure to and practice of writing skills in all fields of study. WAC philosophies have a lengthy history intertwined with that of writing centers, and the two form a "natural" partnership in the innovation of writing education. One of the most significant arguments regarding this partnership has been over whether generalist or specialist peer tutors are better suited to help students. While generalist writing tutors work well to help students improve their rhetorical skills, they often struggle with asking the right questions to guide students who have questions about writing within a specific discipline. Specialist tutors, who have experience in the discipline at issue, tend to have more successful conversations about content and style than generalist tutors do; however, some writing center specialists argue that specialist tutors may give students too much direction, which would contaminate the negotiating nature of peer tutor/student interaction that facilitates active student participation. I argue that generalist tutors are more effective in the early stages of learning to write and specialist tutors are more effective in the later stages of writing development, when students begin to internalize the writing styles of their disciplines. Therefore, collegiate writing centers must staff both generalist and specialist tutors in order to meet the needs of their universities' students.

## Race Predicts Identification, Stereotyping, and Perception of Black Women's Hairstyles

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Malyn Pope** (2016), McNair Scholar

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

Previous research indicates that black women whose features more closely align with Eurocentric beauty standards are rated as more attractive. Attractiveness usually results in more desirable employment outcomes. Many elements of attractiveness have been studied; hairstyles in particular have not. Thus, we examined whether a black woman's hairstyle impacted perceptions of her personality and earning potential. Other variables of interest were whether race or identification with one's race/ethnicity would influence perceptions of the hairstyles. Participants were randomly presented with an image of a black woman with one of four hairstyles and asked to assess the target's probable personality traits, occupation, and income. Next, participants responded to questions about their own acceptance of stereotyping behavior and identification within their

race. Results revealed that race itself was a better predictor of how participants perceived the woman. Black and white participants evaluated the target's competence levels differently. Black participants were more likely to identify with their own race than white participants. There was a positive relationship between identification with one's own race and acceptability of stereotyping behavior. The findings of this study support the notion that black participants are more likely to identify with their own race because of their outgroup status according to social identity theory. Identification with one's own race did not predict perceptions of the woman's personality or earning potential; race itself did predict perceptions of competence associated with the hairstyles. These findings provide new evidence to suggest that hair may be yet another factor in cross-race perceptions and expectations.

## A Qualitative Study of the Effect of Hairstyle on Perceptions of Black Women's Personality and Earning Potential

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Winner, 2nd Place Poster Presentation at the SAEOPP McNair/SSS Research Conference, June 2015*

**Student: Malyn Pope** (2016), McNair Scholar

Faculty Mentor: Merry Sleigh, Ph.D.

CAS – Department of Psychology

Phase one of the study examined whether the hairstyle of a black woman would influence perceptions of her personality and earning potential. One of four conditions (afro, curly, straight, dreadlocks) was randomly generated for each participant to view. Participants assessed the target individual's warmth, competence, earning potential and her likely career. Participants ranked jobs that the woman was likely to hold (administrative assistant, company director, and professor). The curly condition was more likely to be perceived as the company director than any other condition, while the other conditions were most likely to be perceived as secretaries. For the second phase of this study, we conducted qualitative interviews with black and white young adults. Participants were asked to "guess" what we found in phase one of the study. Then after revealing the results, asked to explain why they think our participants responded as they did. Results indicate that almost all participants anticipated the straight hair condition to be perceived most positively (attractive and professional). After results were revealed, black participants theorized a possible explanation for participants rating all of the women as being attractive, professional, and average wage earners may have been due to skin tone rather than hairstyle because that variable was held constant. Some participants believed that the results would have been more similar to their expectations if the target had a darker skin tone. The findings of our qualitative study also indicate that hairstyle may be even more important in perceptions of beauty when black women have darker skin.

## Using a BCI to Assess Attention During an Online Lecture

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; National Conference on Undergraduate Research (NCUR), Asheville, North Carolina, April 2016*

**Student: Ethan Hanner** (2016), **McNair Scholar**

Faculty Mentor: Marguerite Doman, Ph.D.

CBA – Department of Computer Science and Quantitative Methods

Brain computer interfaces (BCI) use neural signals as input into computer applications. In this study, we demonstrate the use of a low-cost, commercially available BCI to directly measure participants' attention levels while using WUTopia, an online learning platform for delivering lectures developed at Winthrop University. The platform incorporates artifacts such as content questions that are displayed alongside the video. Previous research demonstrated that students using the platform performed better on a post-lecture quiz than those who only viewed the lecture. The current study is intended to expand on this finding by examining how participants are utilizing the platform (are they watching the entire video, fast forwarding or rewinding to particular sections of the video, taking advantage of the content questions, etc.) as well as how the two groups differ in performance on the post-lecture quiz. In addition, the study seeks to examine whether increased attention could be a factor leading to better performance for the participants using the full platform. Attention values will be collected from the BCI headset and participants will be asked to respond to a survey on their attention during the activity based on criteria for ADHD from the DSM-V. Their responses will be compared against the values collected from the headset as an indicator of the accuracy of the device. We hypothesize that actual and self-reported attention values will be higher for the group utilizing the full WUTopia platform than for the group that views the lecture video by itself.

## The Most Dramatic Poster Ever: Expectations and Behaviors of Successful and Unsuccessful Relationships on *The Bachelor* and *The Bachelorette*

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Emily Grom** (2016)

Faculty Mentor: Darren Ritzer, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Ritzer)

The number of reality television shows showcasing intimacy has increased over the decades, with *The Bachelor* franchise being one of them. For our study, we selected four seasons of *The Bachelor* and *The Bachelorette*, a reality series in which one man or woman is given the opportunity to select a romantic partner from a large group of potential candidates. Two of these ended with the final couple becoming married (successful), and two ended with the final couple not staying engaged (unsuccessful). We created categories for mild to intense levels of physical contact. Two raters watched each episode and categorized the behavior. Analyses revealed that kissing was a significant indicator of a successful relationship. A positive significant correlation was found between intense kissing and length of time that the final contestant stayed on the show. Similarly, we found that the

more the couple engaged in romantic discourse, the longer the final contestant stayed on the show. More kissing related to more physical touch in general, and to more frequent romantic discourse. Additionally, to assess if “real life” relationships show the same patterns of behavior, we distributed a survey to participants ( $n = 361$ ) to assess the importance of specific qualities in romantic relationships and satisfaction. Overall, the amount of kissing and intimate behavior and satisfaction was significant, while how soon in the relationship they kissed or used intimate behavior was not significant. Overall, this research helps identify patterns in relationships and behaviors that may lead to a more satisfying and/or longer lasting relationship.

## Expression, Purification, and Crystallization of an Endoxylanase from *Bacteroides vulgatus*

*SAEOPP McNair/SSS Scholars Research Conference, Atlanta, Georgia, June 2015; Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student: Jesslyn Park** (2018), **McNair Scholar**

Faculty Mentor: Jason Hurlbert, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Demand for sustainable energy sources is growing as fossil fuels are rapidly expended. One such source is fuel ethanol produced via fermentation of plant biomass generated by engineered biocatalysts. The creation of such biocatalysts requires identifying novel enzymes capable of degrading specific carbohydrate polymers and cloning these enzymes into a bacterial host for structural characterization. This study seeks to characterize a novel endoxylanase of glycosyl hydrolase family 30 (GH30) from *Bacteroides vulgatus*, a bacterium found in the human gastrointestinal microbiome, via X-ray crystallography. The gene for *B. vulgatus* GH30 endoxylanase (BvGH30) was cloned into a pET 28b prokaryotic expression vector, which was used to transform a culture of *Escherichia coli*. The resulting bacterial strain expressed the cloned BvGH30, and the recombinant protein produced was purified to homogeneity via Ni<sup>2+</sup> Metal Chelating Affinity Chromatography (MCAC), as determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE). The protein was concentrated to 10 mg/mL and used to screen for solution conditions that promoted crystal growth via sparse matrix screening in hanging-drop, vapor-diffusion plates. Single cubic crystals of defined morphology greater than 0.1 mm in length were obtained in 20 % (w/v) PEG 3350, 0.2 M NaF. Single rectangular crystals less than 0.1 mm in length were found in 0.2 M (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>, 20 % (w/v) PEG 3350, pH 8.0, and large numbers of smaller rectangular crystals were obtained in 0.1 M citric acid, 0.8 M (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, pH 4.0. Grid screening around these conditions will be employed to optimize crystal size and morphology, and crystals greater than 0.1 mm in length will be subjected to X-ray diffraction analysis.

## Putting an End to the Great Water War

*Water in the World Conference, Winthrop University, November 2015*

**Student: James Ferrell Holland** (2016)

Faculty Mentor: Michael Lipscomb, Ph.D.

CAS – Department of Political Science

(PLSC 325 – Lipscomb)

This paper focuses on the conflict between India and Pakistan, with the peripheral relationship with China over the Kashmir region. This research will have a focus on the role that water, and the right of ownership to the source of said water, plays in international relations and the origin of conflict. Water is known to play a major role in the lives of people simply because it is of such great importance to all multi-celled organisms. With water being so necessary to the very foundations of life, it can be easily understood that it will breed conflict, especially in areas like the Punjab region of India and Pakistan, as well as the southern portion of the Xinjiang Autonomous Region in the People's Republic of China. These three countries, mainly India and Pakistan, should enter into an agreement over the use of the water coming from the glacier in Kashmir; this would, in effect, ease tensions in the region. This agreement would have to deal with water rationing. Should the three nations enter into an agreement with one another, regional tensions would deescalate in a rapid manner and allow for the nations to enter more constructive dialogue and perhaps heal their old wounds and generate profitable opportunities in their respective economies. Using a discourse approach to environmental problem solving, this paper seeks to clarify the possible solutions to this conflict.

## “The Danger of Inconsistency”: The Search for Identity in Henry James’s *The Portrait of a Lady*

*11th Annual Department of English Graduate/Undergraduate Research Conference, Winthrop University, March 2016*

**Student: Anne Cushman** (2017)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 323 – Bickford)

“The danger of a high spirit is the danger of inconsistency,” Henry James warns us in *The Portrait of a Lady*. Our protagonist, Isabel Archer, exemplifies that, as she supplies us with the image of an unconventional feminist character, striving to break out of her century’s high societal constraints. Most critics acknowledge the complexity of Isabel’s character; some critics even point to her tragedies as somewhat self-inflicted, comparing them strongly to Jaques Lacan’s principle of jouissance, or painful pleasure. While I agree that the painful pleasure principle applies to our leading lady, her complex motivations cannot be explained simply through Lacan’s ideas. This paper furthers the analysis of her actions throughout the novel, finding them to create a contrasting portrayal of womanly independence, forming dualities that exemplify both the complexity of human nature and the paradoxical aspects of the upper class. Contradictions arise in Isabel as she seeks to become a self-determined being, while simultaneously playing right into gender and class roles. Her choices regarding her suitors, as she rejects the seemingly advantageous marriages of Lord Warburton and

Casper Goodwood, while accepting the terrible Gilbert Osmond, demonstrate her convoluted thought processes. Isabel struggles to become completely autonomous, even self-proclaiming her search for freedom to be “exclusively theoretical.” However, the strength she shows through Ralph’s death and the revelation of her daughter’s birth mother sparks a renewal in strength and becomes an actual step towards independence. Isabel’s search for self-discovery results in harsh realities, rather than the happy ending she expected. Isabel’s grandest act of independence occurs with her return to Rome, epitomizing the ironies and paradoxes of life

## Understanding Environmental Discourses Relating to Water Security

*Water in the World Conference, Winthrop University, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jesse Perl** (2016)

Faculty Mentor: Michael Lipscomb, Ph.D.

CAS – Department of Political Science

(PLSC 325 – Lipscomb)

During the next 100 years, water security will become increasingly important because there is a limited amount of water that is accessible on the planet. Out of the total amount of water, only 2.5 % of it is freshwater, and thus safe for consumption, and of that only 0.4 % is water found on the surface or in the atmosphere. This means that, out of the million trillion gallons of water that are on the planet, only a small fraction is available for general consumption. While reports inform, and might offer, solutions, they give little insight as to how create policy. This paper seeks those solutions through a careful analysis of the environmental discourses that frame this issue. Using a set of categories developed by the political scientist John Dryzek (Prometheanism, Survivalism, Administrative Rationalism, Democratic Pragmatism and Market Rationalism), this paper seeks to make direct sense out of water-security issues. My paper addresses what the importance of water security is as it relates to individual discourses and the ways in which each discourse influences policy. I would then like to highlight the amount of influence each discourse has over water security to better address the feasibility and challenges each faces when trying to implement policy, and how effective each is at doing so.

## Unspoken: A Tale of Green-washed Democracy

*Water in the World Conference, Winthrop University, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Steven Davidson** (2016)

Faculty Mentor: Michael Lipscomb, Ph.D.

CAS – Department of Political Science

(PLSC 325 – Lipscomb)

Romarco Minerals is ramping up to begin gold mining in Lancaster County, South Carolina. Mining operations raise significant environmental concerns, especially related to water safety. However, with the price of gold over \$1,200 per ounce, mining is also strongly linked to industrial prosperity. This paper will address the history of Haile Gold Mine, the recent approval to re-open the mine, the environmental and economic impacts mining operations could produce for the surrounding region, and the dominant political discourses that are relevant to this case. While Romarco Minerals promises immediate benefits to the region in the way of jobs and tax dollars, lasting effects of mining operations, including scars on the landscape, air-quality disturbances, and contamination of groundwater and watersheds, could leave residents worse off in the long term. Mining operations use cyanide in a method called heap leaching, which leaves behind gallons of toxic byproduct. One look at nearby Brewer Mine gives testament to the harm they pose to the environment: Brewer is currently on the U.S. Superfund list. I will first speak on the prevailing discourse that is practiced nearly world-wide: Industrialism. I will show, through examples of a seemingly green-washed application of the relevant environmental discourses, that Industrialism, through exhibition of what Charles Lindblom called the automatic punishment recoil mechanism, exerted an overwhelming influence on the decision to approve the permits for Romarco's mining operations. I will then turn my attention to the economic realities of Lancaster County, which demonstrate why the power of Industrialism left little room for ecological debate. I will give examples that show the tendency of the impoverished to make unwise decisions regarding the protection of their environment in the face of economic relief, and then I will make a plea for attentiveness in order that Ecological Justice succeed where other discourses failed.

## Impact of Positive versus Negative Political Advertising on Young American Voters

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students: Allison Jordan** (2016), **Martin Smith** (2016), **Corey Brausch** (2016), **Timothy Wooten** (2016), and **Kia Fulton** (2018)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – P. Patwardhan)

This study examines the influence of political ads on young Americans. With the presidential election at hand, and more political advertising being distributed now than at any other point,

it provides the most opportune time to conduct the research. Work done by previous scholars is used as a starting point. Subsequently, using a convenience sample of young Americans, a cross-sectional survey is utilized to answer specific research questions developed for the study. These include examining perceptions of positive versus negative ads, demographic differences in attitudes to political advertising, and influence of prior political knowledge on response to advertising messages. Results of the study will illuminate how young American voters perceive the bombardment of political advertising, advertising techniques that are effective in a political arena, and the roles demographics and pre-existing political knowledge play in young people's interpretation of paid political messages. Results will help political campaigns looking to target young Americans to develop better understanding of how they receive advertising messages.

## Discrimination of Women in the Workplace

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Hannah Louise Strong** (2016)

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

Working women have faced discrimination through the wage gap, the lack of paid maternity leave, harassment, and an overall patriarchal environment. This is an issue all women face and because they are a large portion of the population, research is necessary to find a solution. Though the problem is gradually improving, it still exists. The scope of this project is a generalized approach to the discrimination women face in the workforce. The first step for this research was locating government documents and finding court cases with women in general and women who experienced intersectional discrimination. The second step was conducting an interview with a woman who was one of two women in a corporate setting. I was able to take this information and find that there are not specific laws for women who have multiple intersections with their womanhood. I found that workplace discrimination is an ongoing problem that the government is slowly tackling. Courts have been able to get around gender-based discrimination in the workplace because there are not specific laws to all the different intersections that can occur. Organizations like the Equal Employment Opportunity Commission enforce policies with guidelines to prevent discrimination based on sex and gender.



### Operation Northwoods: JFK's Desperate Bid

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Rachael Estes** (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

After the Bay of Pigs debacle in 1961, President John F. Kennedy was desperate to rectify what could be considered the greatest failure of his presidency. To that end, Kennedy gave his brother, Robert, the United States Attorney General, oversight of a plan called Operation Mongoose, which was designed to overthrow Fidel Castro through psychological operations and sabotage. Operation Mongoose was an interdepartmental plan that included the Department of Defense, the State Department, and the CIA. Within Operation Mongoose, the Joint Chiefs of Staff were responsible for creating a plan that would give the United States a seemingly legitimate reason to invade Cuba, called Operation Northwoods. Documents declassified in 2000 by the CIA and the Department of Defense show the Kennedy administration was so anxious to create an excuse to invade Cuba, they entertained the idea of allowing terrorist acts to be committed on American soil and American citizens, while creating the perception that Cuba was behind the attacks, in order to justify an attack on Castro's government. An extensive examination of the *New York Times* historical archives, along with an examination of speeches given by President Kennedy and Robert Kennedy show a shift in the perception of Cuba, and the Castro regime, as part of the overarching Operation Mongoose, which provides the framework in which Operation Northwoods was examined.

### Effects of Surface Fires and Below Ground Heating on the Biogeochemical Structures of Endomycorrhizal Fungal Spores

*American Geophysical Union (AGU) Conference, San Francisco, California, December 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Molly Bishop** (2016)

Faculty Mentor: Scott Werts, Ph.D.

CAS – Department of Chemistry, Physics and Geology

The impact of surface fires on soil properties can vary from negligible to severe, depending on a multitude of factors on both the surface of the soil and within the soil itself. Once a fire moves through an ecosystem, there are no simple ways to know exactly how deep the heat from the fire penetrated into the soil or what those temperatures actually were. Having this information may provide insight into ecosystem recovery and may have further applications to archaeological studies. We are investigating the biogeochemical structure of endomycorrhizal fungal spores, which show little to no morphological change when exposed to temperatures exceeding 500 °C and should remain present in the soil following a fire event. We obtained soil samples from a pine-dominated forest and a deciduous forest in two different soil types from the Piedmont of the southeastern U.S. and extracted the fungal spores for temperature experiments. We utilized a scanning electron

microscope with emission dispersive spectroscopy to seek information on the biogeochemical structure of the spores and note any changes in the nature and makeup of the structure as temperature increased. Initial results suggest that oxygen ratios may be changing with temperature; however, more work is being done on various species to see if there are species-specific trends.

### Effects of Social Media on Actual Relationships in Young Adults

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students: Carolyn Rennix** (2016), **Diante' Gibbs** (2017), **Crystal Thomison** (2016), and **Emily Goodman** (2016)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – P. Patwardhan)

The use of social media and the Internet is at an all-time high, especially for young adults. With Snapchat, Instagram, Facebook, Twitter and dozens of other methods of communication available on the Internet and phone applications (apps), young adults are using social media on a daily basis. Access to social media makes it even easier for young adults to communicate with each other, without actually having to speak and interact face-to-face. Research by Valkenburg and Peter has shown that this new form of communication actually negatively affects the way young adults form actual relationships, as well as their self-esteem. This study investigates the effects of social media on actual relationships in young adults. Using survey methodology, we hope to uncover what demographics contribute to social media usage, how often young adults befriend others on social media, and whether young adults prefer to use social media as a means to form relationships rather than in the offline world. Our research will look at social media trends among young adults and how this usage hinders their ability to form relationships while offline. This study will also advance our understanding about young adults' dependency on social media, its negative effects and why young adults have trouble forming personal relationships offline.





### **Relationship among Semaphorin-3A, Beta-site Amyloid Precursor Protein-cleaving Enzyme 1, and Growth Cone Collapse in the Developing Chick Visual System**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Eye Institute of the National Institutes of Health*

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

Faculty Mentor: Eric Birgbauer, Ph.D.

CAS – Department of Biology

Semaphorin-3A (Sema3A) is widely known to be an important axon guidance molecule in the developing nervous system. Specifically, it has been found to be involved in distinct pathways in chick dorsal root ganglion (DRG) cells and olfactory axons in the chick olfactory bulb. Recently, researchers found that a potential drug to treat Alzheimer's disease, an inhibitor of beta-site amyloid precursor protein-cleaving enzyme 1 (BACE1), may interfere with Sema3A mechanisms to regulate axon guidance in thalamic and hippocampal neurons in mice. There is limited information about the relationship between BACE1 and Sema3A in the developing chick visual system. The present study seeks to examine the effects of varying concentrations of Sema3A in retinal ganglion cells in the chick model. We hypothesize that higher concentrations of Sema3A will result in proportionately higher growth cone collapse and plateau at a certain concentration, as seen in a previous study on DRGs. We also seek to examine the effects of the inhibition of BACE1 on Sema3A in retinal ganglion cells. Our findings will improve the understanding of the role of Sema3A in the visual system and hopefully shed light on the importance of caution when using inhibitors, such as BACE1, for treatment.

### **Gulliver's Fall to Madness: The Process of Regression through Lacan's Three Orders Of Mentality**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Lindsey Monroe (2015)**

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

(ENGL 525 – Cotharan)

In his novel, *Gulliver's Travels*, Jonathan Swift presents binaries such as big and small, young and old, and human and animal. These binaries, seen through Gulliver's eyes and applied to its classical expectations, show the perception Gulliver has on the world and the way his grasp, along with the binaries, slowly crumble into nothing throughout the course of the novel, degrading through each of the four parts as represented by Lacan's three psychoanalytic orders, and the fourth transitional stage. Lacan's three orders, the Real, the Symbolic, and the Imaginary, plus the mirror stage, are representative of the four sections of Swift's novel and can show Gulliver's degeneration as he loses his sense of self, his humanity, and his grasp on reality as his mind is twisted by the major binaries in the novel. Lilliput is the first place he visits, and on arrival, he is a part of Lacan's final order: the

Real. His journey to Brobdingnag represents the Symbolic order; his travels through Laputa move Gulliver's mind through the transitional mirror stage, and finally, in Houyhnhnm land, he becomes trapped in the Imaginary order. This is what locks him into this mindset forever, since he is unable to see outside of himself. Gulliver's travels through new lands in the novel reflect his disintegration through Lacan's orders as Gulliver loses what it means to be human, what it means to live and be the subject, and what it means to know and understand oneself.

### **Gender Representation in Toy Advertising**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Kathryn Cantrell (2017)**

Faculty Mentor: Sabrina Habib Williams, Ph.D.

CAS – Department of Mass Communication

(MCOM 349H – Habib Williams)

The present study examines how toy advertisements are directed at children, with a specific focus on gender representation, through a review of existing literature. Since the 1950s, advertisements have been saturated with stereotypes. Over the years, females have transformed from being represented as domestic nurturers to beautiful princesses, and males from industrial workers to super heroes. These stereotypes are perpetuated in girls' versus boys' advertisements, by factors such as the location of the ad, the way characters interact with each other, and the type of toy advertised. Even technical aspects, including voiceovers, camera angles, and soundtracks, reinforce stereotypes. Although the majority of analyzed studies occurred in the United States, research is also included from Spain, India, and the United Kingdom. Consistencies are found across all studies regarding stereotypical characteristics in advertisements. Opponents of gender stereotypes in children's advertisements argue that they are denying children the opportunity to fully explore their talents by telling them which toys are for boys and which are for girls. However, others argue that removing gendered toys would decrease the industry's profits, because both boys and girls would be buying the same toys. This study will provide an overview of the literature on gender representation in ads targeting children in order to identify trends and opportunities for further research.

## Do Introduced Animals Spread Their Diseases to Native Wildlife?

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Brianna Moss** (2016)

Faculty Mentor: Matthew Heard, Ph.D.

CAS – Department of Biology

(BIOL 471 – Heard)

Parasites are thought to affect all wildlife species around the world. In many cases, these organisms do not pose significant threats to their wildlife hosts. However, when wildlife hosts are introduced to new parasites to which they have never been exposed and to which they have no immunity, their fitness and survival can be compromised. One important way in which wildlife species can be exposed to new parasites is through the introduction of species to new geographic locations. For example, when raccoons were introduced to Japan for the first time, they transmitted raccoon roundworms to both rabbits and domestic dogs. To date, there have been relatively few studies that have examined the role that species introductions play in introducing new parasites to wildlife species. Here, we address this by conducting the first study that examines whether the introduction of animals from five major groups (amphibians, fish, reptiles, birds, and mammals) to new locations around the world causes spillover of parasites to native wildlife hosts. To do this, we are utilizing data on parasites from the Host-Parasite Database that is managed by the Natural History Museum in London, along with data on introduced species from the Global Invasive Species Database. Using these data, we will be able to determine how frequently the introduction of wildlife species to new locations results in introduction of new parasites for these five taxonomic groups. In addition, this study will help us to understand the role that species introductions play in infectious disease emergence.

## Effects of Sleep Deprivation on Intolerance of Uncertainty and Facial Interpretation

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

**Students: Tollie Schultz** (2017), **Claudia Salazar** (2016), and **Emily Hokett** (2016), **McNair Scholar**

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Research has shown that sleep deprivation is associated with inhibited interpretation of emotions. Our study examined adults' reactions to uncertain feelings and neutral facial stimuli in the context of sleep patterns. We hypothesized that participants with poorer sleep quality would be less tolerant of uncertainty and more likely to interpret faces negatively. Participants were

81 adults with a mean age of 19.90. We selected neutrally coded images from the Chicago Face Database (CFD). Participants then indicated on a continuum which emotion they perceived. The Intolerance of Uncertainty Scale (IUS) was used to evaluate emotional responses to uncertainty. Sleep quality was assessed with the Epworth Sleepiness Scale (ESS) and the Pittsburgh Sleep Quality Index (PSQI). Higher scores on both sleep measures indicated increased sleep deprivation. Results revealed that the higher the participants' intolerance of uncertainty, the higher the ESS and PSQI. In support of our hypothesis, these results revealed that poor sleep was associated with increased intolerance of uncertainty. However, participants' responses to neutral faces were not related to sleep. In sum, lowered tolerance of uncertainty from lack of sleep has the potential to impact an individual's emotional perceptions. However, similar facial interpretation data suggests that sleep only impacts specific aspects of emotional functioning. These findings further add to our understanding of sleep's psychological impact.

## Gulliver's Travel Beyond the Gender Binary: Lemuel Gulliver as Transgender

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Lindsey Monroe** (2015)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

(ENGL 525 – Cothran)

When Gulliver is in Houyhnhnmland, his gender identity falls into question due to his failure to uphold traditional binaries in the way that he sees himself, the way others see him, and the way he presents himself. In this paper, I will explain important transgender terminology, discuss the gender binaries, Gulliver's body and social dysphoria in his mind and with others, and the importance of language. Gulliver's transgender identity reveals itself in the presentation of the Houyhnhnms, the Yahoos, and where Gulliver falls on the species-spectrum of Houyhnhnmland. This spectrum metaphorically refers to gender identity, either in the male/female binary, the cisgender/transgender binary, or the opposition of gender to sex, wherein the Houyhnhnms represent gender identity and the Yahoos represent biological sex. The male/female and cis/trans binaries appear on the spectrum circumstantially. Gulliver's dysphoria is impacted in his visit to Houyhnhnmland when he decides to physically out himself to his master, who then labels him a Yahoo despite Gulliver's identification as a Houyhnhnm. Gulliver's experiences in Houyhnhnmland are a representation of being transgender. While he is physically a Yahoo, Gulliver identifies as a Houyhnhnm, expresses body and social dysphoria, attempts to hide certain features on his body, and presents himself in a way other than his natural and biological self; he feels shame in the way he is approached sexually (heteronormativity), in his appearance, and in the way language is used toward him.

## Millennials Speak: Factors That Drive Them to Vote

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students:** Shakora Bamberg (2017), Andrew Brown (2017), Janay Reece (2017), Craig Taylor (2017), and Kandace Washington (2017)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – P. Patwardhan)

This research study examines factors that drive the millennial generation to vote and the role of media in the process. Using a cross-sectional survey of young potential voters, solicited through convenience sampling, it seeks to provide insights on what makes the millennial generation politically active or inactive. It explores whether intent to vote in this year's election correlates with political and mass media exposure and previous voting behavior. In addition, it also investigates why some millennials do not vote and the influence of factors such as demographics, voter apathy, and feelings toward political leaders. Using statistical data from the survey (collected through nominal and interval level measurement for key variables), the study expects to contribute to understanding of peer pressure, popularity of the candidates, awareness of politics, and mass media influences among millennials. In future research, studies on voting trends in specific groups within millennials (e.g., minorities or women) can be conducted to provide useful information to build political communication campaigns.

## Fatalism and Anselm's Argument for the Possibility of the Coexistence Between Divine Foreknowledge and Freedom of Choice

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** James W. Davidson Jr. (2017)

Faculty Mentor: Adam Glover, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 350 – Glover)

In *The Harmony of the Foreknowledge, the Predestination, and the Grace of God with Free Choice*, St. Anselm of Canterbury (1033-1109 C.E.) does not attempt to prove the existence of free will, but that it is not impossible. The debate between free will and predestination stems from the human idea of God as omnipotent and omniscient. Anselm's argument can be simplified to three premises. First, he claims that an event that is going to happen is going to happen. Second, he asserts that before an event occurs, it is possible that it never occurs. Third, he claims that an event is going to occur (simply because it is going to occur), and it is not compelled by any preceding necessity except for the preceding necessity of free will. I argue that Anselm's first premise is valid, but his second premise fails to support his argument, because future events only exist as potentiality until they occur in actuality; therefore, we cannot prove the existence of an event that is not going to happen. After the second premise fails, the argument cannot sustain itself. Thus, Anselm fails to prove that future events coexist until one of them comes into existence by something other than God.

## Young People's Perception of Violence in Relation to American Media Coverage

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students:** Hannah Strong (2016), Trevor Jones (2017), Holly Morgan (2017), Thomas Calamia (2016), and Cera Crowe (2017), McNair Scholar

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

In this study, we are investigating how young people perceive violence in reality versus how they perceive violence in the media. We will create a survey in Qualtrics that measures participants' knowledge and attitudes toward violence in reality – how violent participants perceive the actual world to be – and violence in the media. For the purpose of this study we categorize violence in five ways as it is reported in the media: terrorism, racially motivated aggression, police brutality, domestic abuse, and mass shootings. We will investigate how participants use and consume news media related to violence. This will allow us to explore whether a cultivation effect exists.

## Quantification of Pseudouridine Modifications through Uridine Specific Cleavage of RNA

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a National Science Foundation Research Experiences for Undergraduates (NSF REU) Program and a grant from the National Institutes of Health*

**Student:** Adaeze Aninweze (2016)

Faculty Mentors: Balasubrahmanyam Addepalli, Ph.D. and Patrick Limbach, Ph.D., University of Cincinnati

CAS – Department of Chemistry, Physics and Geology

Pseudouridine (Ψ), an isomer of uridine (U), is the most common post-transcriptional modification found in RNA. Detection and quantification of pseudouridine in RNA is challenging. The available chemical detection methods are not quantitative. Recently reported mass spectrometry-based methods in this direction include relative quantification of hydrolysis products (base versus nucleoside) in collision-induced dissociation, and pseudouridine-specific SRM (Selected Reaction Monitoring) transition-based absolute quantification. These approaches are effective in dealing with modification at a single sequence location. Our goal is to develop an assay that can quantify multiple modifications in a given oligonucleotide. This is done by uridine-specific cleavage through hydrazinolysis. Pseudouridine is immune to hydrazine addition compared to uridine. This assay can be used to understand the functional role of multiple contiguous modifications, such as those in the subunit interface and the peptidyltransferase center of 23S rRNA.

### Investigating X-chromosome Non-disjunction in *Su(var)3-9* *Drosophila melanogaster* Mutants

*South Carolina Academy of Science Annual Meeting, Winthrop University, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student: Cameron Washington** (2017)

Faculty Mentor: Kathryn Kohl, Ph.D.

CAS – Department of Biology

(BIOL 471 – Kohl)

Meiosis is the process by which homologous chromosomes segregate to form four, genetically diverse haploid gametes. In most organisms, crossing over between all homologous chromosomes must occur accurately and efficiently in order to ensure the proper segregation of chromosomes. However, in the model organism *Drosophila melanogaster*, meiotic crossover events do not occur on the 4th chromosome for reasons still unclear. Since *Drosophila* chromosome 4 is primarily heterochromatic, at approximately 70 %, with respect to the other *Drosophila* chromosomes at approximately 30 %, we hypothesize that the abundance of heterochromatin may be responsible for preventing meiotic crossing over on chromosome 4. To test this hypothesis, a mutant of one of the genes responsible for production of heterochromatin, *su(var)3-9*, was used to understand the effects of decreased heterochromatin levels on the number of cross over events. To begin, we confirmed the presence of a mutation within *su(var)3-9* via Sanger sequencing. Next, we created allele-specific primers using the WASP tool and designed a PCR protocol to more accurately identify mutant flies at the molecular level. Forthcoming, we will measure levels of non-disjunction on the X chromosome in wild-type and *su(var)3-9* mutants to gain insight into the effect of heterochromatin on meiotic chromosome dynamics.

### Mimicking Ocean Conditions to Study the Growth of Calcium Carbonate

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the South Carolina EPSCoR/IDeA Program*

**Student: Danielle Thibault** (2016)

Faculty Mentor: Maria Gelabert, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Calcium carbonate is a very prominent biomineral in the ocean that accounts for the skeletons of coral and the shells of other aquatic organisms. In descending order of stability, the three polymorphs of calcium carbonate are calcite, aragonite, and vaterite. As a result of recent increases in the atmospheric carbon dioxide pressure, 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 this past summer by mimicking ocean conditions and artificial

seawater. The role that magnesium takes in the formation of calcium carbonate was studied at room temperature and a polar temperature of approximately 4 °C. Magnesium is believed to stabilize the metastable polymorphs at high concentrations or incorporate into the crystal lattice at low concentrations, forming dolomite. Through synthesis, analysis with optical imaging and scanning electron microscopy (SEM), X-ray diffraction, thermogravimetric analysis, and differential scanning calorimetry, magnesium was found to impact the morphology of calcium carbonate crystals. The 1:1 magnesium to calcium samples provided a mixture of crystal shapes, while the 8:1 ratio provided solely zinnia-like crystal morphology. Thermal analysis verified the decomposition of calcite at elevated temperatures. As expected, magnesium incorporated into the lattice of the low-ratio samples and a less stable polymorph, not calcite, was formed at the higher ratios.

### Synthesis of 2,5-Dialkylpyrrolidines from $\gamma$ -Keto oximes Derived from Isoxazolines

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Rayshon C. Ellis** (2017)

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

CAS – Department of Chemistry, Physics and Geology

$\gamma$ -Keto oximes and their cyclic tautomers are versatile synthetic precursors to a variety of important compound classes, including pyrroles, pyrrolidines and  $\gamma$ -diketones. We are currently interested in transforming these valuable intermediates into 2,5-dialkylpyrrolidines, some of which occur naturally in the venoms of various species of *Solenopsis* ants. Related piperidine alkaloids from other *Solenopsis* species have been shown to have significant antiangiogenesis activity and have been investigated as potential treatments for cancer. The overall synthetic strategy involves the 1,3-dipolar cycloaddition of a nitrile oxide with an  $\alpha,\beta$ -unsaturated ketone to give an acylisoxazoline. This intermediate is then treated with a silyllithium reagent, triggering a ring-opening Brook rearrangement via chemistry previously developed in our laboratory. Excess silyllithium reagent then cleaves the resulting silyl enol ether, giving the  $\gamma$ -keto oxime upon workup. Selective reduction of the oxime would then initiate an intramolecular reductive amination to give the target pyrrolidine. The current focus of the project is the determination of conditions appropriate for the final oxime reduction and reductive amination sequence. Various catalytic hydrogenation conditions have been explored using oximes prepared from cyclopentanone and cyclohexanone as inexpensive and readily available models of the  $\gamma$ -keto oximes. The successful reduction conditions were then applied to mixtures of oximes and ketones to determine if intermolecular reductive amination would also occur under the same conditions.



## **Incorporating Variable Rate Pricing into an Hourly Rate for a Web Design Company**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by the Mathematical Association of America Preparation for Industrial Careers in Mathematical Sciences (PIC Math) Program, funded by a grant from the National Science Foundation*

**Students:** Lindsay Bradley (2017), MaLyn Lawhorn (2017), Colin Frazier (2018), and Alison Tighe (2017)

Faculty Mentor: Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 350 – Z. Abernathy)

One of the biggest questions in web design is how to charge clients. Some companies charge an overall price per project, whereas other companies charge an hourly rate. RevenFlo is a web design company based in Rock Hill, South Carolina, that charges a flat hourly rate for each project. Since the cost of web design is highly variable due to the many different tasks done for each client, RevenFlo would like to introduce a pricing schematic wherein each task is billed a different rate based on its value to the project. In this project, we analyze past data from RevenFlo and their competitors' prices to determine an acceptable range of rates to charge for each category of tasks in web design. Using the data mining technique of  $k$ -nearest neighbors, we are then able to determine the best price to charge a new client based on the rates other similar clients (categorized by size and expected budget) have been willing to pay. Our proposed technique can help RevenFlo determine appropriate, variable hourly rates to charge each client for specific tasks.

## **Trabecular Bone Reinforces Bone Capability to Withstand Off-axis Loading**

*Summer Undergraduate Research Experience (SURE) Symposium, Winthrop University, July 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students:** Zachary Wood (2016) and Lisa Howard (2016)

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

CAS – Department of Biology

Previous studies show that trabecular bone responds to external loading by adjusting its structure to optimize resistance to the principal direction of loading (Wolff's Law). Yet, each trabecular bone sample is unique and delicate and can only be tested once before failure. So far, it has been practically impossible to test a sample multiple times in different directions to find its optimal mechanical orientation. Here, we present a novel 3D printing approach to determine the stiffness and strength of a trabecular sample in multiple orientations. A micro-CT scan from a sheep talus was reconstructed to create a 3D computer model. Next, the micro-CT reconstruction was tilted ten degrees along the sagittal plane and a new model was created. This sequence was repeated nine times, rotating the reconstruction an additional ten degrees, to a final tilt of 90 degrees. Each model was 3D printed ten times and tested in compression until failure. Our results show that,

contrary to the accepted paradigm, trabecular structure is significantly stiffer and stronger between 40-80° relative to the axial axis. These results differ from the common belief that trabecular bone optimizes its structure along the principal loading axis of the bone and implies that it has a major role in maintaining bone integrity when it is loaded off-axis (e.g., a fall or abnormal loading). Our study introduces new and unexpected results, which may change the way trabecular bone structure and function are understood.

## **Evaluating and Improving the Sustainability of Winthrop University Athletics through Field Maintenance**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Lacy Adams (2016)

Faculty Mentor: Christopher Johnson, B.F.A., M.Arch.

CAS – Department of Interdisciplinary Studies

(SUST 300 – Johnson)

The purpose of this project is to research the current field maintenance practices at Winthrop University, specifically related to chemical usage, in order to determine the degree to which this is sustainable. The specific focus is on the fertilizers, herbicides, and pesticides used and their effects. The effects investigated are environmental health in the surrounding area, social impacts on student athlete health, and economic costs of the treatments. To do this, a committee of specialists is established to assist in collecting contract information and product data sheets from TruGreen®, collecting and analyzing soil and water samples, and researching and recommending appropriate alternatives. The intent of this project is to suggest alternative methods of field maintenance to influence the next maintenance contract, in order to make the Winthrop University Athletics Department more sustainable.

## **Communicating True Costs of Internet Marketing**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by the Mathematical Association of America Preparation for Industrial Careers in Mathematical Sciences (PIC Math) Program, funded by a grant from the National Science Foundation*

**Students:** Stephen Steward (2017), Charles Matthew Farmer (2016), Justin Groves (2017), and David Walker (2016)

Faculty Mentor: Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 350 – Z. Abernathy)

In today's business world, maintaining one's online presence is essential to good marketability. RevenFlo, located in downtown Rock Hill, South Carolina, is a company that offers online



solutions to clients by specializing in Internet marketing, content design, and application development. One difficulty that RevenFlo often faces is the perception that designing a website should be a simple and inexpensive task, and the hidden costs of professional development, technology, oversight, market evolution, and other such factors are typically lost on their clients. We have been asked by RevenFlo to analyze their billable activity for the 2015 fiscal year and, through data mining, to determine any relevant data that can highlight these hidden costs. By preparing a report that can allow clients to easily visualize and understand these costs, more compelling arguments can be made for clients to take advantage of RevenFlo's expertise, rather than maintaining a web presence on their own.

### **Social Media and Politics: What Millennials Know and How They Know It**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Students:** Risa Murray (2016), Jessica Sampson (2016), Tiana McGee (2016), Marquise Adams (2016), and Anna-Marie Hayward (2016)

Faculty Mentor: Aimee Meader, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – Meader)

Social media have taken over in the 2016 primaries. Whether you follow, friend, or retweet, you cannot help but find yourself reading about what's going on politically on your social media feed. You can follow candidates and see what they have to say about many topics. Millennials now hold more power in the polls than ever before. It's important to study media habits of these young adults because millennials rely on social media to gather information about the presidential election – especially on Twitter. This study will survey 100 college-aged students to find out the role of social media in shaping the worldview and political competence of young Americans, using the uses and gratifications theory to guide the research. In addition, this study will reveal who intends to vote, for whom, and which social media have the most influence on political knowledge and engagement.

### **Replication and Further Optimization of Decellularization Methods of Porcine Skeletal Muscle**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student:** Stephanie Colburn (2016)

Faculty Mentor: Matthew Stern, Ph.D.

CAS – Department of Biology

Decellularization is the process by which the cells within a tissue are removed. This leaves behind the tissue's extracellular matrix (ECM), which can be used as a scaffold/substrate for the growth of reseeded cells. This is a commonly employed strategy within the field of tissue engineering, where the goal is to produce a tissue replacement using a patient's own cells. Previous work in our lab has examined the potential of ten different protocols to decellularize porcine (pig) skeletal

muscles into scaffolds that are of clinically relevant sizes for human tissue engineering. From the ten decellularization protocols that were tested, six were selected for further investigation. Our overarching hypothesis is that, by replicating the six protocols in greater numbers, we can further optimize and standardize the production of porcine acellular muscle matrix (PAMM) scaffolds that support the growth of myogenic cells. In the work presented here, we evaluated the scaffolds by 1) their ability to be handled easily, 2) scanning electron microscopy (SEM), and 3) histological analyses. We were able to eliminate two of the protocols because the resulting scaffolds were too fragile for handling. The remaining four protocols produced scaffolds with varying degrees of decellularization and retention of ECM elements, with some protocols yielding more consistent results than others. Ongoing work is now focused on standardizing the size of scaffolds and the use of additional metrics to quantify decellularization, the retention of ECM elements, and the ability of scaffolds to be effectively recellularized.

### **Istanbul Place Branding Campaign**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student:** Katherine Rhoden (2016)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 349 – P. Patwardhan)

The branding strategies a city uses to market itself are vital to the tourism industry and overall well-being of the place. While lacking a large tourism industry, Istanbul is considered the European Cultural Capital City. Bridging Europe and Asia, Istanbul encompasses the cultures of many nations. Part of its tradition includes social gathering at meyhanes, or pubs, which have evolved over centuries into trendy nightclubs and bars. Because of its geographic diversity, the city also is able to offer numerous adventure activities, all within its borders. There is always something to experience, no matter the time of day. This campaign was created to increase awareness of Istanbul as a tourist destination. Consumers will be informed about the lesser-known attractions Istanbul has to offer, especially its nightlife and adventure. Viewers will feel drawn to the city because it perfectly encompasses the excitement and trendiness that they want out of a vacation. They will be influenced to book a trip on their travel sites, to visit the city for its adventure, and discuss it as a travel destination with other young, hip peers. Istanbul stands for adventure and being daring. This is not your typical holiday, as it offers so much more history and culture than the typical urban destination, and so much more edge than the average historical site. This positioning will be highlighted in the various deliverables of the campaign.

### Analysis of Leopold Mozart's Trombone Concerto

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Kathryn Bernard** (2016)

Faculty Mentor: Ian Pearson, Ph.D.

CVPA – Department of Music

(MUST 563 – Pearson)

Leopold Mozart's Trombone Concerto, drawn from his Serenade in D Major, is one of the earliest pieces of trombone literature still performed today. This study examines the origin of the concerto and how it is typically performed. It presents the historical background of the composer and the concerto while, at the same time, weighing its historical significance, especially with regard to modern-day trombone literature.

### On Interval Divisor Graphs

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

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

**Students: Justin Groves** (2017) and **Mark Hubbard** (2017)

Faculty Mentor: Arran Hamm, Ph.D.

CAS – Department of Mathematics

A graph is a collection of vertices along with an edge relation, which is a rule by which vertices are joined by an edge. A divisor graph is a graph whose vertices are labeled by whole numbers and whose edge relation is given by divisibility (i.e.,  $i$  and  $j$  are joined by an edge if  $i$  divides evenly into  $j$  or vice versa). Our work has focused on interval divisor graphs, for which the number labels are consecutive whole numbers. Specifically, one can easily observe that if the label "1" is present, the graph will be connected (since 1 divides evenly into all numbers). If, however, 1 is not in the given interval, then the interval divisor graph will not be connected. We give a criterion to check if two numbers are in the same connected component in a general interval divisor graph. We also examine the number of edges in an interval divisor graph by using a bit of Calculus II. We will finish by giving some partial results on finding the matching number of interval divisor graphs, where the matching number is the largest number of nonintersecting edges in a graph.

### A Self-Immolative Nucleic Acid-Drug Conjugate as a Dual-Action Therapeutic Agent

*Summer Undergraduate Research Experience (SURE) Poster Session, Winthrop University, September 2015*

*Supported by a National Science Foundation Research Experiences for Undergraduates (NSF REU) Program*

**Student: Jessica Logan** (2016)

Faculty Mentors: Ke Zhang, Ph.D. and Xuyu Tan, M.S., Northeastern University

CAS – Department of Chemistry, Physics and Geology

The combined delivery of chemotherapeutics and nucleic acids can have synergistic effects that result in reduced multidrug resistance. The successful co-delivery of hydrophobic drugs and nucleic acids in a carrier-free system has been demonstrated in a self-immolative nucleic acid-drug nanostructure with a photo-labile linker. These nanostructures display spherical nucleic acid properties, such as high cellular uptake and increased stability against nuclease degradation. Following application of UV light, the linker is cleaved and the nucleic acids and drugs are released by an irreversible, self-immolative process. The use of the photo-labile linker, however, is not viable for a therapeutic application. Herein, we have designed and synthesized a bio-trigger disulfide linker to be incorporated into the nucleic acid-drug nanostructures. This study is ongoing, and future work will include the demonstration of cell uptake, stability against DNase I, controlled drug release, and cytotoxicity in cancer cells.

### Impact of Social Media and Online Sources on Young American Voters

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Students: Kate Golden** (2017), **Jarvis Brailsford** (2017), **Victor Volious** (2016), and **Briauna Kilgore** (2017)

Faculty Mentor: Padmini Patwardhan, Ph.D.

CAS – Department of Mass Communication

(MCOM 301 – P. Patwardhan)

The purpose of this study is to understand the impact that media sources have on the voting behavior of millennials in America and to understand which sources are considered to be credible among them. Using a convenience sample of young Americans, an online survey will be used to collect data to answer research questions regarding credibility, whether or not gender, age and background affect one's voting behavior, and how social media is defined by young Americans. Data will be collected on age, gender, class, ethnicity and political affiliations. The major expected contribution of this research is to produce an answer to the question of whether or not millennials' voting behavior is dependent on the news from media sources.

## Child Abuse Prevention Efforts in South Carolina

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Keyatta Crowell (2016)**

Faculty Mentor: William Schulte, Ph.D.

CAS – Department of Mass Communication

(MCOM 441 – Schulte)

The purpose of this project was to create a three-part investigative broadcast news story with a multimedia component on child abuse and neglect prevention. The state of South Carolina ranks 46th in the nation for overall child well-being, but receives millions of dollars in government assistance each year. This money is used for the CAPTA (Child Abuse Prevention and Treatment Act) program, foster care, TANF (Temporary Assistance for Needy Families), home visitations, SNAP (Supplemental Nutrition Assistance Program), employee training and goal setting. After researching, I found that South Carolina had a total of 7,139 investigations of child abuse and neglect in 2013. According to the Child and Family Services Plan of 2015-2019, there were many federal safety standards that the state met, but they failed to reach federal standards for providing timely initial investigation of reports of child maltreatment and risk assessment and safety management. The Department of Social Services (DSS) in South Carolina does a much better job of prevention when they set goals and standards, such as when they created WIGs (Wildly Important Goals) in 2012. My research showed that meeting the basic needs of families is at the core of prevention efforts and should be the focus of DSS in South Carolina and could be applied to every state across the nation.

## Heavy Upon Their Shoulders: A Study of Eleventh Century European Royal Mantles and Regalia

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Lydia W. James (2018)**

Faculty Mentor: Laura Dufresne, Ph.D.

CVPA – Department of Fine Arts

(ARTH 343 – Dufresne)

The 11th century was a time fraught with change. Dynasties rose and fell, nations were changed to their very core, and artistic achievements became more widespread throughout Europe. With the foundation being laid for these endeavors by illustrious leaders such as Charlemagne and Alfred the Great, their descendants and followers were able to create, sponsor, and inspire great works of art in the Romanesque period. While many of the works that have survived are architectural, one of the greatest accomplishments in this period was in the field of fashion. In this time, gold embroidery and metalwork flourished, with great mantles, vestments, crowns, reliquaries, and other treasures being created. Although not all of what was created has survived, there are some notable examples that are still extant. Even more notably, they hail from one extended family, two countries united by kinship: the Holy Roman Empire and the Kingdom of Hungary. Through the objects they wore and commissioned, a brief and dazzling glimpse is given into their lives. This article shall endeavor

to explore the details of several of these remarkable objects, with emphasis on the surviving mantles. The extraordinary embroidery that was created for these mantles is stunning, and is rare in its entirety. In our modern world, we often take any sort of metallic object, let alone a metallic textile, for granted. Yet there was a time when creating such things required one thing, real gold.

## The Examination of Autotaxin in the Production of LPA as an Axon Guidance Molecule in Chicken Retinal Ganglion Cells

*Symposium for Young Neurosciences and Professors of the Southeast (SYNAPSE), Presbyterian College, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

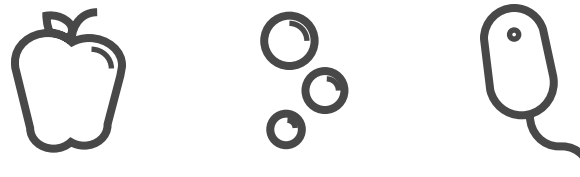
*Supported by a grant from the National Eye Institute of the National Institutes of Health*

**Students: Garrett Driscoll (2016) and Rebecca Chopko (2016)**

Faculty Mentor: Eric Birgbauer, Ph.D.

CAS – Department of Biology

Growth cones direct axon pathfinding during neurological development. The finger-like projections do this by detecting environmental stimuli, which are referred to as axon guidance molecules. Lysophosphatidic acid (LPA) is produced by the enzyme autotaxin (ATX) and has been demonstrated to cause growth cone collapse *in vitro*. ATX has been found in the mid-forebrain boundary of the embryonic chick brain, a target region for retinal axons. To understand LPA's role in axon guidance, we injected a virus expressing an siRNA agent for ATX into chick brains prior to retinal axon innervation at day three of development (E3), and then examined retinal axon guidance to the target, the optic tectum, at E12. Through viral expression of the siRNA, the mRNA transcript of ATX is silenced, thereby depleting the production of enzyme and its subsequent product, LPA. Using a control virus that does not silence ATX, and thus does not inhibit LPA production, preliminary data demonstrate normal retinal axon development and pathfinding to the optic tectum. Examination of optic tecti with the ATX/siRNA virus under fluorescence and confocal microscopy will allow us to investigate whether LPA acts as an axon guidance molecule for retinal axons at the tectum.



### **Making Schools of Choice Equitable or Inequitable? An Insight Into Rock Hill School District's Schools of Choice Program**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by a grant from the National Science Foundation*

**Students:** Gabriel Paxton (2017) and Ana Castellanos (2018)

Faculty Mentor: Stephen Smith, Ph.D.

CAS – Department of Political Science

(PLSC 503 – Smith)

This research concerns the Rock Hill School District's (RHSD) 2015-2016 Schools of Choice policy. The RHSD has long been at the forefront of progressive and extensive measures to achieve desegregation within the district. As compared to other districts within the state and the region, the RHSD has largely been responsible for desegregation efforts without the need of a court mandate. The district has taken upon itself great measures to involve the community and families in its many efforts to promote a diverse and first-class education system. This past fall and spring, the district made announcements of implementing changes to the existing Schools of Choice policy. Our research will attempt to unpack the reasoning behind the decisions made for the upcoming school year. Furthermore, we will attempt to explain the extent to which the school district has gone to ensure that these changes stick with the precedence of desegregation efforts. This will be done through the analysis of written plans, school board meetings, board votes, and interviews with board members and parents of students attending these schools.

### **Effect of Weapon Usage in Domestic Violence Relationships on Help-Seeking Behavior**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Saige Dunlop (2017)

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

CAS – Department of Sociology and Anthropology

(SOCL 516 – Aysa-Lastra)

Unfortunately, South Carolina has the highest rate of domestic violence incidents; efforts are needed to foster policies that alleviate the effects on victims. Research indicates that women are likely to leave abusive relations once a threshold of violence has been reached. This paper explores these dynamics and particularly focuses on weapons used in domestic violence incidents. I use data from the National Crime Victimization Survey of 2014 and multivariate modeling to explore the relation between help-seeking behaviors, types of abuse, and weapons used. Results indicate that women subject to long periods of domestic violence as well as women who have been attacked with knives or other bladed weapons are more likely to seek help and leave abusive relations. The paper concludes with recommendations on the need to increase our knowledge about lethal domestic violence incidents in the state.

### **Investigating the Role of an Lpar2 Variant (ChEST973j21) in Cellular Signaling in B103 Neuroblastoma Cells**

*Symposium for Young Neurosciences and Professors of the Southeast (SYNAPSE), Presbyterian College, April 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016; Seminar, Department of Biology, Winthrop University, April 2016*

*Supported by a grant from the National Eye Institute of the National Institutes of Health*

**Student:** Han-Hua Hsu (2016)

Faculty Mentor: Eric Birgbauer, Ph.D.

CAS – Department of Biology

(BIOL 471 – Birgbauer)

Lysophosphatidic acid (LPA) is a bioactive lysophospholipid mediator that is involved in diverse biological activities and is well known as an extracellular signaling molecule. Fincher et al. found that LPA induces growth cone collapse and neurite retraction in the embryonic retinal axons of the chicken embryo. LPA can be found abundantly in various cells and tissues at varying concentrations. Many studies link LPA to human cancer and have shown that Lpar2 is highly expressed in several human organs and in tumorigenesis. We discovered a chicken cDNA clone (ChEST973j21) that is partially identical to chicken Lpar2 at the nucleotide level and we considered this chicken cDNA clone as an Lpar2 variant. ChEST973j21 consists of a fragment (from 125 bp to 490 bp) that matches to bases 1 to 367 in Lpar2, while the rest of the sequence diverges. This study is focused on identifying the biological functions of ChEST973j21 in cellular signaling and response in B103 neuroblastoma cells, by comparing it with Lpar2 from chicken brain, specifically as ChEST973j21 relates to Lpar2. B103 cells normally do not express LPA receptors and do not respond to LPA. We cloned ChEST973j21 and Lpar2 into a mammalian expression vector to express them in B103 cells. We are testing them in B103 cells exposed to LPA to investigate the role of this Lpar2 variant in B103 cells compared to Lpar2 in LPA signaling. We aim to discover whether ChEST973j21 could be a new LPA receptor that may respond to and/or be regulated by LPA.

### **Young Adults' Perceptions of Domestic Violence**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

**Students:** Michael Szeman (2017), Savannah Pewett (2017), Megan Lollis (2016), and Sydney Miller (2017)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Perceptions of domestic violence depend on gender, race, and socioeconomic status. Our study examined multiple perpetrator characteristics to assess the impact on perceptions of domestic violence. We also examined how personal experiences with domestic violence impacted individuals' perceptions. Participants were randomly assigned to read one vignette describing a domestic

violence incident between a heterosexual couple. The vignettes were varied in terms of the couple's race (African American or Caucasian) and socioeconomic status (high or low), creating four conditions. Following each vignette, participants responded to items to assess perceptions of the incident, the Acceptance of Violence Questionnaire, and the Domestic Violence Blame Scale. We also asked participants about their past experiences with domestic violence. In contrast to our hypothesis, an ANOVA revealed no significant differences in the way participants perceived the four descriptions of domestic violence. In general, participants viewed the situations as serious and inappropriate ways to resolve disagreements. Consistent with previous research, we found men to place less blame on the perpetrator. Ironically, male victims of domestic violence placed 100 % of the blame on the perpetrator, while female victims of domestic violence accepted blame themselves. These findings indicate that the public's perceptions of domestic violence may not mirror those of victims. An increased understanding of domestic violence factors may allow us to better identify and serve those involved.

### **Violence in Music Videos by Male and Female Artists**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

**Students:** Zane Repp (2016) and Luceil Harrison (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Music videos tend to have high levels of violent content, a fact that was established decades ago. However, what is less clear is how the genders of the people in the video and the gender of the artist relate to violence. Some studies have argued that men are portrayed as the more aggressive gender in music videos, while others argue that women are more aggressive. Much of this research is now dated, and current music videos may reflect society changes in gender roles. Thus, our study compared types of violence visible in current music videos by both male and female artists. We predicted that male artists would have a greater range of violent acts in their videos than female artists based the preponderance of previous research. To ensure that we were using current and popular material, we used the 30 music videos from Vevo's Top 30 Most Viewed Music Videos for the week of February 22-28, 2015. We created categories for unique types of violence based on the research of Kalia and Neuendorf. We found that artist gender did not predict violence in videos; however, violence seemed to occur in predictable ways. First, active and passive violence were simultaneously present. Second, videos containing cross-gender violence tended to contain more overall violence than videos containing same-gender violence. These findings provide some initial understanding of how music videos may be changing over time, perhaps reflecting societal changes.

### **Connections Between Sibling Relationships and Young Adults' Romantic Relationships**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

**Students:** Ashleigh Stallworth (2016), Jaclyn Evans (2018), and Kelsey Barton (2016)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Sibling relationships are thought to shape the way young people form later romantic relationships. Previous research has focused on the effect of siblings on adolescents' and young adults' romantic relationships. Our study examined whether similarities existed between young adults' current relationships with siblings and romantic partners. Participants were 65 adults with a mean age of 20.03 years ( $SD = 1.90$ ). We used a scale developed by Funk and Rogge that assessed relationship quality. Participants were asked to respond to this scale with their romantic partners in mind and then with their closest-aged siblings in mind. Contrary to our hypothesis, the overall quality of the sibling relationships did not predict the overall quality of the participants' romantic relationships. However, we did find some similarities in how adults perceived the people in these two types of relationships. For example, when allowed to select among positive and negative adjectives, participants made very similar choices for their siblings and their romantic partners. In other words, the characteristics that adults perceived in their siblings matched the characteristics they perceived in their romantic partners. Similarly, adults who perceived their siblings as friendly felt more comfortable confiding in their romantic partners. These findings suggest that, while sibling relationships may set the foundation and influence romantic relationships, they do not dictate those relationships. Sibling relationships vary as do romantic relationships, with many contributing factors.

### **The Venture Bros.: An Exploration of Trans-Human Satire**

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student:** Zachary Ryan Dennis (2017)

Faculty Mentor: David Meeler, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 350 – Meeler)

The paper explores the extensive trans- and post-human universe created within the animated television show *The Venture Bros.* Major science fiction archetypes are explored and compared to their satiric counterpoints within the show. In particular, normally one-dimensional sci-fi and horror standards, such as Frankenstein's monster and the Arch-nemesis, are shown to have drastically different outcomes with the addition of typical human personality flaws.



### Effect of Methamphetamine on the Gut Epithelial Barrier Function

*Summer Undergraduate Research Symposium, University of Minnesota, Twin Cities, August 2015; Annual Biomedical Research Conference for Minority Students (ABRCMS), Seattle, Washington, November 2015; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institute of Health*

**Student: Brionna Bennett** (2018)

Faculty Mentor: Sabita Roy, Ph.D., University of Minnesota, Twin Cities

CAS – Department of Biology

Methamphetamine (Meth) is a highly abused and addictive stimulant, with an estimated 35 million users worldwide. Meth usage elicits a plethora of adverse consequences in the body, affecting the brain, the circulatory system, heart, and liver. Recent studies by our lab suggest that Meth increases bacterial translocation within the liver, lung, and mesenteric lymph node. Bacteria can be translocated by two mechanisms – an imbalance within the microbiome or an impaired epithelial barrier. Therefore, in the present study, we analyzed the effect of Meth on epithelial barrier function using two cell lines – IEC-6 and CaCo-2. We hypothesized that Meth would modulate the barrier function by inducing cell death and disrupting the epithelial tight junctions. We found that a high dosage of Meth at 100 micromolar causes a significant reduction in cell viability at 24 and 48 hours in IEC-6 and CaCo-2 cells using a CCK8 assay; however, a low dosage of METH at 10 micromolar doesn't have the same effect. We also found that 10 micromolar Meth causes a significant increase in caspase-3 activity in IEC-6 cells. Furthermore, using Electric Cell Impedance Sensing (ECIS) and immunofluorescence, we observed a disruption in barrier integrity. In summary, this study shows that Meth treatment in high doses disrupts epithelial barrier function by modulating tight junction integrity and epithelial cell viability.

### Young Adults' Romantic Relationship Quality and Cross-sex Friendships

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

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

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Sleight)

Cross-sex friendships are platonic relationships between men and women. We examined how cross-sex friendships impacted young adults' romantic relationships. We hypothesized that women would be less comfortable with their partners having cross-sex friendships than men, and that better relationship quality would predict a higher level of comfort with cross-sex friends. Participants ( $n = 100$ ) took an online survey assessing friendship maintenance, friendship quality, and friendship satisfaction. We first defined cross-sex friendship, and then asked participants to picture their closest cross-sex friends. Participants responded to the three scales with those

friendships in mind. We subsequently asked participants to think of their romantic partners' closest cross-sex friends and answer the same questions with regard to those relationships. Last, we asked a series of questions to assess participants' attitudes toward their own and their romantic partners' cross-sex friends, and, in addition, the quality of their romantic relationships. Results revealed that young adults are more accepting of their own cross-sex friendships than they are of their romantic partners' cross-sex friendships. This pattern was especially true of the oldest adults, women, and people in lower quality romantic relationships, results that supported our hypotheses. These findings provide some of the first data on cross-sex friendships in the context of romantic relationships; these two types of relationships, romantic and friendly, have the power to impact one another and may be complicated by individual characteristics, such as age and gender.

### Going Beyond Entertainment: The Voice of the Playwright and Director in Theatre

*Good Boys and True, Department of Theatre and Dance, Johnson Studio Theatre, Winthrop University, March 2016; Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jasmine Gunter** (2016)

Faculty Mentors: Andrew Vorder Bruegge, Ph.D. and Janet Gray, M.F.A.

CVPA – Department of Theatre and Dance

(THRA 392 – Vorder Bruegge)

Many people think of theatre as a creative form of entertainment used to amuse the audience. However, theatre goes beyond entertainment. It has the power to spark discussion and bring about change or revolt. It is an art form with a mission, and that mission is to communicate. Theatre can be amusing and heart-warming, and the audience can go to bed at night knowing that the characters of that world will be happy, safe, and content. At other times, theatre can be devastating, raw, ambiguous and haunting, leaving the audience with unsatisfied endings that will leave one awake all night long. Despite the differences, there is something that is universal in every play: the message. The playwright has a clear message that he or she wants to communicate to the audience, and it is the director's responsibility to interpret that message and bring the story to life with the help of the actors. This presentation will include a small performance from the play *Good Boys and True*, by Roberto Aguirre Sacasa, in hopes of demonstrating how a playwright's words are brought to life and what creative acting choices are made to effectively communicate the story to the audience.

## Determinants of High School Retention Among Juvenile Offenders

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Matthew Stone** (2017)

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

CAS – Department of Sociology and Anthropology

The literature on deviant behavior among young populations has focused on the risk behaviors for dropping out of high school, which constitutes an important impediment for leading a productive life in the current economy. This paper instead focuses on the protective behaviors for high school graduation among delinquent youth. It explores the roles of parental expectations, family composition, family history, and mentoring intervention, controlling for other factors such as employment, socioeconomic status, income, education of parents, neighborhood conditions, gang affiliation, and race. I use data from the longitudinal study Research on Pathways to Desistance. This data set includes observations on delinquent youths in Philadelphia, Pennsylvania and Phoenix, Arizona from 2000 to 2004. The expected results would indicate that parental expectations and interventions by mentors in school settings are strong predictors of the likelihood for graduation.

## Misery Loves Company: Young Adults' Misery Levels, Best Friends' Misery, and Authenticity

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

**Students: Jordan Alexis McCoy** (2017), **Stephanie Copeland** (2017), and **Felicia Harnish** (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 302 – Sleight)

Happiness can be obtained through a variety of different methods and seems to perpetuate itself. Although happiness is a heavily studied topic, misery has received little attention. To fill this gap, our study examined how misery, happiness, and authenticity were related; we hypothesized that misery would be negatively correlated to both happiness and authentic living. In addition, we investigated the possibility that miserable people seek the company of other miserable people. Participants were 80 young adults, with approximately half of the sample being Caucasian and the remainder representing other ethnicities. Participants responded to our misery scale (based on that of Madanes), the Subjective Happiness Scale, and the Authenticity Scale. We then asked each participant to picture his or her “best friend” and respond to the misery and happiness scales answering as that friend. In general, results revealed that miserable people either associate themselves with other truly miserable people, or inaccurately believe that those around them share their misery. Misery was connected with self-alienation and a lack of authenticity, but was not predicted by other individual characteristics. It seems that misery, like happiness, might perpetuate itself. Miserable people had unhealthy perceptions of themselves and created (mental or actual) environments that maintained their unhappiness.

## A Woman's Nature: Ecofeminism in Carl Hiaasen's *Skinny Dip*

*Water in the World Conference, Winthrop University, November 2015*

**Student: Laurie Hilburn** (2016)

Faculty Mentor: Casey Cothran, Ph.D.

CAS – Department of English

(ENGL 200 – Cothran)

In the 21st century, a call to arms has been resonating throughout the United States: the natural state of our world is in danger and we are the culprits. Environmental awareness has boomed with economic and technological changes, resulting in green initiatives, or “going green,” presented to reduce the excess use of natural resources while increasing research in academic and public literature. According to Charles E. Bressler, ecocriticism is “the latest emerging field in literary studies that directly relates to who we are as human beings to the environment.” The rise of awareness has gathered “an eclectic group of writers, critics, and theorists who emphasize place, nature, and the physical world, attesting to the interconnectedness between humans (their culture) and nature.” Thus, in Carl Hiaasen's mystery *Skinny Dip*, not only is there the crime of attempted murder, but there is the crime occurring beneath the surface: the murder of the Everglades and the environmental crisis in Florida. Hiaasen's ecocritical subversion of the detective fiction formula transforms main character Joey from the victim into the victor. Because the violent crime enacted on her person transforms her into a detective rather than a dead body with no voice or agency, Joey is instead empowered to speak for herself and for the environment, pursuing the personal crimes against her as well as the larger crimes occurring against nature.

## Motivational Patterns of Fibromyalgia Patients to Be Physically Active

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

**Student: Jocelyn Leaf** (2017)

Faculty Mentor: David Schary, Ph.D.

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

Fibromyalgia (FM) is a rare chronic pain disorder that affects the joints and muscles, it is especially common among women with arthritis. FM negatively affects sleeping patterns, mood, fatigue, and cognitive functioning. Currently, there is no known cure for FM but physical activity has been shown to help reduce symptoms like pain and depression. Despite these benefits, it is often hard to motivate individuals suffering from FM to be physically active because of their current levels of pain. To help increase physical activity levels among those with FM, health practitioners need effective motivational strategies. Thus, the purpose of this research project is to explore the motivational patterns of individuals with FM suffering from pain to participate in physical activity, exercise, and/or rehabilitation. Comparing motivation to exercise with causes of pain, this exploratory research project will help uncover the motivational patterns of individuals suffering from FM. The sample will consist of patients ( $n = 25$ ; ages 45–65 years) from Fitness after Rehab (F.A.R.), a rehabilitation program for individuals currently suffering from FM.

## **To Be Her or To Be With Her: Female Identity and Romance in Daphne du Maurier's *Rebecca***

*11th Annual Department of English Graduate/Undergraduate Research Conference, Winthrop University, March 2016*

**Student: Laurie Hilburn** (2016)

Faculty Mentor: Leslie Bickford, Ph.D.

CAS – Department of English

(ENGL 300 – Bickford)

In Daphne du Maurier's *Rebecca*, feminist and gender theory combine to deconstruct the heteronormative ideologies of romance fiction. The traditional goal of romance fiction is heterosexual marriage, but *Rebecca* emphasizes queer theory to remove the limitations of heterosexual fantasies. While *Rebecca* follows the coupling of the nameless female heroine and wealthy but widowed Maxim de Winter, it is the narrator's obsession with Rebecca, the ghost of the first Mrs. de Winter, that has made the novel so well known, focusing more on the developing relationship between the two women. Despite Maxim de Winter's tangible presence, Rebecca's ghost is who inspires the protagonist to feel such emotional conflict typical in romance fiction, where she cannot differentiate whether she wants to *be* Rebecca or be *with* Rebecca. It does not matter that Rebecca turns out to be villainous—the narrator grows so enamored with Rebecca's confidence as an erotic and promiscuous woman that she arguably desires to emulate her identity, no less her sexuality, to make up for the distinct fact she is given no identity herself. Through the protagonist's conflicted relationship with Rebecca's memory, Rebecca is caught between wickedness and martyrdom, lost to society because society could not take her rebellion against it. Ultimately, the obsession with Rebecca that the nameless protagonist develops appears detestable but arguably is a sensualized form of idolization, providing new depths to a classic villain and fascinating new ways to read the representation of female identity and romantic relationships in romance fiction.

## **Relations Among Social Media Use, Relationship Quality, Depression, and Anxiety**

*Southeastern Psychological Association (SEPA) Annual Meeting, New Orleans, Louisiana, April 2016*

*Winner, Psi Chi Regional Research Award, SEPA Annual Meeting, April 2016*

**Student: Grace Ferguson** (2015)

Faculty Mentor: Merry Sleight, Ph.D.

CAS – Department of Psychology

(PSYC 471, 472 – Sleight)

Social media sites are a commonly used communication tool, especially for the development of romantic relationships. Use can lead to social connectedness or isolation. Tinder and Snapchat predict negative romantic relationship outcomes, while the use of Facebook does not. We sought to gain deeper understanding of media use and relationship quality, as well as to assess whether social media use impacted young adults' emotional stability. Adults ( $n = 86$ ) responded to an

online survey that assessed relationship satisfaction and commitment. Participants also responded to the Beck Depression Inventory and an Anxiety Scale. Then, participants responded to questions to assess experiences with social media use (based on previous work by the researchers). Results revealed that Tinder and Snapchat were associated with negative relationship outcomes, as well as increased anxiety and depression. Perhaps this is due to the tendency for these sites to be used for sexual purposes, such as soliciting short-term sexual partners. In contrast, Facebook was associated with positive relationship outcomes, perhaps because Facebook is targeted to a broader audience for broader purposes. Participants who used social media for sexual reasons, most often men, felt more shame, admitted to being less honest, and were less invested in their romantic relationships. Our findings demonstrate that social media use can impact romantic relationships, self-perceptions, and psychological health, dependent on the type of social media and the user's goals.

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

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE), Winthrop University, April 2016*

*Supported by grants from the National Institutes of Health, from the IDEA Networks for Biomedical Research Excellence (NIH INBRE) Program and the National Heart, Lung, and Blood Institute*

**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) proteins are 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, which will be electroporated into *Ciona* embryos, where it will be expressed. The NLS will direct the exogenous ciFoxO sequence to the nuclei 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 FoxO target genes, to determine the level of conserved function of FoxO family members in chordates during heart development. To date, we have successfully expressed the NLS in the vector and dechorinated embryos. Electroporation is underway.

### Winthrop's Greenhouse Gas Inventory: A Catalyst for Future Carbon Management

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student: Veronica Williams** (2016)

Faculty Mentors: Marsha Bollinger, Ph.D. and Christopher Johnson, B.F.A., M.Arch.

CAS – Department of Interdisciplinary Studies

(ENVS 496 – Johnson)

An inventory of greenhouse gases generated campus-wide has been compiled, based on data on consumption of natural gas, fuel oil, and gasoline; generation of solid waste and recyclables; and more. Data from FY 2015 were converted to metric tons of carbon, by use of a carbon calculator and inventory system hosted by the University of New Hampshire, for ease of comparison to other institutions. By analyzing these numbers, Winthrop's Sustainability Committee will be able to identify which areas of the inventory need primary focus to reduce carbon production, and ultimately mitigate Winthrop University's contribution to climate change.

### Environmental Issues in the Films of Hayao Miyazaki

*Second Annual Showcase of Undergraduate Research and Creative Endeavors (SOURCE),  
Winthrop University, April 2016*

**Student: Willard Ramsey** (2018)

Faculty Mentors: Laura Dufresne, Ph.D.; Laura Gardner, Ph.D.; Karen Stock, Ph.D.

CVPA – Department of Fine Arts

(ARTH 482 – Dufresne)

The director Hayao Miyazaki at the animation company Studio Ghibli is known for creating exciting and fantastical films. His films are generally marketed to children, yet they strike a chord with many adults who watch them. Looking at box office records, his 2001 film *Spirited Away* holds the record for being the highest-grossing film in Japanese history. This being said, it is understandable why Studio Ghibli's films have international popularity. Hayao Miyazaki's works are either his own or adapted from literature, and he incorporates many recurring themes; one of these is a focus on environmental issues, particularly pollution of the natural world. This is seen in many of his films, but especially *Ponyo*, *Princess Mononoke*, and *Spirited Away*. In these films, pollution is seen not only as destructive, but also as a call for change. All three films deal with the conflict of man's "progress" and how it can be detrimental to the natural world, because progress can also upset the relationship between man and nature.

### Exploring Word Relationships: Strategies to Actively Engage Students in Vocabulary Building

*41st Annual Conference of the South Carolina International Reading Association, Hilton Head,  
South Carolina, February 2016*

**Students: Hannah Brandon** (2017) and **Katelyn Dodd** (2017)

Faculty Mentor: Shawna Helf, Ph.D.

COE – Department of Curriculum and Pedagogy

Vocabulary is a fundamental building block in the development of proficient readers and writers. In 2000, the National Reading Panel emphasized the significance of language development, as it identifies vocabulary as one of the five essential components of reading. Birsch contends that students' vocabulary is continuously expanding through shared experiences with direct and indirect language experiences; therefore, it is critical that teachers engage students in exploring relationships between words. We were interested in (a) examining strategies that help students make connections to meaning and context and (b) assisting teachers in integrating this instruction into their regular literacy routines. We identified three strategies to actively engage students in word building: list-group-label, semantic feature analysis, and semantic gradients. For each, we designed demonstrations of the strategy, shared examples from classrooms (across content areas), and outlined steps for successful implementation, including instructional considerations for diverse learners and students with special needs.







# 28th 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 28th Annual Undergraduate Juried Exhibition, Rutledge Gallery, made by juror Crista Cammaroto, director of the Projective Eye Gallery at UNC Charlotte. The exhibition will be on display April 11 – July 1, 2016 (reopening August 15 – August 19, 2016).

Images of several award-winning pieces are shown on the following pages.

## **Karen Derksen, M.A.**

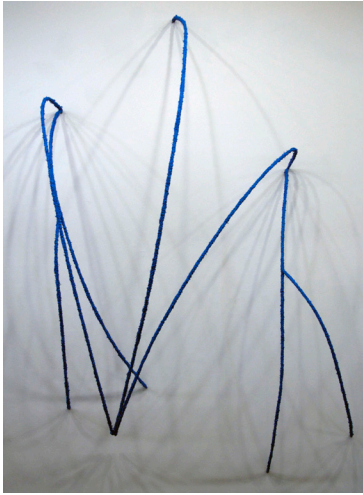
Director, Winthrop University Galleries

## **Artist**

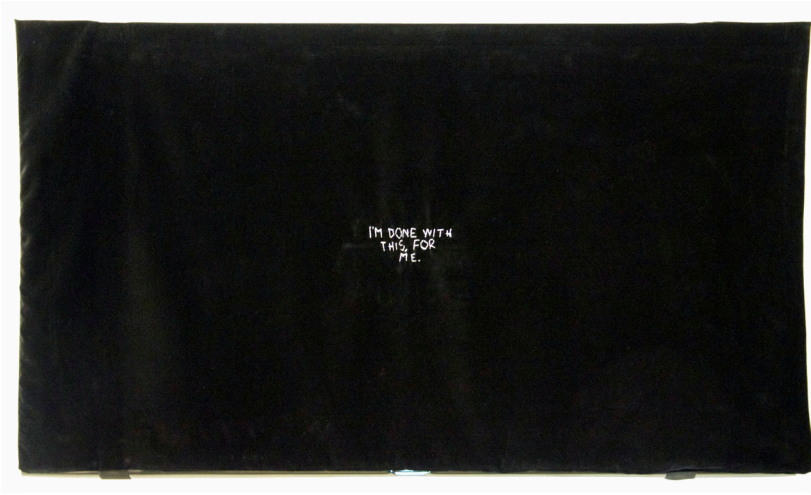
Emily Furr  
 Emily Furr  
 Emily Furr  
 Emily Furr  
 Craig Stewart  
 Caroline Kalayjian  
 Caroline Kalayjian  
 Caroline Kalayjian  
 Jay Wood  
 Jason Sandy  
 Lindsey Bargar  
 Macy Ruple  
 Grace Windey  
 Grace Windey  
 Taylor McGuirt  
 Christopher Brown-Emanuelli  
 Kitty Nix  
 Danny Byron  
 Dallas Austin  
 Dallas Austin  
 Sam Walton  
 Kristin Rowell  
 Kristin Rowell  
 Laura Knies  
 Morgan Willis  
 Brandy Scholl  
 Meaghan Westfall  
 Annie Doar  
 Brandy Scholl  
 Caroline Kalayjian  
 Will Lattman  
 Will Burke  
 Lindsey Bargar  
 Tina Hinojosa  
 Tina Hinojosa  
 Alexis Howard  
 Alexis Howard  
 Alexis Howard  
 Amy Ciravolo  
 Matthew Nielson  
 Kelly Williams  
 Khayla Chapman  
 Jordan Sommer  
 Olivia Adams  
 Passhunate Scott  
 Caroline Kalayjian and  
 Jordan Sommer

## **Title**

*Danny*  
*Will Featuring Sexy Cowboys*  
*Wings*  
*Visual Biography*  
*Putrid Desire*  
*Parasite Protein*  
*All there is, all there was, and all there will ever be*  
*Goodbye, Kiev!*  
*Big Blue*  
*Umbraculum*  
*Comfort in Vain*  
*Body*  
*Restriction: Movement : Vessel*  
*I am done with this, for me*  
*Presence 3*  
*Untitled*  
*Frippy Red*  
*Seventeen Bucks, Broke Even*  
*Untitled*  
*Home IV*  
*Cardboard Snake Head*  
*Designed Connection*  
*Untitled*  
*Nowhere Man III*  
*Slides*  
*My Home is Not*  
*Tube*  
*Raku Vase*  
*Necklace*  
*Complete One Orbit Everyday*  
*Stillness in Woe 1*  
*Dress Up*  
*Rotten*  
*Blue Spoon Handles*  
*Cold Connections*  
*Dakota*  
*A Gorgeous Fever Dream*  
*Mental Security Gate*  
*VII*  
*Untitled*  
*Over Comfort*  
*She's Got Rabeem*  
*Baseball Glove*  
*Remnants of Past Lives*  
*Untitled*  
*Cosmic Bits*



*Big Blue*  
Steel  
**Artist: Jay Wood**  
Best in Show



*I'm Done with this, for me*  
Black Velvet, TV, Silver Thread, Film  
**Artist: Grace Windey**  
1st Place



*Umbraculum*  
Wood  
**Artist: Jason Sandy**  
Juror's Honorable Mention

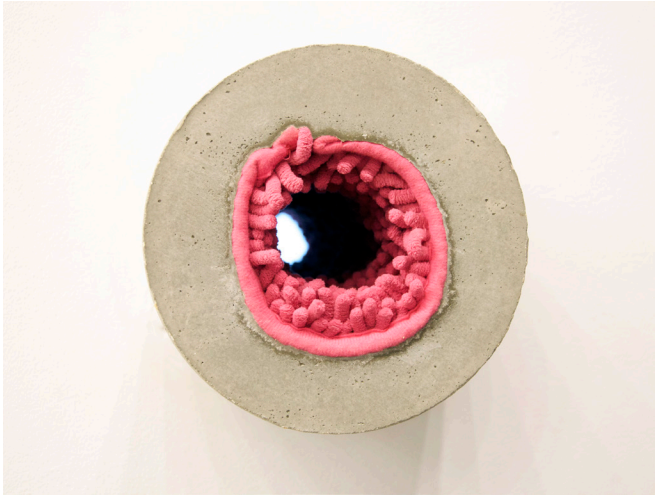


*Seventeen Bucks, Broke Even*  
Acrylic Paint, Lottery Tickets and Ink  
**Artist: Danny Byron**  
2nd Place



*Untitled*  
Wood, Steel Rods, Hot Glue, Dirt  
**Artist: Kristin Rowell**  
3rd Place





*Tube*  
Concrete and Carpet  
**Artist: Meaghan Westfall**  
Juror's Honorable Mention



*Complete One Orbit Everyday*  
Oil on Canvas  
**Artist: Caroline Kalayjian**  
Juror's Honorable Mention



*Dakota*  
Salt Print  
**Artist: Alexis Howard**  
Juror's Honorable Mention



*Visual Biography*  
Oil on Panel, Glass Vials, Hair, Finger Nails and Saliva  
**Artist: Emily Furr**  
Lewandowski Merit Award



*Slides*  
Glass, Slip Wood  
**Artist: Morgan Willis**  
Lewandowski Merit Award

# DEPARTMENT OF FINE ARTS SENIOR EXHIBITION

The 2016 Senior Exhibition in the Department of Fine Arts is a key component of capstone courses ARTS 500, Senior Studio Seminar for B.F.A. in art candidates, and ARTS 501, Senior Project Seminar for B.A. in art candidates. Degree candidates develop personal professional websites while also preparing a group exhibition that illustrates their conceptual and artistic growth. An exhibition website, [www.winthropseniorexhibition.com/](http://www.winthropseniorexhibition.com/), is developed by the candidates and is launched with the exhibition opening on April 15, 2016.

## Faculty and Administration

Mark Hamilton, Professor, Photography

Tom Stanley, Professor, Department Chair

Joshua Kuensting, Studio Technician

Carolyn Sumner, Assistant to the Chair

Dylan Bannister, Undergraduate Studio Assistant and Webmaster

## Artist Statements

### Dallas Austin, B.F.A. in Art

I incorporate a new technique in each new piece of artwork I make. This is the nature of my process; each time I accomplish something in a work, I move on to something else I have not yet done. It is because of this, mentally, that until recently my artwork has not stood as a cohesive body. I am currently focusing on cement casting and experimental use of heated wire and glass. These experiments have developed into a Home series that has emerged from heating wire between sheets of glass. This led to embedding heating elements in cast cement shelves to melt plastic objects on top of them. My work is a comment on family life, the transition out of the household and the absence of family.

### Joshua Baker, B.A. in Art

Throughout my artistic career, I have endeavored to explore a variety of media in order to best express the thematic concepts with which my art is concerned. My work is a medium for my expression of the human condition. The binary oppositions found within humanity fascinate and inspire me to create; life and death, growth and destruction, memory and loss, and the constant human struggle against the passage of time drive me to create. I consider my work consistently experimental in its process. I believe that my experimental nature allows me to continually grow as an artist, remaining curious and passionate.

### Dylan Bannister, B.F.A. in Art

My work is informed by the analog video aesthetic. Fusing my fascination with nostalgia and technology, my imagery originates from captured stills and clips of dated VHS recordings. I often rework these images, allowing more traditional media such as drawing, printmaking, and painting to be the vehicle for the final piece. In using electronics such as VCR, VHS, and CRT televisions as generators for image-making, I aim to push the boundaries of how this technology can be viewed as fine art. My greatest artistic challenge is bridging the opposing forces in my work: technological and traditional, digital and physical, static and kinetic.

### Lindsey Bargar, B.F.A. in Art

Photography can be manipulated into the most beautiful or the strangest of imagery. With such an expansive medium, I focus on never getting stagnant. In recent works, I am experimenting with portraiture while not losing a sense of artistic integrity or sense of humor. My photography stands out, with bold colors, strong focal points, and simplicity tied to dynamic lighting. Though my recent focus has been portraits, I also enjoy shooting landscapes and still life photography. My hope is to continue to pursue photography and be a part of an artistic community that encourages other photographers to enter the art world.

### Ariana Brown, B.F.A. in Art

People fall apart and put themselves back together, but are forever changing. The intention of this body of work was to explore a physical manipulation of large format negatives. Cutting up the portrait and putting it back together for printing is representative of the human condition. Though the negatives are put back together, the changes and fractures are very evident. Some of the negative pieces are reassembled with water between two glass panels and printed on silver gelatin paper. Other negatives are sewn together with thread and printed.

### Amy Ciravolo, B.F.A. in Art

What is usually not given a second glance can be the most interesting. I give homage to overlooked objects by creating paintings inspired by them, using abstract elements to illustrate my impressions of the objects. Flowing forms, bright colors, and structural lines are painted into a shallow environment that utilizes and shows the beginning layers of the painting. I use the build-up of paint and line to capture my first impressions as well as my full observation, while creating a space where the ordinary objects will be given a second glance.

### Shambria Figueroa, B.A. in Art

Instead of thinking of my dyslexia as a disadvantage, I used it to help see things others might miss. I found others around me used different forms of communication outside of their voices; one of these forms being American Sign Language. It was the discovery of this language here at Winthrop that led me to want to understand and explore hand movements and motions. Through the rapid movement of the hands I intend to capture the human hand in motion using multimedia.

**Emily Furr, B.F.A. in Art**

My interest in portraiture began with an exploration of depth with color, beginning with still life subjects and then more prominently in portraits. I became interested in the process of painting people. The paintings became translations of how I see my subject and in turn how that is rendered in paint. I recently began incorporating patterns and fabric to create portraits that go beyond just painting a face. I choose colors, patterns, and fabrics based on what I know about the subject. Experimenting with fabric led me to embroidery and how textiles and thread could be incorporated with the paint. I found correlations in creating a portrait with embroidery in comparison to a portrait in paint. Combining the painting with embroidery is a satisfying conglomerate of two media that has peaked my interest. The combination created a new style and depth within my portraits.

**Dakota Greywolfe, B.F.A. in Art**

The making of sculpture with natural materials allows me to immerse myself in my environment. Experimentation, collection of materials, and extensive research goes into the creation of my pieces, along with a host of ethical concerns that keep me from relying on traditional materials like steel, bronze, plastic etc. to make sculpture. To maintain a wholesome and organic studio practice is a difficult task, but it is this challenge that keeps me interested in creating sculpture.

**Aimee Harman, B.A. in Art**

This body of work represents a type of curatorial process illustrating people I've come to know, or want to know better, as artists. They reflect Edgefield in different ways and represent portions of the town that I love.

**Alexis Howard, B.F.A. in Art**

In this series I combine natural elements and portraiture through the use of digital photography. My compositions often include painted backdrops with soft lighting and digital manipulation. My use of bright, sometimes calming colors, contrasts with the emotion evoked by the subject.

**Ducky Jones, B.F.A. in Art**

My work has been a direct response to my healing and a tool for my recovery. Because of the abuse I suffered at the hands of my mother after my father disappeared, I have been diagnosed with Post Traumatic Stress Disorder. I dissociate and have incredible nightmares and flashbacks of my childhood. My work is completely composed of documents and relics of my past; it is the physical and mental deconstruction and reconstruction of my memories as I have unveiled the truth. Throughout my on-going recovery, I am remembering details and memories I had forgotten, and I am reconnecting with the family from which my mother intentionally isolated me and forced me to fear. I have fabricated a fairy tale where I am the hero, a lamb whose mother is a wolf in sheep's clothing. In the story, I realize that the flowers growing on my mother's back flourish not because she is nurturing, but because she is rotting, and I am currently making works with these fairy tale characters to exaggerate my victory. Though mentally and emotionally exhausting, this work has forced me to mature and evolve, pushing through my mental illness and emerging a stronger person.

**Caroline Kalayjian, B.F.A. in Art**

My work has been influenced by my interest in chemistry and physics. The charts and graphs that serve as visual representations of different molecular reactions and compositions are the visual and conceptual generators of my work. I work with painting, screen printing and multimedia collages to look past the human as a whole and examine the unseen actions that make life possible, and the difficulty that comes with understanding the various scientific and emotional relationships therein.

**Jenna Lilly, B.A. in Art**

I was taught at a young age that every single step of a work should be able to stand alone – every step should speak for itself. Keeping this in mind, I have a love for the basic working of a piece – from the neatness in craft to the composition of a layout. While my works vary greatly in medium, size and technique, I draw much inspiration from letter forms in different fonts and sizes. The seeming simplicity of a letter, I consider to be one of the most fascinating and complex forms that are overlooked every day. Flipping through magazines, I find myself completely enthused and at ease with the workings of a layout, a catchy title and bold typeface.

**Nicole Love, B.A. in Art**

The nature of my work is mostly mixed media and conceptual. Over the past three years, I have experimented with paper and Japanese origami. The inspiration for this origami installation primarily came from my wonderful mom who seemed to always be one step ahead of me. She constantly warned me to be cautious of things I should not do. I dedicated this installation to her titling it, “What My Mother Never Warned Me Would Happen”, resulting from our time spent apart. In this conceptual installation piece, I have folded over four hundred paper cranes – mostly recycled material – for each day of 2015 and the beginning of 2016. Inside each individual paper crane is a record of a significant event that occurred on that particular day.

**Abigail O'Daniel, B.F.A. in Art**

For this series, I was inspired by the family photographs that my grandmother gave me over the summer. I started thinking about the phrase “secret family recipe,” and how often family gets treated like a recipe. We are raised in an environment where a particular outcome is expected. The recipe of family is what brought about these photographs. I used my own family photographs and albums, which led to an exploration of self-portraiture with the photographs. I used a large format camera and all photographs were taken on black and white 4x5 film.

**Aaron Padgett, B.F.A. in Art**

Working with ceramics, I try to find ways to reference the natural world and bridge the separation between mankind and nature. I do this by focusing on a cycle that connects every living thing on the planet, being life, death, and rebirth. I start by constructing the human form with clay and imprinting tree bark textures on the surface. The result is a heavily textured, hollow form that is fired and placed half-way into the ground with new plant life growing from the body. The basic intention is to evoke the feelings of mortality and humbleness, by understanding that our bodies are made of ever-changing matter that serves us today, and serves another tomorrow.



### **Eric Padgett, B.F.A. in Art**

My sculptures and drawings are both intuitive and exhibit a sense of meditative repetition in building forms and surfaces. My process is based on repetition and is pulling from craft, while at the same time looking for opportunities to expand on what the technique offers. My materials are usually fibrous natural material, such as ropes, threads, vines and bamboo, but I also have juxtaposed these with steel and concrete. While using the materials that are readily available, the overall intention is to embody these objects with an implied human quality from implied use or proximity to other components.

### **Nia Ricks, B.F.A. in Art**

To me, the process of painting is more significant than the final product. My work is driven by intuition, and my process is spontaneous. Currently, I have been working on a series of nonrepresentational splatter and drip paintings. Nia Aloia was created haphazardly as I tested techniques and colors for other paintings. The subconscious choices I made led to a piece to which I feel very connected. I think of this piece as a visual representation of myself. The painting Aloia Eloise is named for my grandmother who passed in 2015. I made this painting the night I found out she had passed. It is full of sadness and grief, but I also consider it a celebration of her life and the love I feel for her.

### **Macy Ruple, B.F.A. in Art**

As a sculptor and photographer, I explore different aspects of memory and the passage of time through self-portraits. These portraits rarely reflect parts of my actual body, but instead reflect the self through experiences and memories. The portraits are presented to the viewer in a way that requires them to reflect on the same or similar memories in their own life. In photos of my sculptures, I explore dramatic light and shadow to create interest.

### **Brandy Scholl, B.F.A. in Art**

The main focus in my work is the emotional relationship between home, family, and self. I use a variety of materials to create minimalistic installations and wall pieces. The vast majority of my work involves glass, steel, thread, and reflective surfaces. My recent work is primarily about tension in the home by using seemingly strong materials, such as steel and mirror, to give a false sense of security that is ultimately shattered in the sudden destruction of the piece. My goal is to create installation pieces that evoke a strong emotional reaction from the viewers.

### **Passhunat Scott, B.F.A. in Art**

My work revolves around the idea of graphicacy, which is the ability to interpret information in the form of an image. This concept of visually communicating an idea is something that has always attracted me to the arts, especially sequential art. Sequential art embodies this idea of graphicacy, and it is this ability to tell a story through images that I explore in my paintings.

### **Kathryn Shaw, B.F.A. in Art**

These pieces are about the relationship and contrast between form and texture, with the intention to inspire a sense of familiarity as well as curiosity. The shape of each piece mimics multiple elements of the natural world, such as the pattern of flower petals or the form of a nest or egg sac.

However, none of these works displays an exact form, each instead suggesting at many familiar shapes. Over these forms are distinct textures intended to further the relation to nature while also being foreign and with no hint to its material. Each piece is made from purchased handmade paper that has been formed around an internal frame. The process is long and fairly intuitive, each shred of paper painted with a glue mixture and then placed and formed by hand.

### **Justin Squirewell, B.A. in Art**

“All we have to believe with is our senses, the tools we use to perceive the world: our sight, our touch, our memory. If they lie to us, then nothing can be trusted. And even if we do not believe, then still we cannot travel in any other way than the road our senses show us; and we must walk that road to the end.” (Neil Gaiman, *American Gods*) I wish to utilize sensory perception to navigate and explore the human form via classical mythology and to engage my viewers with a diverse body of work depicting models as ancient Egyptian gods and goddesses. I was inspired to photograph the human form in a mythological setting. I am connected to this body of work simply because of the passion I have for mythology and the creativity used to express my unique perception on classical mythos. I have found that the unique features of the subjects greatly influenced the end results of the images. When photographing different aspects of mythos, different qualities and personalities of the subjects produce interesting photos. Each image is rendered to a greater or lesser degree by the persona of the subject.

### **Kathryn Thoma, B.A. in Art**

My research focuses primarily on work by female artists and how they approach concepts such as power and gender. Feminist and revisionist theory has revealed the difficulty that women artists face when approaching images such as the male nude. The current visual language of art, which has been developing for thousands of years, struggles to adapt to the concepts that these women are trying to portray, as art for so long has been a male-dominated field. I am using my research to further clarify how this language originated and how women artists might continue to create their own visual language while avoiding the problems that exist within the current one.

### **Samantha White, B.A. in Art**

Through the years, I have struggled to create artwork for the classroom because it never felt like it was mine. When I create a work of art, I sit down and do it for fun and relaxation. I do not limit myself to one medium, style or concept, but rather take my inspiration from the world around me and decide what medium to portray that piece after the thought has been formed. My hobbies, my interests, and anything that I would deem enjoyable makes its way into my artwork. In these two pieces, my fish has become my inspiration.

### **Jay Wood, B.F.A. in Art**

*Orchis adamanteus* is an exploration of drawing in space continued from my previous work. This work juxtaposes the delicate nature of curvilinear lines with the imposing and threatening underlying materiality of the steel. This drawing in space seeks to engage viewers by simultaneously pulling them in for a closer look while disconcerting them with its defensive demeanor and aggressive protrusions.

# DEPARTMENT OF DESIGN

## SENIOR EXHIBITIONS

Students in Interior Design and Visual Communications in the Department of Design participate in exhibitions of their portfolio and thesis work.

### Interior Design Senior Portfolio/Thesis Students

Ellen Cobb

Taylor Farrell

Courtney Guy

Tung Nguyen

Amy Schoch

Katherine West

### Visual Communications Senior Portfolio/Thesis Students

Chelsea Chao

Ah Young Cheong

Althea Holenko

Kaitlin Larke

Kelsey Law

Yaritza Luna

Reagan Martin

Kyahdric Moses

Andrea Perkins

Tara Phillips

Eden Reeves

Tatiana Rice

Ashley Scarborough

Abdul Hakim Shabazz

Amber Thompson



# DEPARTMENT OF THEATRE AND DANCE FESTIVALS AND SHOWCASES

## Spring One-Act Festival

April 15-17, 2016 – Faculty Coordinator, Sarah Provencal

A lively, entertaining, and eclectic mix of one-act plays directed by advanced theatre students. The following is a list of the one-act plays and their student directors:

*How to be a Good Son* by Julia Cho, directed by student **Justin Ezekiel Jones**

*Heart of Hearts* by Jim Daniels, directed by student **Brianna Stillinger**

*De Profundis* by Tim Mogford, directed by student **Maxx Saltarelli**

*Like Dreaming, Backwards* by Kelli Powell, directed by student **Lauren Roberts**

*13 Ways to Screw Up Your College Interview* by Ian McWethy, directed by student **Ashley McHam**

*Big Butt Girls, Hard-Headed Women* by Rhodessa Jones, directed by student **Nehemiah Hope**

## Fall One-Act Festival

November 20-22, 2015 – Faculty Coordinator, Sarah Provencal

A lively, entertaining, and eclectic mix of one-act plays directed by advanced theatre students. The following is a list of the one-act plays and their student directors:

*All's Well That Ends Wrong* by Greg Kachejian, directed by student **Caitlyn Bryant**

*Little Red Riding Hood* by Billy Aronson, directed by student **Sarah Stewart**

*The Sex Lives of Superheroes* by Stephen Gregg, directed by student **Garrett Whiffen**

*12 Rounds* by S.W. Senek, directed by student **Madia Medico**

*The Spotted Man* by Walter Wykes, directed by student **Frank Zellers**

*Liliane: Resurrection of the Daughter* by Ntozake Shange, directed by student **La'Rae Carmichael**

*One Tit, A Dyke, and Gin!* by Pennell Somsen, directed by student **Rachel King**

### **Junior Choreography Showcase**

April 22-24 – Faculty Coordinator, Emily Morgan

Modern dance works choreographed by advanced dance students. The following is a list of the student choreographers and the titles of their dance pieces:

**Natalie Bradley:** *PAINted*

**Danielle Cannon:** *Kaleidoscope*

**Sydney Carr:** *DePrivatus focus*

**Kennedy Crosby:** *What is Home?*

**Jennifer Kight:** *me-ativity*

**Shelby Lewis:** *Left Alone*

**Megan Long:** *Final Solution*

**Jessica McFarland:** *In the eye of the beholder*

**Ashley Minton:** *Reverb Effect*

**Iris Myers:** *The Heartest Part: Asystole*

**Hannah Potter:** *Etallico*

**Billy Thompson:** *F. A... D.... E.....*

**Carly Thompson:** *Reverie*

**Carmen Trull:** *let there be light*

**La'Raine Turlington:** *trust, again*

### **Senior Choreography Showcase**

December 4-6, 2015 – Faculty Coordinator, Emily Morgan

Modern dance works choreographed by advanced dance students. The following is a list of the student choreographers and the titles of their dance pieces:

**Bridget O'Connor:** *Fireside*

**Kristin Ramirez:** *Thoughts in Existence*

**Niki Credit:** *What Makes Life So Sweet*

**Devon DiFederico:** *Experiences of an Idea*

Performed for the Informal Concert at the American College Dance Association (ACDA) Southeast Conference, Atlanta Georgia, March 2016

**Kaila Dockal:** *Can we go back?*

Performed and adjudicated at the American College Dance Association (ACDA) Southeast Conference, Atlanta Georgia, March 2016

**Michael Arrington:** *Beautiful Nightmare*

**Mason Diaz:** *Common Thread*

**Dashae Middleton:** *In-Rem*

**Danielle Cannon:** *Search in Progress...*

**Kristin Ward:** *Hoopla!*





# ADDITIONAL PROJECTS

## Homophobia in the Black Church

**Student:** Tammy M. Walls (2016)

Faculty Mentor: Kristin Beise Kiblinger, Ph.D.

CAS – Department of Philosophy and Religious Studies

(RELG 495 – K. Kiblinger)

This paper focuses on homophobia, which is defined as the fear and hatred of homosexuality and homosexual people. It looks primarily at homophobia within the Black Church and its impact on the black community. First, this paper explains the meaning of homophobia generally and then it discusses issues with interpreting the Bible on matters pertaining to homosexuality. Turning to the black community, this paper then discusses homosexuality among black men, in particular, in relation to their religion. After providing brief background on the origins and characteristics of the Black Church, the paper next offers an explanation for why homophobia is so prevalent within the Black Church. Growing out of the author's compassion for gays and lesbians condemned by their churches and from concern that the Bible not be used as a weapon, ultimately the paper argues that the Black Church's homophobia is in opposition to its Christian message, mission, and historical traditions.

## Nationalism and the Golden Age of Mexican Cinema

**Student:** Sam Alexander (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

A significant number of directors and other filmmakers making an impact in Hollywood are either from Mexico or of Mexican-America descent. Alfonso Cuarón, born in Mexico City, won the Best Director award at the Academy Awards in 2013 for his film, *Gravity*. Alejandro G. Iñárritu, another native son of Mexico City, won the Best Director award and other awards the next year at the 87th Academy Awards for his film, *Birdman or (The Unexpected Virtue of Ignorance)*. Despite their heritage and place of birth, however, there is criticism that Mexican filmmakers in Hollywood are producing Hollywood films and not Mexican cinema, primarily because their films are financed by Hollywood instead of the Mexican film industry. In light of such criticism, my paper examines the peak of truly Mexican films. The Golden Age of Mexican Cinema – generally regarded as ranging from the late 1930s to late 1950s – occurred both when Mexican filmmakers produced films with a strong sense of nationalism (films distinctly Mexican) and during the Cold War, when the United States was actively trying to display strong political and cultural power throughout Latin America. This thesis is supported by analysis of the films by prominent directors of the era, such as Emilio Fernandez and Fernando de Fuentes, alongside the events occurring during the Golden Age.

## United States Involvement in the Assassination of Rafael Trujillo

**Student:** Mary Margaret Guilbault (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

My study of the Dominican Republic focuses on the leadership and demise of Rafael Trujillo. I address the question, “To what extent did the United States play a role in the assassination of Rafael Trujillo, and was the U.S. justified in having such a role?” I discuss Trujillo's upbringing, his journey in the military, and how he became President and Dictator of the Dominican Republic and offer evidence of American interference in or (some might say) help for the Dominican economy. Through the use of Dominican based biographies and declassified American documents, I show the influence of the United States. Many of my primary sources came from primary documents of the U.S. Department of State, Foreign Relations of the United States, and many of my secondary sources came from scholars in the Dominican Republic. While the United States meddled in the political scene for the Dominican Republic, it is evident that Trujillo brought his ending upon himself and that the citizens of the Dominican Republic opposed him, with or without the United States.

## Chile 1963-1973: Peace Corps Ambitions Met With Reality

**Student:** Kaylee Oliver (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

Chile was a perfect playing ground for the Peace Corps in 1961 when the program was first created, or so it seemed. Although the Peace Corps enjoyed initial success in recruitment and ideology, the Corps was no match for the harsh realities of political change in Cold War Chile. Ultimately, the failure of the Peace Corps in Chile was embedded in its rough start, the Chilean political upheaval, and extended American involvement in Chile, especially in elections. It is important here to also explore why Chile was chosen as one of the first destinations of the Peace Corps. In conclusion, the Peace Corps was merely another way for the United States to gain influence in the country. This reveals that U.S. Cold War intentions were less democratic than had been preached. Overall, this is a significant issue because it connects to wider trends of the limitations of American influence in Latin America during the Cold War. The primary documents most useful to this study were those from John F. Kennedy, Sargent Shriver, and Peace Corps volunteers to establish the goals of the Peace Corps and the nature of the training. U.S. government documents and comments from Eduardo Frei Montalva and Salvador Allende contributed to setting the stage for the political upheaval in Chile and how the United States interpreted Chilean politics and justified election intervention.

## 1968: The “Year of Peace” in Mexico City

**Student:** Briana Schoen (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The year 1968 was a chaotic time for Mexico City. In October, the city was set to be the first Latin American host of the Olympic Games. In the midst of progress, President Diaz Ordaz hoped the Olympics would elevate the status of Mexico in the eyes of “First World” countries such as the United States. Students throughout Mexico had been protesting, and the protests soon became violent. About ten days before the Games began, the Tlatelolco Massacre occurred and 1968 in Mexico City would forever be remembered for a reason other than the Olympics. The number of people killed in Tlatelolco Square remains a mystery, and people are still unsure about whom to blame for the killing. Even recent Mexican presidents have been questioned about their involvement, as family members of the victims are still searching for answers. With the approaching Olympics, the Mexican government did everything in their power to keep the massacre hidden. Using recently declassified National Security Archive and U.S. State Department documents, as well as first-hand accounts of sports journalists in Mexico City, I explore the United States government’s relationship with Mexico at the time and argue that President Diaz Ordaz and his regime suppressed the student protesters with violence and manipulated the media to create one of the biggest cover-ups in Mexican history, just to save face in time for the Olympic Games.

## A Diplomatic Fall from Grace

**Student:** Elizabeth McDonald (2015)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

“Falling from grace” is a phrase used to describe when a person does something that makes him or her appear to lose respect, status, or prestige. This paper examines Manuel Noriega’s cooperation and collaboration with the United States up until his downfall in the late 1980s, using documents from the United States government and international primary sources on the Noriega trial. The thesis of the paper asserts that Noriega did not fall for the human rights violations as had been originally implicated by the U.S. government, but actually because he no longer proved useful when the United States decided to pull out of Latin American countries. The paper is broken down into three sections detailing the invasion (Operation JUSTCAUSE) responsible for deposing Noriega, U.S. perspective, and Noriega’s perspective. First, the invasion is discussed, and the following two sections pick apart details of the years of Noriega-U.S. collaboration. Sources such as the diary of Oliver North and emails of Admiral John Poindexter provide more than enough evidence for the U.S. side of things. Because additional sources from Panamanian perspectives are not available, most primary sources come from the United States or surrounding countries. The point of this paper is not to remove the monstrous title from Noriega, but to examine the role versus intention of the United States in Latin America during the Cold War.

## National Front, Cold War Context

**Student:** James C. Ramsey (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

Nothing occurs in a vacuum, and this is especially true of Latin America in the Cold War. As a result, the creation of the National Front in Colombia poses a very important question. How did this new government arising from conflict fit into the geopolitical landscape of the early Cold War? Based on available documents, the evidence supports the conclusion that the National Front was not significantly influenced by the Cold War, despite sharing many broad similarities with other new governments arising during the period. To the contrary, the leaders of Colombia and the National Front appropriated the international conflict for their own domestic conflicts. The importance of understanding the context of the National Front is that Colombia provides a very different narrative in the story of Latin America during the Cold War and shows how a government within the hegemony of the United States was guided by its own self determination and even used the Cold War to its advantage. Colombian sourcing is scarce on the specific time period in question and, as a result, the bulk of primary materials used come from declassified United States government documents and newspapers articles. While there is an inherent bias present due to the perspectives all being western in origin, they help to emphasize the lack of direct involvement by the U.S. at the time; a base of secondary sources including Colombian scholars helps provide a more complete interpretation of events.

## Why the Bay of Pigs Invasion Would Have Never Worked!

**Student:** Renna Hampton (2015)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

“For I am convinced that we in this country and in the free world possess the necessary resource, and the skill, and the added strength that comes from a belief in the freedom of man,” said President John F. Kennedy after the disastrous outcome of the Bay of Pigs invasion in 1961. The intent of the Bay of Pigs Invasion was to overthrow its leader, Fidel Castro. Most historians agree that this invasion was a complete loss for the United States of America, but there are many different approaches as to why this invasion was unsuccessful. While each historian who has written about this invasion differs in interpretation of the invasion, all demonstrate why this invasion never could have succeeded. While the invasion was poorly planned and executed, the most important reason it failed is that the U.S. Central Intelligence Agency was feeding President Kennedy false information about Cuba.

### **Thorns in the Hide of the Beast: The Inevitability of the Tlatelolco Massacre, Mexico 1968**

**Student:** Desiree LaFreniere (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The developing Mexican student movement coupled with the approaching Olympics in a country controlled by a single-party authoritarian government guaranteed the violent response by the government of Mexico known as the Tlatelolco Massacre. There are three main aspects to consider. First, fears of communism flared, resulting in extreme responses. Secondly, as the student movement progressed, the protest gained supporters, strength, and increased the intensity of their protest tactics. Finally, a larger amount of evidence points to the Olympics as being the principal factor. All of these culminate as the Tlatelolco Massacre, an inevitable event crafted during the summer and fall of 1968. This paper was constructed with use of U.S. documents from the embassy in Mexico as well as DIA and CIA reports. This paper is somewhat evened out with the use of Poniatowska's Massacre in Mexico, a collection of translated student propaganda and personal accounts published three years after the conflict. Also from the Mexican perspective, a translated speech from the president and images offer further primary evidence. Secondary sources, including journal articles and monographic books support this argument. Interpretations and arguments include gender and western neo-imperialism, as well as ties to global student movements, the Olympics, or Cold War. This take on October 2nd in Tlatelolco, Mexico, attempts to remain neutral when evaluating the actions of the government and even presents a reality in which the government was provided with seemingly sufficient provocation in handling a student movement so violently.

### **Cuban Baseball in the United States during the Cold War**

**Student:** Andrew Gates (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

My research shows just how much influence the Cold War actually had. In the Western Hemisphere, this “war” affected every aspect of life, even sports. Baseball relations between the United States and Cuba started off great. A growing number of Cuban players continued to enter the U.S. with hopes of making it to the Major Leagues. But, in 1959, that all changed: Cubans were no longer able to leave Cuba and come to the United States. My research explores the exact cause and effect of that change between these two countries. I focus on the reasons behind a Cuban player making the choice to come to the U.S. My research shows the reasons for defection have to do with the player's financial background and upbringing. My primary sources show that baseball was two different sports in U.S and Cuba; everything was different, from the game play and economics to the social lives of the players.

### **The Implications of the Freudian Castration Complex in *King Lear***

**Student:** Jessica Doscher (2017)

Faculty Mentor: Matthew Fike, Ph.D.

CAS – Department of English

(ENGL 305 – Fike)

This paper presents a Freudian analysis of the theme of castration in *King Lear* and examines the related gender divisions. The previous criticism includes Catherine Cox's discussion of these divisions and Peter Rudnytsky's claim that Lear's violation of them leads to his feminization, the destruction of his phallic psyche, and his worldly downfall. Freud's concept of castration anxiety provides a way to further Rudnytsky's line of thought by bridging the gap between psychosexuality and politics. Freudian analysis highlights Lear's fear of losing his masculinity to his evil daughters and the patriarchal underpinnings of his fear. In addition, the king's relationship to his good daughter, Cordelia, reveals an Oedipal elevation of her to mother status. Psychological issues with all three daughters yield negative consequences when the kingdom is divided and primogeniture is violated. Lear's punishment is psychological castration: he becomes feminine and loses both his political power and his sanity, plunging into a personal chaos that parallels the storm on the heath. The psychosexual dimensions of the characters of *King Lear* and the political implications of gender thus suggest that king and kingdom are closely connected. Insofar as both fall, the play critiques the ties between ruler and state and the havoc to which emasculation can lead.

### **U.S. Trained Death Squads in Guatemala**

**Student:** Dwayne McClain (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

For decades, the School of the Americas, or Western Hemisphere Institute for Security Cooperation, now known as WHINSEC, has trained foreign government personnel in methods of counterinsurgency training and tactics. The purpose of the school was to train Latin American military personnel to enforce anti-communism in their home countries. There is conclusive evidence to prove that the School of Americas played a key role in the training of military personnel who comprised four of eight military officials in the cabinet of Guatemalan Dictator Fernando Romero Lucas Garcia and six out of the nine officials that served President of Guatemala Efraín Ríos Montt from 1982 to 1983. In 1983, his own minister of defense, Oscar Humberto Mejía Victores, deposed Montt. Mejía Victores served as President of Guatemala from 1983 to 1986, and five out of ten officials who served under him also graduated from the School of Americas. These brutal military dictatorships ruled Guatemala from 1978 to 1986 and were directly responsible for a portion of the human rights violations that occurred during Guatemala's gory civil wars. This paper shows that the School of Americas trained personnel directly responsible for the human rights violations and genocide in Guatemala. It shows that the United States was aware of the carnage that took place in Guatemala and was more concerned with protecting U.S. interests in Guatemala than the human rights of the citizens there.

## The Eagle in Guatemala: The United Fruit Company and the 1954 Guatemalan Coup

**Student:** Christopher Sandlin (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

Over the course of this paper, I examine the events and motivations surrounding the 1954 CIA-backed coup in Guatemala. With the rise of the U.S.S.R. as a competing superpower after World War II, the United States abandoned non-interventionism and quickly returned to the same hegemonic tactics that it had been using in Latin America since the 1890s. Though contemporary historiographic study implies that the intervention in Guatemala occurred solely in the interest of halting the spread of Communism in the Western Hemisphere, I argue that the primary motivator was the preservation of the interests of the United Fruit Company. The company was not only a major player in the destabilization of the Arbenz presidency; it was also tied on a fundamental level to the continuance of U.S. economic superiority throughout Latin America, and to the private interests of multiple U.S. policy-makers. Through careful study of primary documents, I prove that the United Fruit Company provided early support to Carlos Castillo Armas prior to U.S. intervention, and that the United States' goals were tied directly to the corporation's success. In discussing this topic, I rely on a significant number of declassified primary documents that are available from the CIA through the Freedom of Information Act. These documents give considerable insight into the CIA's perception of Castillo Armas and the United Fruit Company and their roles in organizing the coup. In addition to this database, I utilize the *Foreign Relations of the United States* series for further primary documentation.

## Data Mining to Improve Player Engagement

*Supported by the Mathematical Association of America Preparation for Industrial Careers in Mathematical Sciences (PIC Math) Program, funded by a grant from the National Science Foundation*

**Students:** Alexander D. Middleton (2017), Lynnique Johnson (2016), and Kaelyn Selonen (2018)

Faculty Mentor: Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 350 – Z. Abernathy)

Kongregate, a browser-based video game website, seeks to improve understanding of player preferences and practices. Specifically, they are interested in increasing player retention and encouraging the purchase of “Kreds,” an online currency for subscribed members that helps Kongregate generate revenue. The aim of this project is to help Kongregate's business model, by using data mining techniques to analyze a large, multi-dimensional set of data provided by the company. Data mining techniques such as association, clustering, and classification can help to investigate and identify valuable patterns that will improve player retention and “Kreds” purchases. Tableau, an industry-standard data visualization program, will also be used to assist with pattern identification.

## The “U-Bomb”: Eisenhower's Subversive Use of the USIA in Guatemala and the Resulting Fallout Across Latin America, 1952-1958

**Student:** Joy Rudd (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The traditional narrative of the Cold War in Latin America focuses on U.S. sanctioned violence and subversion. While many historians like to discuss the marked effects of U.S. involvement and support of “friendly” dictatorships, few discuss the psychological warring that also took place during the Cold War. The United States used organizations, like the United States Information Agency (USIA), to subtly indoctrinate the Third World in their anti-communist agenda. Unlike the CIA's use of physical violence through torture or weaponry, the USIA had a psychological emphasis and targeted individuals with anti-communist pamphlets, posters, and newsreels. I argue that Eisenhower used the USIA in Guatemala to promote democratic ideals, while additionally ensuring U.S. hegemony in Latin America. I support this argument by analyzing primary sources. These include newsreels produced by the USIA, posters found in the National Archives, and State Department and National Security documents found in *Foreign Relations of the United States*. These sources indicate the promotion of public disapproval of Jacobo Arbenz's “Communist” government and the intent to foster national and international support of Carlos Armas' anti-communist agenda. Analysis of these sources also demonstrates misconceptions concerning differing definitions of Nationalism and Communism between the United States and Guatemala. Finally, I explain the negative reaction in Latin America concerning U.S. involvement in Guatemala, which resulted in strained U.S. and Latin American relations. I also discuss Nixon's visit to Latin America in 1958, a trip mentioned in Stephen Rabe's monograph, *Eisenhower and Latin America*.

## How African Americans are Viewed through Media and Its Effects

**Student:** Jessica Sampson (2016)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

African Americans were viewed in the news in 2014 and 2015 as those who are victims of police brutality. Even though it seems that many people are concerned about the issue, there are those who think that the media is covering it in the wrong way. The media uses framing to put stories in the perspective of the victim by digging up anything that would put a bad light on the victim. The media's framing of African Americans in a certain way is giving fuel for those of other races to make certain assumptions about African Americans. Many articles say that the victim should not have been doing what he/she was doing, instead of focusing on the violations of the officer. The victims may have committed crimes, but the questions should be focused on the actions of the officers. Media framing is an ethical issue that needs to be addressed in order for African Americans to be seen in a different light.

## The Catholic Church and Its Dirty War

**Student:** Deborah Frasier (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The Process of National Reorganization, otherwise known as the Dirty War of Argentina, was a seven-year campaign from 1976 to 1983 to rid the country of subversives. Conducted by the military dictatorship led by Jorge Videla, this campaign produced between 15,000 and 30,000 disappeared persons, ranging from students to union members who were tortured and then killed by the government. These actions were, however, well known to an important institution, the Catholic Church. Elected Jesuit provincial of Argentina in 1973, Jorge Bergoglio and other church members encouraged and stood by while the government killed thousands of people. Up until Jorge Bergoglio was elected Pope Francis in 2013, most authors and journalists regarded him as another innocent member of the church. It was not until after his election that others began to come forward with claims of his and other church members' wrong doings during the Dirty War in Argentina. Data obtained under the Freedom of Information Act detail agreements made between the government of Argentina and representatives of the Catholic Church to carry out the murder of various Argentines during the Dirty War and not have backlash from the Church itself.

## Understanding Iron Regulation in *Streptococcus pneumoniae*

*Supported by a grant from the National Institutes of Health IDEA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student:** Jessica Zielinski (2018)

Faculty Mentor: Nicholas Grossoehme, Ph.D.

CAS – Department of Chemistry, Physics and Geology

*Streptococcus pneumoniae* is a bacterium known to cause many diseases, including meningitis, pneumonia, conjunctivitis, and others. To survive, *S. pneumoniae* must maintain a balance between essential cellular functions that rely on iron versus iron-induced toxicity. It is known that an iron transport regulator known as RitR represses the expression of the *pneumococcal iron uptake (piu)* gene when bound to DNA; the transmembrane proteins that allow iron into the cell are coded for within the same gene. RitR must be phosphorylated to prevent DNA binding, thus allowing for transcription of *piu*. Another protein known as phosphoprotein phosphatase (phpP) is believed to control the dephosphorylation of RitR. This enzyme is a member of the PP2C class of phosphatases, which are known to be activated by metal binding. If phpP is activated by iron, this would be a good indication that it is regulating the dephosphorylation of RitR. The aim of this research was to investigate the activity of phpP and better understand its potential role in regulating iron levels within *S. pneumoniae*. By first varying the concentrations of a chemical substrate, *para*-Nitrophenylphosphate (pNPP), we were able to test the enzymatic activity of phpP when either iron or manganese was present. Having demonstrated that iron leads to higher enzymatic activity, we then measured the enzyme's affinity for iron through varying concentrations of the metal. After conducting these experiments, it was determined that phpP is successfully activated by iron, making it a likely addition to the proposed regulatory system.

## An Insecure Understanding: A Contextual Analysis of Early Cold War American-Venezuelan Relations

**Student:** Cody Knight (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

A survey of diplomatic histories pertaining to twentieth century U.S.-Venezuelan relations uncovers a plethora of books dedicated to the influence of oil on the countries' interactions. However, there exists little research as to how operation PBFORTUNE and the subsequent operation PBSUCCESS, two missions designed to depose Guatemalan President Jacobo Árbenz after his attempts to nationalize corporate lands, influenced future relations between the United States and Venezuela. Declassified documents by the U.S. Department of State allude to growing insecurity by government officials as to the reliability of Venezuelan President Marco Pérez Jiménez in the years following American intervention in Guatemala. Specific concerns related to rumors suggesting that Pérez Jiménez aspired to nationalize the country's oil. Through extensive examination of recently released State Department documents from the end of WWII to Venezuela's 1958 democratization, I find that United States interests in Venezuela evolve from purely economic to increasingly political as to assure the viability of pro-American leadership and the continued availability of natural resources.

## Brazil's Phantom Communists and the Tangible Resources

**Student:** Chris Davis (2017)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

During the Cold War, the United States was desperate to enforce a policy of "containing" communism in the world and isolating its spread. However, these extreme measures seem to have been taken with the bare minimum in basis, and there was no credible source of a major Soviet insurgency, so there is a question of why the United States would intervene. This research paper uses newly declassified documents from both the Kennedy and Johnson administrations from the National Security Archives along with a plethora of other resources to prove that the United States was primarily interested in Brazil's economic business ventures for intervention. The issue of communism, while thought of as a separate factor in America's decision to influence a regime change, was in fact linked directly to the economy, with President Kennedy and other members of the State Department believing that President Goulart's sympathies to the Soviets were the cause of Brazil's stagnating economy. Soviet documents also show that the U.S.S.R. had no interest in establishing a true foothold in Latin America and found establishing intelligence networks there difficult, and that there was no true communist threat in Brazil. Threat of communism was used as a moral justification both inside Washington, and eventually to the public.



## From Celebrity to Public Enemy: The Reign of Manuel Noriega

**Student:** Aaron Ball (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

While the public may attribute the Cold War to simply an ideological conflict between opposing superpowers, many historians argue that the most significant events of the war happened within the Latin and South American countries. Throughout the latter half of the twentieth century, several Latin and South American nations were experiencing revolutions and frequent shifts in power, a majority of which were influenced by the United States either directly or indirectly. The former military dictator of Panama, Manuel Antonio Noriega Moreno, was one particularly disturbing example of the amount of political and international influence that can be obtained through manipulation of public image. Through extensive research into documents acquired from the National Security Archives, minutes from Senate hearings, and his personal memoirs, I argue that because of the United States' willingness to turn a blind eye to Noriega's drug trafficking and accumulation of dominance in Panama, his rule of the country is considered to be one of the most momentous failures of United States foreign diplomacy.

## Design and Construction of *E. coli* Expression Plasmids that Make Use of the Golden Gate Cloning Strategy

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student:** Autumn Leggins (2018)

Faculty Mentor: Nicholas Grossoehme, Ph.D.

CAS – Department of Chemistry, Physics and Geology

Cloning is the alteration of an organism's gene sequence. Traditional cloning methods make use of one or two Type I endonucleases, at least one gel purification, digestion reactions, ligation reactions, and ultimately result in a low yield of the desired plasmids. Though this method is helpful, its low efficiency, high consumption of time and resources, and tendency toward self-ligation leave room for improvement. The process of cloning has become faster and more efficient with the creation of the Golden Gate Cloning strategy – a one-pot reaction that makes use of Type II endonucleases, condenses multiple steps of traditional cloning, and does not self-ligate. The goal of this project was to create plasmids suitable for Golden Gate Cloning. The created plasmids needed to have antibiotic resistance, an origin of replication, and the ability to efficiently express the chosen genes in *E. coli* cells using the Golden Gate Cloning strategy. A plasmid that worked with *E. coli* cells and had an antibiotic resistance site and an origin of replication was found. A T7 Promoter, Ribosomal Binding Site, T7 Terminator, and BsaI recognition sites needed to be added. By creating two different inserts and running two separate rounds of Golden Gate reactions, these desired pieces were successfully placed into the plasmids and introduced into *E. coli* cells so that these cells could express the desired genes.

## Psychopathy and Leadership in College Students

**Students:** Luccil Harrison (2016), Claudia Salazar (2016), and Zane Repp (2016)

Faculty Mentor: Darren Ritzer, Ph.D.

CAS – Department of Psychology

This study focused on the relationship between self-report of psychopathy and leadership behaviors. Participants ( $n = 92$ ) filled out the Self-Report of Psychopathy Scale-Revised, the Narcissistic Personality Inventory, and demographic questions, and then read 12 real-world leadership scenarios created by the researchers. Participants could choose from four different leadership behaviors to address each scenario. Each behavior represented a different level of psychopathy (normal to maladaptive). Participants' psychopathy scores were compared to their choices of scenario answers. Our hypothesis was that higher self-report of psychopathy personality scores would correlate with "psychopathic" choices for scenario answers. There was a significant relationship between leadership choices and psychopathic qualities ( $r = 0.34, p < 0.001$ ). In other words, participants who scored highly on the psychopathic personality scale also made psychopathic choices of behaviors when faced with real-world scenarios. Their personality measures were indeed related to (hypothetical) choices in behavior. Additionally, there were several scenarios that showed differential responding between high scorers on psychopathy and high scorers on narcissism. This is potentially an interesting area of future research. In terms of self-report of psychopathy, there were no significant differences between genders or between those with and without previous leadership experience. Some possibilities for further research include specifically targeting on-campus leaders and further exploring differences between psychopathy and narcissism in terms of behavior choice.

## Oscar Romero: Oppression's Guiding Light

**Student:** Kathryn Backman (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The Cold War involved more than just the United States and Russia; it extended into other countries, such as Korea, Vietnam, and many in Latin and South America. In El Salvador, the Cold War incited a revolution, and the Catholic Church became a voice for the oppressed and the poor against the junta government. One man in particular, Archbishop Oscar Romero, became the voice for the people. On February 23, 1977, Romero was officially appointed archbishop of San Salvador, where he served until his tragic assassination on March 24, 1980. Prior to and following Romero's assassination, anyone who crossed his path would give testimony to the impact he had in the community and how he would take a stand against the junta government for the poor and oppressed. Through study of Romero's own writings and evidence provided in government documents from the National Security Archives, I have found that Romero's teachings and sermons gave a voice to the people, and I argue that he helped to change the face of not only El Salvador's oppressed but also the Catholic Church as a whole. This study is important for understanding the effect of the Cold War on El Salvador, as well as the movement to beatify Archbishop Romero.

## Chile in the Cold War: Unintended Consequences

**Student:** Jacob Moan (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

United States involvement in the government of Chile from the late 1960s throughout the 1970s unintentionally caused the brutal government of Pinochet to rise to power. The United States intended to keep out Communism and any kind of Communist ideals. Furthermore, the U.S. wanted to encourage democracy in Chile and in other places in South America. Their covert actions directly against democratically elected leaders in Chile caused a terrible result. This action against Communism actually turned the people more and more in favor of Communist ideals and eventually led to a completely authoritarian government that would slaughter its own people. The United States is directly responsible for the fall of Allende and the rise of the military dictatorship of Pinochet. There are official speeches made by both Allende and Pinochet, White House briefings from the Nixon administration, foreign policy records from the CIA base in Chile, press accounts, Chilean newspapers, Kissinger office files detailing his policy goals in Chile, and specialized documents from the operations that took place in Chile. There are many other sources easily accessed in the United States and other states such as Cuba. The administration was very destructive in its attempts to quell communism in Chile and these overzealous attempts actually pushed the Chilean people overboard in their radical elections.

## A Reaction-Diffusion Model of Cancer Invasion with Cancer Stem Cells

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student:** Alexander D. Middleton (2017)

Faculty Mentor: Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

The use of partial differential equations in cancer modeling allows us to describe both how cancer populations grow over time as well as how tumor cells can invade healthy tissue. In 2013, McGillen et al. considered a system of three nonlinear, partial differential equations that modeled the compartmental interactions between healthy cells, tumor cells, and lactic acid concentration. Through numerical simulations and asymptotic approximations, McGillen et al. demonstrated four distinct types of traveling-wave behavior: heterogeneous and homogeneous invasion, nonaggressive (slow-moving) tumor dynamics, and tumor clearance. We extend the work of McGillen et al. by incorporating the cancer stem cell (CSC) hypothesis into the existing model. CSCs are a specialized subset of tumor cells with normal adult stem cell properties, including high proliferation potential and the ability to self-renew. These cells are a possible culprit for tumor recurrence, as they are thought to be highly resistant to standard cancer therapies. By including CSCs into the model, we establish new conditions to achieve a locally stable cure state and numerically demonstrate the existence of a recurrence state in which CSCs are able to repopulate a dormant tumor.

## Lacunae Structural Characteristics Differ between the Femur and the Scapula in Accordance with Wolff's Law

*Supported by a grant from the National Institutes of Health IDeA Networks for Biomedical Research Excellence (NIH INBRE)*

**Student:** NaiKesha Daniels (2016)

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

CAS – Department of Biology

In accordance with Wolff's Law, it is widely accepted that bone structure alters in response to mechanical stimuli. Several recent studies have also demonstrated a similar effect on bone cells, specifically osteocytes. The purpose of our study was to investigate this effect further, by comparing lacunae structural characteristics between a directly loaded bone (femur) and a non-directly loaded bone (scapula, a flat bone suspended by muscle at the shoulder girdle). Multiple slices were cut from the femur and scapula of a young white-tailed deer, in the transverse, sagittal and frontal planes. Next, the slices were polished to a final thickness of 50-60 micrometers and inspected under high magnification (400 $\times$ ) using a light microscope (Nikon Instruments). To determine whether lacunae number, size and shape are significantly different between these bones, the size (perimeter) and shape (spherical/ellipsoidal) were measured and compared. As a result of slicing a cross-sectional area, the projection was only a 2D image. Thus, to grasp the full 3D model, the aspect ratio (AR, length to width ratio) of each lacuna was taken. The closer the AR ratio was to one, the more circular the 2D image and the more spherical the 3D projection. Our results demonstrated that lacunae in the femur are more numerous than in the scapula but smaller in size. In addition, the lacunae in the femur are also less spherical (bigger AR ratios) compared to the scapula. Our results are in agreement with previous studies, which showed a more spherical lacunae structure in the non-loaded bones (e.g., calvaria). Yet this is the first time that this correlation is shown also in non-directly loaded bones, such as the scapula.

## Manuel Noriega: From Friend to Foe

**Student:** Clinton Washington (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

My paper shows what led to the breakup of the relationship between the United States and Manuel Noriega. Sources such as the Oliver North File (his diaries, e-mail, and memos) and the Kerry Report, as found on the National Security Archive, suggest the connection between the CIA and the drug smuggling activities of Manuel Noriega. I argue that the breakup between Manuel Noriega and the United States started with the failure of the Soviet Union. Author David Boren suggested in his essay, "The Winds of Change at the CIA," that the failure of the Soviet Union made some countries less likely to follow guidelines from the United States. Other secondary sources have argued for the importance of politics, especially the transition to the presidency of President George H. W. Bush, in explaining the end stages of the U.S. relationship with Noriega.

## Hate Speech and Propaganda Usage: An Analysis of Unethical Reporting in Foreign Countries

**Student:** Cathyleen Rice (2016)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

(MCOM 412 – Reel)

According to the Ethical Journalism Network, today there are blurred lines between journalism and satire. Media outlets in foreign countries need to refrain from hate speech and government propaganda ideologies, which contort what and how people think. Since news is no longer regionally viewed, media have a greater effect on reaching viewers overseas, and for this reason, propaganda and hate speech become intemperate bursts of invective, hatred that is repeated deliberately and continuously. This paper explains governmental control in some areas over media outlets, the underlying meaning of using the media, the advantages and disadvantages those journalists in those countries face and ethical changes that could be made. The research quantitatively analyzes articles from other countries using hate speech, and shows the hostility and violence brought against particular ethnic groups because of hate speech. Specifically, channeling areas in South Africa, the Middle East and Nepal, this paper deconstructs techniques that have become some newspapers' worst nightmare.

## The Falklands/Malvinas War: An Organizational/Structural Cause in Argentine Context

**Student:** Ian Fagan (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The Falklands/Malvinas War stands as an interesting case study for countless historians, political scientists, and various other academics from numerous fields, with different narratives applied to it. It sits at the end of the Cold War, with the major players of the United States and the United Kingdom forced to choose sides. It also represents the culmination of colonial tensions between Argentina and the United Kingdom. Finally, it stands at a crossroads of the end of autocracy and the beginning of democracy for Argentina. Traditionally, the most commonly debated issue for historians regarding this topic are the motivations for the military *junta* regime of Argentina to invade the islands in 1982 and risk war with the United Kingdom. Several different explanations have been offered for the start of this conflict, ranging from simplistic arguments of distraction or misperception to more complex ones regarding prospect theory. What these arguments largely ignore, however, are the longer historical trends in Argentina that allowed for military to exist and exercise such influence within the political system. Using the primary sources of various cables between leadership throughout this period, the *Infomante Rattenbach*, and various newspapers, I argue that conventional views of the conflict involving diversionary tactics or misperception are less accurate than an organizational/structural explanation within the context of longer historical trends in Argentinean history.

## Means to the End: Deception in Journalism

**Student:** Jerrica John (2016)

Faculty Mentor: Guy Reel, Ph.D.

CAS – Department of Mass Communication

Throughout the history of journalism, undercover journalism has been a subject of much controversy. The question of whether it is permissible to lie to get the truth is one that many journalists face at some point in their careers. It is often easier for journalists or reporters to retrieve information from sources when they don't identify themselves as such. However, this is considered deception. There are ethical principles in place to guide journalists on when it is right to engage in deception. My paper explores the topic of undercover journalism and the cases in which deception has been used to retrieve information. I will also review cases in which going undercover was appropriate and necessary, as well as cases in which it was not; basically the question is, "When does the end justify the means?" According to ethical standards, deception, which is defined as the successful execution of an intention to cause others we interact with to have false beliefs, should be used as a last resort, after all other avenues of gathering information have been exhausted. But there are some journalists who consider deception as a shortcut to the information they seek.

## Nixon's Double Standard: U.S. Foreign Relations with Haiti during the Nixon Administration

**Student:** Casey Espich (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

With the Cold War at one of its many peaks, a Caribbean dictator was indiscriminately arresting and torturing suspected "dissidents." There would be no sanctions on this dictator, no embargo and no words of condemnation for the blatant disregard of basic human rights. The dictator, François "Papa Doc" Duvalier, would soon reap the benefits of American friendship. Through Richard Nixon, the recently elected President of the United States, financial aid and diplomatic ties were finally coming back to Haiti. Nixon's policy was hypocritical, but also necessary to ensure that American goals of stability in the region were met. The Nixon administration instituted a policy of aid to Haiti, while they continued to isolate Cuba and other left-leaning countries. Nixon was content to allow atrocities and repression to go unpunished in Haiti, in order to keep "Papa Doc" as an ally to counterbalance Cuba in the Caribbean. Using primary documents from the State Department, I argue that American policy makers were not only aware of ongoing oppression in Haiti, but even administered aid to the Duvalier regime to help keep him in power. Duvalier, for his part, was cognizant of America's desire to fight the spread of communism and used that fear to acquire more from Washington, but also to tighten his grip on Haiti. Duvalier would do whatever it took to maintain control, whether that was touting anti-communist rhetoric or expelling American help from the island.

## Crusade Against Peace: U.S. Involvement in the Esquipulas Peace Process

**Student:** Aaron Allen (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

The Esquipulas peace process was a noteworthy and unique event in Central American history. Through the efforts of five Central American nations (Costa Rica, El Salvador, Guatemala, Nicaragua, and Honduras), this region came closer than ever to achieving a long and lasting peace. While this process was an internal Central American effort, the United States challenged the region's autonomy by attempting to derail this peace process through various means. The United States involved itself within this peace process for its own best Cold War interests. This paper is an examination of U.S. involvement within the Esquipulas peace process. A careful study of declassified U.S. government documents from the Department of State, the National Security Council, and Presidential bulletins, supports this thesis. Other important supporting documents include the Esquipulas-II Declaration and former Costa Rican President Oscar Arias' reflections surrounding the Esquipulas peace process. The purpose of this work is to highlight how U.S. policy makers actively worked to destabilize the Central American region for marginal U.S. benefits.

## Evolution and Ethics

**Student:** David Yates Spearman (2016)

Faculty Mentor: Kristin Beise Kiblinger, Ph.D.

CAS – Department of Philosophy and Religious Studies

(PHIL 495 – K. Kiblinger)

The aim of this paper is to reconcile what is sometimes considered to be an incompatibility between evolution and ethical, social behavior. Because Darwin's idea of natural selection was based on "survival of the fittest," evolutionary theory has often been criticized as unable to explain social or moral behavior that exemplifies values other than individual survival. However, a modern understanding of evolutionary theory (influenced by Richard Dawkins, Stuart Kauffman, and David Sloan Wilson) that borrows and expands upon Darwin's theories demonstrates that evolution can be shown to be compatible with ethical or social behavior. Moreover, evolutionary theory can do more than this. It can explain the origin of ethical behavior, as well as its transition to become an indispensable part of the human experience. As well, evolutionary theory is able to settle current debates within the ethics field, such as those that surround utilitarianism and altruism. Lastly, when ethics is discussed from an evolutionary standpoint, it allows for future ethical decisions to be made from a common framework, rather than a culturally relative one. For these reasons, the current opinion that evolutionary theory is incompatible with ethical behavior should no longer be believed and instead evolutionary theory should become an additional tool in the study of ethics.

## Liberation Theology and How The Cold War Affected the People of El Salvador

**Student:** Craig David Hodge (2016)

Faculty Mentor: Gregory Crider, Ph.D.

CAS – Department of History

(HIST 590 – Crider)

In Latin America's smallest country, El Salvador, torture and murder became the common theme of its citizens during the Cold War. Death squads assembled in the country murdered thousands of citizens who organized peasants, workers, students, priests and nuns that spoke against the government. This fear tactic by the government made a sound statement that no one who spoke against the government or even mentioned the disappeared was safe. Archbishop Oscar Romero would be one of many whom the government made an example of, assassinating him in front of thousands of his followers during mass. Oscar Romero was the most powerful voice of the poor and his teachings on liberation theology would cost him his life. Liberation theology began in Latin America and was used by the Catholic Church as a voice for the people against social injustice and poverty. Drawing from declassified documents, newspaper articles, personal journals and interviews, I will prove in my paper that the Church was a battleground for politics that led to the military's response for the assassination of Oscar Romero and how his beliefs and teachings on liberation theology and speaking against the government led to his assassination.

## Strategy and Design of Incremental Games

*Supported by the Mathematical Association of America Preparation for Industrial Careers in Mathematical Sciences (PIC Math) Program, funded by a grant from the National Science Foundation*

**Students:** Jay Camp (2018), Joshua Dasburg (2017), and Matthew O'Malley (2017)

Faculty Mentor: Zachary Abernathy, Ph.D.

CAS – Department of Mathematics

(MATH 350 – Z. Abernathy)

Incremental games are video games that require the player to repeat an action to acquire currency, which is then used to purchase items or abilities that allow the player to gain currency more rapidly. One recent mechanic that has been introduced in these games is the use of multiple types of resources to create production bottlenecks that limit the player's progress. The player is then faced with the enjoyable challenge of balancing the rate at which each resource is produced to relieve the bottleneck and optimize progression through the game. Kongregate, an online browser-based video game website, is interested in learning more about the mathematics behind creating and relieving such bottlenecks, as well as comparing this mechanic to other popular incremental mechanics. The goal of this project is to create a mathematical model for Kongregate to share with game developers, which can be used to improve understanding of various incremental game mechanics, especially production bottlenecks, thus facilitating the design and balance of incremental games and offering improved gameplay enjoyment for players.



## OPUS: Revisiting the Printmaking Exchange at Winthrop University

**Students:** Dylan Bannister (2016), Caroline Kalayjian (2016), and Meaghan Westfall (2017)

Faculty Mentors: Paul Martyka, M.F.A.; Michael Goetz, B.F.A.; Carolyn Sumner; Tom Stanley, M.F.A.

CVPA – Department of Fine Arts

*The Printmaking Exchange* is a long-standing tradition among printmakers within the Winthrop University Department of Fine Arts. Each semester, students enrolled in relief, intaglio, and silkscreen printmaking courses propose theme ideas. Through a voting process, a single common theme is chosen and each printmaker creates an own image based on his or her understanding or interpretation of it. The result: each contributor receives a collection of prints by all who participated. *OPUS* was an exhibition that revisited chosen works produced by printmaking students and faculty from exchanges over the course of decades. As exchange themes vary widely, so do the works created. The exchange pushes Winthrop's printmakers to produce quality fine art prints, encouraging them to share their strongest work with their peers. This incentive is indicative of the printmaking program guided by Professor Paul Martyka (1950-2016) since he arrived at Winthrop in 1979. He encouraged a balance of creative imagery and strong technical skill. This exhibition represented only a fraction of the works produced in the "Rutledge 105 Print Shop." Because the shop retains one print from students' exchange editions, there exists an archive of some of the finest prints produced at Winthrop. As a part of the Union of Student Artists' larger effort to promote student work, printmaking students Dylan Bannister, Caroline Kalayjian, and Meaghan Westfall curated works from the Printmaking Exchange archive for this exhibition. *OPUS* occupied the McLaurin Student Galleries from November 10-16, 2015. The reception and sale were held on November 13, 2015.

## Applying Standard Dilution Analysis to Quantitative NMR

**Student:** James Ford (2016)

Faculty Mentor: Cliff Calloway, Ph.D.

(CHEM 551, 552 – Hanna)

CAS – Department of Chemistry, Physics and Geology

Standard dilution analysis (SDA) is a novel calibration method that combines standard addition and internal standard methods of analysis to correct for matrix interference, instrument and sample variations in a single analysis. In previous experiments, SDA has been shown to give rapid, accurate, and precise results; it is for this reason that it was applied to the  $^1\text{H}$  NMR analysis of whisky samples. Exchangeable proton peaks are known to shift, known as peak walk, due to matrix interference. This technique is being designed to work on any NMR that is able to monitor two wavelengths simultaneously, so it would be possible to use an inexpensive, permanent-magnet desktop instrument. These are usually less than one tenth the price of their counterparts, and less than half the price of an HPLC, even without factoring in things like columns, cryogenics, and their time-consuming nature. Methyl ethyl ketone (MEK) has a singlet in an otherwise empty region of the spectrum, and has proven to be a good internal standard. The standard solution has been optimized and it has been determined that the responses of both MEK and ethanol are linear in the regions that were used.

## Application of Standard Dilution Analysis to Infrared Spectroscopy

**Student:** Brianna Milks (2016)

Faculty Mentor: Cliff Calloway, Ph.D.

CAS – Department of Chemistry, Physics and Geology

(CHEM 551, 552 – Hanna)

Standard Dilution Analysis (SDA) is a novel method of analysis that can be used to improve on current techniques. This method combines standard addition and internal standard methods of analysis by spiking the sample with a known concentration of analyte and including an internal standard compound. The ratio of the response of the analyte to the internal standard is calculated to correct for both matrix interferences as well as measurement fluctuations. This study focuses on the determination of *trans* fatty acid levels in oils using the SDA method. This is done with a standard addition compound of trielaidin and an internal standard of methyl oleate, which shows no absorbance interference with trielaidin. Static solutions are prepared with the standard solution and the sample solution and FTIR spectra are taken by transmission, using sodium chloride salt plates commonly employed for qualitative analysis. The SDA calibration will be used to determine the concentration of *trans* fatty acids in each sample. These results will be compared to results obtained on the same samples using a costly fixed path length cell. When a fixed path length is used, Beer's Law can be applied without using a correction technique, but it does not correct for matrix interferences. The amount of *trans* fatty acids have been determined within 11 % of a known value. The methods continue to be investigated to lower the error associated with this procedure.

## Triangles in Cayley Graphs

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

**Student:** Charles Matthew Farmer (2016)

Faculty Mentor: Jessica Hamm, Ph.D.

CAS – Department of Mathematics

Cayley graphs were introduced by Author Cayley in 1878. Since then, they have been studied extensively due to their connection to group theory, graph theory, computer science, and other fields. In this presentation, we will briefly review Cayley graphs and then introduce two new parameters for Cayley graphs:  $\text{Cay}^n(G)$  and  $\text{Cay}_n(G)$ . When  $n = 3$ , these parameters tell us about the existence of triangles within Cayley graphs. We find  $\text{Cay}^3(G)$  for all groups  $G$  and give some results for  $\text{Cay}_3(G)$ , along with future directions.



# 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 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 the application for a nationally competitive award is often transformative in a student's life and can be as important as the outcome.

Scholars who applied for these prestigious awards spent countless hours writing and revising personal statements, policy and research proposals, essays, resumes, and answers to "short answer" questions on application forms (which are never short, and always challenging). In the process, I hope each student learned a little more about him- or herself and his or her goals. Scholars, I'd like to acknowledge and applaud your hard work and say how much I enjoyed getting to know each of you this year.

In addition to recognizing the work of each of our ONCA Scholars, I would like to thank each and every member of the Winthrop University community who has given a student an encouraging word, recommended a student for ONCA in person or through the online interim reporting system established by Dean Gloria Jones, brought an ONCA presentation into the classroom, participated in an award selection or mock interview committee, or served on the ONCA Advisory Board. I would especially like to thank members of Winthrop faculty and administration who have written letters of recommendation for our students this year: this is an arduous undertaking, often resulting in two- to three-page letters full of descriptive detail about our students, their capabilities, and their potential. For all of your time and effort, your students and I thank you.

## Leslie Bickford, Ph.D.

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

## Award Nominees and Winners, 2015-2016

**ANSWER Scholarship:** The Andersen Nontraditional Scholarship for Women's Education and Retraining (ANSWER) was established to provide financial support and encouragement to adult women age 25 and older who are raising school-age children (Kindergarten – Grade 12) and are seeking to earn a two-year nursing degree, a two-year degree in CPCC's Health Careers Program, or a four-year undergraduate degree in the fields of their choice.

Winthrop University Nominee: Jackie Bithorn (**Pending**)

**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: Maria Braswell

Winthrop University Nominee: Cici Bronson

Winthrop University Nominee: Christine Buckley

Winthrop University Nominee: Mikayla Catoe

Winthrop University Nominee: Asiah Fulmore

Winthrop University Nominee: Caroline McDonald

Winthrop University Nominee: Julia Poppell (**Pending**)

Winthrop University Nominee: Jordan Reilly (**Pending**)

Winthrop University Nominee: Akchita Singh (**Pending**)

Winthrop University Nominee: Clarissa Zills

**Boren/National Security Education Program (NSEP):** The National Security Education Program (NSEP) provides a unique funding opportunity for U.S. students to study world regions critical to U.S. interests (including Africa, Asia, Central & Eastern Europe, Eurasia, Latin America & the Caribbean, and the Middle East). NSEP provides scholarships to U.S. undergraduate students for study abroad in world areas critical to U.S. National Security. Recipients incur an obligation to work either for an office or agency of the Federal Government involved in national security affairs or in higher education. NSEP is merit based. The maximum NSEP Boren Scholarship award is \$8,000 for a summer, \$10,000 for a semester, and \$20,000 for an academic year.

Winthrop University Nominee: Aadaeze Aninweze (**Pending**)

**Chi Omega Mary Love Collins Memorial Scholarship:** Celebrating a former National President's pursuit of education, this scholarship assists members who are enrolled in a full-time graduate degree program for the upcoming academic year. Both seniors in college and alumnae members are encouraged to apply.

Winthrop University Nominee: Lauren Goodwin (**Pending**)

**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**)

**Ford Foundation Fellowships:** Through its Fellowship Programs, the Ford Foundation seeks to increase the diversity of the nation's college and university faculties by increasing their ethnic and racial diversity to maximize the educational benefits of diversity and to increase the number of professors who can and will use diversity as a resource for enriching the education of all students. Predoctoral, Dissertation, and Postdoctoral fellowships will be awarded in a national competition administered by the National Academies of Sciences, Engineering, and Medicine on behalf of the Ford Foundation. Awards will be made for study in research-based Ph.D. or Sc.D. programs.

Winthrop University Nominee: Ashley Causey (**Pending**)

**Fulbright Award for Study/Research or Teaching English Abroad:** Among the most widely recognized academic honors, 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, English Teaching Assistant Abroad: Rachel Burns (**Finalist, Pending**)

Winthrop University Nominee, English Teaching Assistant Abroad: Stacey Packer

**Fulbright U.S.-U.K. Summer Institutes for Undergraduates:** The U.S.-U.K. Fulbright Commission offers special Summer Institutes for U.S. citizens to go to the U.K. These summer programs provide the opportunity for U.S. undergraduates with at least two years of undergraduate study remaining to go to the U.K. on a three- to six-week academic and cultural program. Participants experience exciting academic programs at highly regarded U.K. universities, explore the culture, heritage and history of the U.K., and develop their academic abilities by improving presentation, research and communication skills.

Winthrop University Nominee: Matea Milojkovic (**Pending**)

**Hertz Foundation Fellowships:** The Hertz Graduate Fellowship Award is based on merit (not need) and consists of a cost-of-education allowance and a personal-support stipend. The cost-of-education allowance is accepted by all of the participating schools in lieu of all fees and tuition. Hertz Fellows therefore have no liability for any ordinary educational costs, regardless of their choices of participating schools.

Winthrop University Nominee: Olivia Manley (**Pending**)

Winthrop University Nominee: Emili Moan (**Pending**)

**National Physical Science Consortium:** The National Physical Science Consortium is a partnership between government agencies and laboratories, industry, and higher education. NPSC's goal is to increase the number of American citizens with graduate degrees in the physical sciences and related engineering fields, emphasizing recruitment of a diverse applicant pool. NPSC's member universities do not require fellows to pay tuition. Most government agency fellowships must cover all or part of tuition. Partly as a result, the total cost of an NPSC fellowship is roughly half what it costs a government agency to provide its own fellowships.

Winthrop University Nominee: Lauren Lintz (**Pending**)

Winthrop University Nominee: Olivia Manley (**Pending**)

**National Defense Science and Engineering Graduate (NDSEG) Fellowships:** As a means of increasing the number of U.S. citizens and nationals trained in science and engineering disciplines of military importance, the Department of Defense (DoD) awards approximately 200 three-year graduate fellowships to individuals who have demonstrated the ability and special aptitude for advanced training in science and engineering. Fellowships are awarded to applicants who will pursue doctoral degrees in areas of DoD interest or closely related fields.

Winthrop University Nominee, Emili Moan (**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: Olivia Manley (**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: Emily Hokett (**Pending**)

Winthrop University Nominee: Lauren Lintz (**Pending**)

Winthrop University Nominee: Kyle McDaniel (**Pending**)

Winthrop University Nominee: Emili Moan (**Pending**)

**Pat Tillman Foundation Scholarship:** Founded in 2008, the Tillman Scholars program supports our nation's active-duty service members, veterans and military spouses by investing in their higher education. The scholarship covers educational expenses, including tuition and fees, books and living expenses, but scholars receive much more than just funding. The program unites the best talent and leadership in the military to make a significant impact in the fields of medicine, law, business, policy, technology, education and the arts.

Winthrop University Nominee: Joshua Howell (**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: J.W. Barrera (**Pending**)

Winthrop University Nominee: Kathryn Steverson (**Pending**)

Winthrop University Nominee: Deanna Worley (**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: Caitlyn Bryant

Winthrop University Nominee: Emily Gill

**Sigma Tau Delta Scholarly Paper Awards for Undergraduate Students:** Sigma Tau Delta will award up to \$250 for the best undergraduate student scholarly paper presented at a non-Sigma Tau Delta professional, academic conference. The paper must be on an English-related subject and have been presented at a conference within the past academic year.

Winthrop University Nominee: Andrew McIver (**Pending**)

**Sigma Tau Delta Study Abroad Scholarship:** Sigma Tau Delta awards these scholarships to enable active undergraduate members to study for an academic term or year in certified undergraduate programs outside the home countries of their nominating chapters. 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: Addie Crawford (**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**)



# McNAIR SCHOLARS

The Winthrop University 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 by a five-year renewable U.S. Department of Education TRiO Ronald E. McNair Post-Baccalaureate Achievement Program grant (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 2015-2016, federal funds represent approximately 72 % of program costs. Winthrop and the Winthrop Foundation contribute the remaining 28 % of the budget 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. A sample of Winthrop's McNair Scholars' research can be viewed at <http://digitalcommons.winthrop.edu/mcnair/>. Being a McNair Scholar is a prestigious, nationally recognized honor; Scholars are actively recruited by graduate programs across the country. For more information, please visit [www.winthrop.edu/mcnair](http://www.winthrop.edu/mcnair) or e-mail [mcnair@winthrop.edu](mailto:mcnair@winthrop.edu).



## 2015-2016 Winthrop McNair Advisory Board Members

Adolphus Belk Jr., Ph.D., Professor of Political Science

Ashley Causey, McNair Scholar, Special Education

Heather Evans-Anderson, Ph.D., Associate Professor of Biology

Cheryl Fortner-Wood, Ph. D. (ex officio), Director, McNair Scholars Program and Associate Professor of Psychology

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

Gloria Jones, Ph.D. (ex officio), Dean, University College

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

Bradley Witzel, Ed.D., Professor of Education

Winthrop McNair Staff and Mentors support the Scholars before, during, and after the summer research experience.

Dr. Cheryl Fortner-Wood, Director

Mrs. Barb Yeager, Executive Support Specialist

Mrs. Amanda Cavin, Graduate Associate

Ms. Stephanie Bartlett, Writing Coach

Dr. Matt Hayes, Statistics and Methods Coach

The following Winthrop McNair Scholars participated in the 2015 Winthrop McNair Summer Research Experience from May 13 – July 8, 2015. They presented their research at the S.C. TRiO McNair Research Symposium June 22, 2015, 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.

**Ashley Causey (1st)**, *Mentor: Jeannie Haubert, Ph.D.*

Beyond Whitewashing: Incorporating Multicultural Education in Teacher Preparation Programs (Oral—Education)

**Cera Crowe**, *Mentor: Aimee Meader, Ph.D.*

How Do Family Background and Self-Esteem Affect an Individual's Perception of Gender-Role Portrayal in Online Advertisements? (Poster)

**Jesse Grainger**, *Mentor: Brent Cagle, Ph.D.*

LGBTQ Emerging Adults: Their Experiences with Homelessness (Oral—Social Sciences)

**Lauren Green**, *Mentor: Matthew Stern, Ph.D.*

Brain-Penetrating Histone Deacetylase Inhibitor RG2833: A Potential Malignant Melanoma Growth Suppressor (Oral—Life Sciences)

**Lauren Green (1st)**, *Mentor: Matthew Stern, Ph.D.*

Brain-Penetrating Histone Deacetylase Inhibitor RG2833: A Potential Malignant Melanoma Growth Suppressor (Poster)

**Ethan Hanner**, *Mentor: Marguerite Doman, Ph.D.*

Using a BCI to Assess Attention during an Online Lecture (Poster)

**Emily Hokett**, *Mentor: Sarah Reiland, Ph.D.*

Cognitive Flexibility and Depression in Relation to Social Support (Oral—Social Sciences)

**Shawn Hoskins**, *Mentor: Meir Barak, Ph.D., D.V.M.*

Comparing the Tensile and Compressive Young's Moduli of Cortical Bone (Oral—Life Sciences)

**Jordan Lewis (3rd)**, *Mentor: Matthew Heard, Ph.D.*

Impacts of Beach Renourishment on the Distribution and Abundance of *Escherichia Coli* (Oral—Life Sciences)

**Olivia Manley**, *Mentor: Nicholas Grosseehme, Ph.D.*

Biophysical Characterization of Nur from *Streptomyces coelicolor* (Oral—Physical Sciences)

**Kyle McDaniel (2nd)**, *Mentor: Julian Smith III, Ph.D.*

A Genetic Confirmation of Temporary Meiofauna in the Meiobenthic Food Web (Oral—Life Sciences)

**Theresa Melendez**, *Mentor: Takita Sumter, Ph.D.*

Biological Evaluation of Novel Benzisoxazolo[2,3-a] Pyridinium and Quinolinium Tetrafluoroborates as Anticancer Agents (Poster)

**Savannah Moritzky**, *Mentor: Victoria Frost, Ph.D.*

Phylo-grouping and Analysis of Virulence Factors of *Escherichia coli* Found in Beach Sand (Poster)

**Jesslyn Park**, *Mentor: Jason Hurlbert, Ph.D.*

Expression, Purification, and Crystallization of an Endoxylanase from *Bacteroides vulgatus* (Oral—Physical Sciences)

**Malyn Pope (2nd)**, *Mentor: Merry Sleigh, Ph.D.*

The Effect of Hairstyle on Perceptions of Black Women's Personality and Earning Potential (Poster)

**Shannon Snelgrove**, *Mentor: Laura Gardner, Ph.D.*

Creating Narratives through Art as Self-Definition for Black Women (Poster)

**Leigha Stahl**, *Mentors: Victoria Frost, Ph.D. and Matthew Heard, Ph.D.*

Creating a Microcosm to Examine Salinity Tolerance of *Escherichia coli* in Beach Sand (Poster)

**Taylor Toves**, *Mentor: Adolphus Belk Jr., Ph.D.*

The Case of Affirmative Action in Undergraduate Admissions in the United States and Brazil (Oral—Social Sciences)

**Alexis Williamson**, *Mentor: Bradley Witzel, Ed.D.*

Instilling Resilience in Children of Poverty (Oral—Education)

Winthrop's McNair program serves students at Winthrop and some other four-year institutions in South Carolina. All but two of the Scholars listed here are Winthrop students; Shawn Hoskins and Shannon Snelgrove are Clemson students.



# WINTHROP INITIATIVE FOR STEM EDUCATORS (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 on their scholarly work for inclusion in this compilation:

Lindsay Bradley

Danielle Gasparik

Shiannea Gathers

Katja Hall

Lisa Howard

Lynnique Johnson

Lauren Lintz

Olivia Manley

Mikala Smith

Leigha Stahl

David Walker

Jessica Zinna

# STUDENT INDEX

- Adams, Lacy 50  
Adams, Marquise 51  
Adams, Olivia 61  
Alexander, Sam 71  
Allen, Aaron 79  
Altman, Jennifer 20  
Aninweze, Aadaeze 48, 81  
Arrington, Michael 69  
Ateca, Stephen 24, 32  
Austin, Dallas 61, 64  
Backman, Kathryn 76  
Baird, Lisa 40  
Baker, Joshua 64  
Ball, Aaron 76  
Bannister, Dylan 64, 80  
Barber, Sommer 37  
Bargar, Lindsey 61, 64  
Barrera, J.W. 83  
Barton, Kelsey 55  
Beck, Emily 24  
Bennett, Brionna 56  
Bernard, Kathryn 52  
Bishop, Molly 45  
Black, Margaret Arielle 11  
Bradley, Lindsay 27, 50, 86  
Bradley, Natalie 69  
Brailsford, Jarvis 52  
Brandon, Hannah 59  
Braswell, Maria 81  
Brausch, Corey 44  
Broadway, Rachel 29  
Bronson, Cici 81  
Brown, Andrew 48  
Brown, Ariana 64  
Brown-Emanuelli, Christopher 61  
Brumley, Katlyn 18  
Bryant, Caitlyn 68, 83  
Buckley, Christine 81  
Burke, Will 61  
Burns, Rachel 18, 82, 83  
Burt, Kathryn 41  
Byron, Danny 61, 62  
Calamia, Thomas 48  
Camp, Jay 79  
Cannon, Danielle 69  
Cantrell, Kathryn 46  
Carmichael, La'Rae 68  
Carr, Sydney 69  
Castellanos, Ana 54  
Catoe, Mikayla 81  
Causey, Ashley 82, 84, 85  
Chao, Chelsea 67  
Chapman, Khayla 61  
Chen, Michael 17  
Cheong, Ah Young 67  
Chisholm, Felicia L. 9  
Chopko, Rebecca 53  
Ciravolo, Amy 61, 64  
Cobb, Ellen 67  
Colburn, Stephanie 51  
Copeland, Stephanie 57  
Crawford, Addie 8, 83  
Credit, Niki 69  
Crimi, Mallory 31  
Crosby, Kennedy 69  
Crowe, Cera 39, 48, 85  
Crowell, Keyatta 53  
Cushman, Anne 33, 43  
Daise, Emily 36  
Daniels, Naikeshia 77  
Dasburg, Joshua 79  
Davidson, James W., Jr. 7, 8, 48  
Davidson, Steven 44  
Davis, Chris 75  
Dean, James R. 21  
Dennis, Zachary Ryan 55  
Diaz, Mason 69  
Dickey, Jessica 34  
DiFederico, Devon 69  
Doar, Annie 61  
Dockal, Kaila 69  
Dodd, Katelyn 20, 59  
Doscher, Jessica 73  
Doucette, Kelsey 56  
Driscoll, Garrett 53  
Dunlop, Saige 54  
Eberhard, Annalise 30  
Eisenstein, Christian 12  
Ellis, Danielle 34  
Ellis, Rayshon C. 49  
Espich, Casey 78  
Estes, Rachael 45  
Evans, Jaclyn 55  
Fagan, Ian 78  
Farmer, Charles Matthew 50, 80  
Farrell, Taylor 32, 67  
Ferguson, Grace 58  
Figueroa, Shambria 64  
Ford, James 80  
Frasier, Deborah 75  
Frazier, Colin 50  
Fulmore, Asiah 81  
Fulton, Kia 44  
Furr, Emily 61, 63, 65  
Gasparik, Danielle 34, 86  
Gates, Andrew 73  
Gathers, Shiannea 16, 86  
Gibbs, Diante' 45  
Gibbs, Laura 40  
Gill, Emily 83  
Golden, Kate 52  
Goodman, Emily 45  
Goodwin, Lauren 23, 82  
Grainger, Jesse 37, 85  
Grant, Marissa 19  
Green, Lauren 35, 85  
Green-Woolcock, Anna-Kay 22

Greywolfe, Dakota 65  
 Grom, Emily 7, 42  
 Groves, Justin 50, 52  
 Guilbault, Mary Margaret 71  
 Gunter, Jasmine 56  
 Guy, Courtney 67  
 Hall, Katja 21, 40, 86  
 Hallex, Jacob 28  
 Hampton, Renna 72  
 Hanner, Ethan 42, 85  
 Harman, Aimee 65  
 Harnish, Felicia 57  
 Harrison, Luceil 38, 55, 76  
 Hayward, Anna-Marie 51  
 Hernandez, Benjamin P. 34, 38  
 Hicks, Brandon 26  
 Hilburn, Laurie 9, 57, 58  
 Hinojosa, Tina 61  
 Hinson, Kristin 20  
 Hodge, Craig David 79  
 Hokett, Emily 7, 46, 47, 83, 85  
 Holenko, Althea 67  
 Holland, James Ferrell 43  
 Hope, Nehemiah 68  
 Hoskins, Shawn 85  
 Howard, Alexis 61, 63, 65  
 Howard, Lisa 50, 86  
 Howell, Joshua 83  
 Hsu, Han-Hua 54  
 Hubbard, Mark 52  
 Hudson, Krysten 19  
 Hurtt, Matthew J. 38  
 James, Lydia W. 53  
 John, Jerrica 78  
 Johnson, Lynnique 11, 74, 86  
 Jones, Ducky 65  
 Jones, Justin Ezekiel 68  
 Jones, Trevor 48  
 Jordan, Allison 44  
 Kalayjian, Caroline 61, 63, 65, 80  
 Kay, Patrick 8, 27, 28  
 Kight, Jennifer 69  
 Kilgore, Briana 52  
 King, Rachel 68  
 Knies, Laura 61  
 Knight, Cody 15, 75  
 Laffredo, Paul Joseph, III 26  
 LaFreneire, Desiree 73  
 Larke, Kaitlin 67  
 LaRose, Kelly 28  
 Lattman, Will 61  
 Law, Kelsey 67  
 Lawhorn, MaLyn 50  
 Leaf, Jocelyn 57  
 Lee, Jodi 36  
 Leggins, Autumn 76  
 Lewis, Shelby 69  
 Lilly, Jenna 65  
 Lintz, Lauren 30, 82, 83, 86  
 Logan, Jessica 52  
 Lollis, Megan 54  
 Long, Megan 69  
 Love, Nicole 65  
 Luna, Yaritza 67  
 Lusk, Julia 11  
 Manley, Olivia 15, 82, 85, 86  
 Martin, Reagan 67  
 Masters, Zachary 22  
 Mayers, Simone 39  
 McClain, Dwayne 73  
 McCoy, Jordan Alexis 57  
 McDaniel, Kyle 83, 85  
 McDonald, Caroline 81  
 McDonald, Elizabeth 72  
 McFarland, Jessica 69  
 McGee, Tiana 51  
 McGlade, Caylie 36  
 McGuirt, Taylor 61  
 McHam, Ashley 68  
 McIver, Andrew 23, 24, 27, 83  
 Medico, Madia 68  
 Melendez, Theresa 35, 85  
 Middleton, Alexander D. 74, 77  
 Middleton, Dashae 69  
 Milks, Brianna 80  
 Miller, Sydney 54  
 Milojkovic, Matea 82  
 Minton, Ashley 69  
 Moan, Emili 82, 83  
 Moan, Jacob 77  
 Monroe, Lindsey 8, 46, 47  
 Montanye, Maggie 34  
 Morgan, Holly 48  
 Moritzky, Savannah 38, 85  
 Moses, Kyahdric 67  
 Moss, Brianna 47  
 Murakami, Jamie 35  
 Murray, Risa 51  
 Myers, Iris 69  
 Naz, Ariba 39  
 Nguyen, Tung 67  
 Nielson, Matthew 61  
 Nix, Kitty 61  
 O'Brien, Kaitlyn 14  
 O'Connor, Bridget 69  
 O'Daniel, Abigail 65  
 Oliver, Jennifer J. 23  
 Oliver, Kaylee 71  
 O'Malley, Matthew 79  
 Packer, Stacey 82  
 Padgett, Aaron 65  
 Padgett, Eric 66  
 Park, Jesslyn 42, 85  
 Patrick, Steven 17  
 Paxton, Gabriel 54  
 Perkins, Andrea 67  
 Perl, Jesse 15, 43  
 Pewett, Savannah 54  
 Pham, Carolina 31  
 Phillips, Tara 67

Plasko, Davis P. 29  
 Pope, Malyn 41, 85  
 Poppell, Julia 81  
 Potter, Hannah 69  
 Pritchard, Jesse 12  
 Ralyea, Cecilia Anne 18  
 Ramirez, Kristin 14, 69  
 Ramsey, James C. 72  
 Ramsey, Willard 59  
 Reece, Janay 48  
 Reeves, Eden 67  
 Reilly, Jordan 81  
 Renfroe, Connor 14  
 Rennix, Carolyn 45  
 Repp, Zane 20, 38, 55, 76  
 Rhoden, Katherine 14, 32, 51  
 Rice, Cathyleen 13, 36, 78  
 Rice, Tatiana 67  
 Richardson, Taylor 39  
 Ricks, Nia 66  
 Riley, Corey 12  
 Roark, Caroline 13, 56  
 Roberts, Jake 34, 38  
 Roberts, Lauren 68  
 Rounds, Emily 19  
 Rowell, Kristin 61, 62  
 Rudd, Joy 74  
 Ruple, Macy 61, 66  
 Salazar, Claudia 38, 47, 76  
 Saltarelli, Maxx 68  
 Sampson, Jessica 51, 74  
 Sandlin, Christopher 74  
 Sandy, Jason 61, 62  
 Scarborough, Ashley 67  
 Schoch, Amy 67  
 Schoen, Briana 72  
 Scholl, Brandy 61, 66  
 Schultz, Tollie 47  
 Scott, Passhunate 61, 66  
 Selonen, Kaelyn 74  
 Shabazz, Abdul Hakim 67  
 Shaw, Kathryn 66  
 Singh, Akchita 81  
 Smith, Martin 44  
 Smith, Mikala 58, 86  
 Snelgrove, Shannon 85  
 Sommer, Jordan 61  
 Spearman, David Yates 79  
 Squirewell, Justin 66  
 Stahl, Leigha 40, 85, 86  
 Stallworth, Ashleigh 55  
 Steverson, Kathryn 16, 83  
 Steward, Stephen 36, 50  
 Stewart, Craig 61  
 Stewart, Sarah 68  
 Stillinger, Brianna 68  
 Stone, Matthew 57  
 Strong, Hannah 44, 48  
 Szeman, Michael 54  
 Taylor, Andrea L. 38  
 Taylor, Craig 48  
 Teal, Skyler A. 8, 9, 21  
 Tennant, Sara 16  
 Thibault, Danielle 69  
 Thoma, Kathryn 66  
 Thomas, Angela-Faith 33  
 Thomison, Crystal 30, 45  
 Thompson, Amber 2, 67  
 Thompson, Billy 69  
 Thompson, Carly 69  
 Thompson, Jordan M. 31  
 Tighe, Alison 33, 50  
 Toves, Taylor 85  
 Tracy, Brooke 22  
 Trull, Carmen 69  
 Turlington, La'Raine 69  
 Turnow, Morgan 28  
 Van Cleave, Jessica 36  
 Volious, Victor 52  
 Volstad, Maria 36  
 Walden, Katlyn 25  
 Walker, David 50, 86  
 Walls, Tammy M. 71  
 Walton, Sam 61  
 Walvoort, Asa 29  
 Ward, Kristin 69  
 Washington, Camerun 49  
 Washington, Clinton 77  
 Washington, Kandace 48  
 Watson, Emily 40  
 West, Katherine 67  
 Westfall, Meaghan 61, 63, 80  
 Whiffen, Garrett 68  
 White, Samantha 66  
 White, William 32  
 Whitley, Margaret 35  
 Wilcox, Sara Elizabeth 12  
 Williams, Andrew 37  
 Williams, Ashley 13  
 Williams, Kelly 61  
 Williams, Veronica 36, 59  
 Williamson, Alexis 85  
 Willis, Morgan 61, 63  
 Windey, Grace 61, 62  
 Wood, Jay 61, 62, 66  
 Wood, Zachary 50  
 Wooten, Timothy 44  
 Worley, Deanna 83  
 Zellers, Frank 68  
 Zielinski, Jessica 75  
 Zills, Clarissa 81  
 Zinna, Jessica 17, 86

# FACULTY INDEX

- Abernathy, Kristen, Ph.D. 11, 12, 20, 27, 36  
Abernathy, Zachary, Ph.D. 5, 12, 36, 50, 74, 77, 79  
Addepalli, Balasubrahmanyam, Ph.D. 48  
Anschuetz-Jeffers, Heather, Ph.D. 20  
Aysa-Lastra, Maria, Ph.D. 32, 54, 57  
Barak, Meir, Ph.D., D.V.M. 11, 14, 22, 50, 77, 85  
Barger, Bettie Parsons, Ph.D. 11, 20  
Bartlett, Stephanie, M.A. 84  
Belk, Adolphus, Jr., Ph.D. 84, 85  
Bell, Gregory, Ph.D. 5, 26  
Benson, Keith, Ph.D. 22  
Bickford, Leslie, Ph.D. 10, 12, 24, 25, 27, 43, 58, 81  
Birgbauer, Eric, Ph.D. 48, 53, 54  
Bollinger, Marsha, Ph.D. 5, 59  
Britt, Judy, Ph.D. 10  
Burgess-Wilkerson, Barbara, Ph.D. 12  
Cagle, Brent, Ph.D. 37, 85  
Calloway, Cliff, Ph.D. 21, 40, 80  
Chang, Catherine, Ph.D. 23  
Click, William, Ph.D. 13  
Collins, Tara, Ph.D. 29, 33, 34, 39  
Constance-Huggins, Monique, Ph.D. 23  
Cordis, Adriana, Ph.D. 10  
Cothran, Casey, Ph.D. 8, 9, 23, 46, 47, 57  
Crider, Gregory, Ph.D. 26, 45, 71-79  
Derksen, Karen, M.A. 61  
Doman, Marguerite, Ph.D. 42, 85  
Dubert-Bellrichard, Michelle, M.S.L.S. 10  
Dufresne, Laura, Ph.D. 53, 59  
Evans-Anderson, Heather, Ph.D. 5, 18, 58, 84  
Fike, Matthew, Ph.D. 5, 12, 21, 24, 25, 27, 30-33, 73  
Fortner-Wood, Cheryl, Ph.D. 13, 16, 84  
Frost, Victoria, Ph.D. 16, 22, 38, 40t, 85  
Furman, William, M.L.St. 32  
Gardner, Laura, Ph.D. 59, 85  
Gelabert, Maria, Ph.D. 17, 21, 34, 49  
Gibson, Allison, Ph.D. 5  
Glasscock, Laura, Ph.D. 11, 14, 16, 18, 22  
Glover, Adam, Ph.D. 10, 48  
Goetz, Michael, B.F.A. 80  
Grattan, Christian, Ph.D. 5, 28  
Gray, Janet, M.F.A. 56  
Gray, Kareema, Ph.D. 84  
Gray, Rose, M.A. 84  
Grossoehme, Nicholas, Ph.D. 5, 13, 15, 21, 35, 58, 75, 76, 85  
Habib Williams, Sabrina, Ph.D. 14, 46  
Haire, Wenonah, D.M.D. 84  
Hamilton, Mark, B.F.A. 64  
Hamm, Arran, Ph.D. 52  
Hamm, Jessica, Ph.D. 80  
Hanna, James M., Jr., Ph.D. 13, 17, 21, 26, 29, 34, 35, 38, 80  
Hartel, Aaron M., Ph.D. 21, 49  
Hathaway, Dale, M.Div., M.A. 16  
Haubert, Jeannie, Ph.D. 85  
Hayes, Matthew, Ph.D. 84  
Heard, Matthew, Ph.D. 16, 22, 38, 40, 47, 85  
Helf, Shawanna, Ph.D. 59  
Hiner, Amanda, Ph.D. 21  
Hoffman, Dustin M., Ph.D. 7, 8, 9, 12, 14, 18  
Hope, Kimberly, M.M. 11  
Hopper, Kerrin, M.A. 20  
Hurlbert, Jason, Ph.D. 10, 17, 22, 42, 85  
Igou, Anna, Ph.D. 5  
Johnson, Christopher, B.F.A., M.Arch. 32, 50, 59  
Jones, Gloria, Ph.D. 1, 10, 12, 21, 81, 84  
Judge, Peter, Ph.D. 5  
Kedrowski, Karen, Ph.D. 10, 18  
Kiblinger, Kristin Beise, Ph.D. 31, 71, 79  
Kohl, Kathryn, Ph.D. 16, 37, 49  
Koszewski, Wanda, Ph.D. 5  
Kuensting, Joshua, M.F.A. 64  
Kull, Trent, Ph.D. 12, 20  
Lammi, Robin K., Ph.D. 1, 5, 13, 17, 34, 38  
Lewis, Willis, Ph.D. 84  
Limbach, Patrick, Ph.D. 48  
Lipscomb, Michael, Ph.D. 15, 43, 44  
Lyon, Kathy, Ph.D. 10, 19  
Mader, Cheryl, Ed.D. 20  
Marchel, Carol, Ph.D. 5, 11, 20  
Martin, Mary E., Ph.D. 8  
Martyka, Paul, M.F.A. 80  
Matthews, Michael, Ph.D. 22  
McEvoy, Jeffrey, D.M.A. 10  
McFadden, Bryan, M.S. 36  
Meader, Aimee, Ph.D. 39, 51, 85  
Meeler, David, Ph.D. 15, 55  
Mitchell, Paula, Ph.D. 28  
Morgan, Emily, M.F.A. 69  
Nelson, Donna, Ph.D. 13, 19  
Nortz, Mark, M.Ed. 13  
Owens, Patrick, Ph.D. 15, 21  
Patwardhan, Hemant, Ph.D. 14, 32  
Patwardhan, Padmini, Ph.D. 14, 36, 44, 45, 48, 51, 52  
Paulino, Clara, Ph.D. 10  
Pearson, Ian, Ph.D. 5, 52  
Pierce, Barbara, Ph.D. 22  
Polaski, Thomas W., Ph.D. 20, 33  
Prickett, Robert, Ph.D. 5  
Provencal, Sarah, M.F.A. 68  
Rademaker, Scott, Ph.D. 11  
Reel, Guy, Ph.D. 13, 28, 78  
Reiland, Sarah, Ph.D. 7, 85  
Richardson, Kelly, Ph.D. 12  
Riddle, Emma, Ph.D. 12  
Ritzer, Darren, Ph.D. 7, 19, 20, 38, 42, 76  
Robbins, Keith, Ph.D. 12  
Roy, Sabita, Ph.D. 56  
Sarow, Marilyn, Ph.D. 14  
Schary, David, Ph.D. 57  
Schulte, William, Ph.D. 5, 30, 44, 53  
Shinabargar, Scott, Ph.D. 36



Sjostrom, Mary Pat, Ph.D. 11

Sleigh, Merry, Ph.D. 5, 13, 16, 19, 20, 41, 47,  
54-58, 85

Smith, Jane, Ph.D. 5, 14, 21, 24, 41

Smith, Julian, III, Ph.D. 14, 17, 18, 85

Smith, Stephen, Ph.D. 5, 14, 15, 24, 54

Stanley, Tom, M.F.A. 64, 80

Stern, Matthew, Ph.D. 11, 16, 17, 18, 22, 31,  
35, 39, 40, 51, 85

Stiles, Christina, M.L.A. 19

Stock, Karen, Ph.D. 59, 84

Sumner, Carolyn 64, 80

Sumter, Takita, Ph.D. 13, 15, 35, 37, 84, 85

Tan, Xuyu, M.S. 52

Thacker, Will, Ph.D. 5, 84

Tripp, Bradley, Ph.D. 5

Van Aller, Christopher, Ph.D. 15

Weeks, Evelyne, M.A. 8, 9, 18, 28

Werts, Scott, Ph.D. 5, 29, 30, 45

Westover, Kristi, Ph.D. 5, 16, 17

Wheat, Annie-Laurie, M.F.A. 12

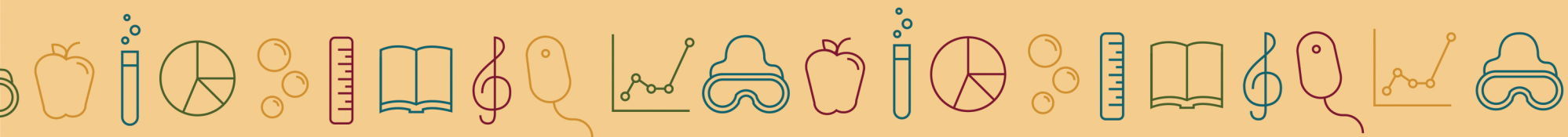
Winar, Amanda, M.A. 18

Witzel, Bradley, Ed.D. 20, 84, 85

Wozniak, Silvia, Ph.D. 18

Yeager, Barb 84

Zhang, Ke, Ph.D. 52



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