

**Ninth Annual  
UNC Pembroke  
Undergraduate Research and Creativity Symposium**



**April 8, 2015**

**Program with Abstracts**





Pembroke Undergraduate Research and  
Creativity (PURC) Center  
One University Drive  
P.O. BOX 1510  
Pembroke, NC 28387-1510  
(910) 521-6195

April 8 2015

Dear Students and Colleagues,

The UNC Pembroke Undergraduate Research and Creativity Center cordially welcomes you to the Ninth Annual PURC Symposium, a campus-wide celebration of undergraduate scholarship. We are pleased to include seventy presentations, by eighty-three students and thirty-seven faculty mentors, all from across UNC-Pembroke's curriculum.

The mission of PURC is to stimulate, support, and promote inquiry, discovery, and creativity in scholarship and the arts through mentored research experiences with faculty and other regional, national, and international scholars and professionals. The Center facilitates and coordinates preparation in research skills necessary for professional fields and graduate study.

The PURC Center supports Faculty Mentored Student Scholarship/Creativity. In addition to the ***Student Travel Funds (STF)*** for Research or Presentation of Results, which we have traditionally offered, we also grant ***Student Scholarship Support (SSS)*** and ***Undergraduate Scholar Assistantships (USA)***. So far this academic year, we have provided *STF* for ten presentations that involved forty students and *SSS* for six student projects. Finally, we awarded twenty *USA*, which are funded in part by a grant through the Department of Education- Native American Serving Non-Tribal Institutions (DOE-NASNTI).

Contributions from Duke Energy help make this program possible. Duke Energy's commitment to higher education helps the PURC Center continue to provide UNCP students with extracurricular scholarly opportunities.

Many thanks go to all the students and faculty mentors, whose works are represented here today. I would also like to acknowledge the PURC advisory council for all of the hard work they have done to help bring this event to you, the Office of Academic Affairs, Provost Kitts, and Chancellor Carter.

It is our desire that the PURC Symposium will be a launching pad for student participation in research and formal presentation venues. So, please plan to take your works to local, regional, national, and international meetings.

Best wishes

Ryan K. Anderson, Ph.D.  
Interim Director – PURC  
Associate Professor of History



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*9<sup>th</sup> Annual*  
**Pembroke Undergraduate Research and Creativity Symposium**

Wednesday April 8, 2015  
*UC Annex*

**Schedule of Events**

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**8:30-8:45**     **Greetings – with morning refresher**  
Dr. Kyle R. Carter, Chancellor – UNC Pembroke  
Dr. Rebecca Bullard-Dillard, Dean, School of Graduate Studies and Research  
Dr. Ryan K. Anderson, Interim Director, PURC

**8:45-9:30**     **Oral Presentation Session One**

8:45 – 9:00     *“I know, I know, I know!”: The Dangerous Fallacy of the Governess’s Understanding*

**Courtnee Bishop**, English, Theatre & Foreign Languages  
Mentor: **Dr. Susan Cannata**

9:00 – 9:15     *99 Volunteer Experiences, BUT A JOB AIN’T ONE!*

**Bryana Ferguson**, Criminal Justice, Office for Community and Civic Engagement  
Mentor: **Ms. Christie Poteet**

9:15-9:30     *Computer Science or Information Technology: Which Degree is Better?*

**Lucas Klinikowski**, Mathematics & Computer Science  
Mentor: **Dr. Lydia Gan**

**9:30 – 11:00**     **Poster/Exhibit Session**

The UNC Pembroke Tuba Euphonium Ensemble

Euphoniums: **Brittany Wilson, William Wilson, Jeffrey Webster, BryHanna Waller, Alex Watkins, Aaron Brown, DePaul Barron**

Tubas: **Ted Tinker, Max Mensing, Dylan Quick, Sam Hall, Jalen Chappelle**

*Elegy for a King* (2008)

Portia Njoku (b. 1984)

Concerto No. 3 in F Major, HWV 334

Georg Friderick Handel (1685-1759)

Allegro

arr. Kunkler/Buttery

*Three Perspectives* (2008)

Elizabeth Raum (b. 1945)

II. Unfolding

*Lady Almuc’s Scottish Dances*

Anne Hunter (1742-1821) arr. Hersey

Slowly

Slow

The Lammermoor Lift Quickstep

*Pilgrimage and Reunion (2014)*

**11:00 – 11:45 Keynote Address**

*From Curiosity to Career: Research and the World Around Us, Why the World Needs a Diverse Perspective.*

**Dr. Andrea Benjamin**

Assistant Professor of Political Science  
UNC – Chapel Hill

**11:45 – 12:15 Deli Lunch Service**

**12:15 – 12:45 Oral Presentation Session Two**

12:15-12:30 *Jibber-Jabber*

**Rielly Morton**, Music

Mentor: **Prof. Aaron Vandermeer**

12:30 – 12:45 *Documentary Video Workflow*

**Michael Litty**, Mass Communications

Mentor: **Prof. Nathan Phillippi**

**12:50 – 1:35 Alpha Chi Honor Society Panel (co-sponsored with PURC)**

12:50 – 1:05 *The New Approach to Management in the 21st Century*

**Michelle Hernandez**, Business

1:05 – 1:20 *Be Brave; Recreating the Lumbee play "Strike at the Wind"*

**Sam Miles**, Business

1:25 – 1:40 *Rural Homelessness and Potential Privatization: A Community Needs Assessment in Southeastern North Carolina*

**Hannah Roberts**, Social Work

Poster *Understanding and Managing Supply Chain Risk*

**Terri Ledlow**, Business Administration

**1:40-2:00 Awards Presentation, Reception, and Closing Remarks**

## **Keynote Speaker 2015**



**Dr. Andrea Benjamin** earned her Ph.D. from the University of Michigan in 2010. She is currently an Assistant Professor in the Department of Political Science at The University of North Carolina, Chapel Hill. Her research interests include Race and Politics, Elections and Voting Behavior, Urban Politics, and Public Opinion. Andrea just finished working on a book, *Follow the Leader: Ethnic Identity, Elite Cues, and Voting in Municipal Elections*, which is under review. The book explores the relationship between elite cues (endorsements) and the potential for Black-Latino coalitions in local elections. She is just starting her next project, which explores Latino Political Incorporation in Durham, NC. She teaches courses on Race and Politics, Public Opinion, Identity Politics, and Urban Politics.

Andrea Benjamin is originally from Northern California. She completed her Undergraduate degree in African and African American Studies and Political Science at the University of California, Davis. While there, she participated in the McNair Scholar's program.

## ORAL PRESENTATIONS

### - “I know, I know, I know!”: The Dangerous Fallacy of the Governess’s Understanding

**Courtnee Bishop**, *English, Theatre & Foreign Languages*

Mentor: **Dr. Susan Cannata**

Henry James’s 1898 novella, *The Turn of the Screw*, is a work that has perplexed its readers for a little more than a century. The common approach to this piece of fiction is to break it down into two schools of thought: to believe that either the ghosts of Peter Quint and Ms. Jessel are real and are after Miles and Flora or to believe that Quint and Ms. Jessel are evil manifestations of the governess’s own mind. However, there is another possibility. In the uncle’s turning the control of Bly over to the governess, there could have been a grave misunderstanding as to what was expected of her. Due to the governess’s class, inexperience, and the novelty of her unspecified authority, there is an inherent and dangerous misalignment between the governess’s understanding of her position and the actuality of her role as governess that ultimately leaves her unprepared for the occurrences at Bly.

### - 99 Volunteer Experiences, BUT A JOB AIN’T ONE!

**Bryana Ferguson**, *Criminal Justice*

Mentor: **Ms. Christina Poteet**

So, you've found your dream job and are racking your brain to figure out what is going to make you stand out against the other candidates. Remembering the great work ethic, communication skills and innovative thinking skills that you possess, you also realize that other candidates probably possess the same skills. However, what they don't have is your experience in volunteering and utilizing these and all of your other great attributes. You know about the great volunteer experiences you led and participated in, but how do you effectively share it with others, especially a potential employer? In this workshop, we will explore ways to effectively communicate, examine the purpose of discussing, compare various mediums for professionally sharing, and develop resume entries that summarize skills gained through your personal volunteer experiences.

### - Computer Science or Information Technology: Which Degree is Better?

**Lucas Klinikowski**, *Mathematics & Computer Science*

Mentor: **Dr. Lydia Gan**

This paper intends to analyze the costs and benefits of two college degree paths, Computer Science and Information Technology. It attempts to determine which path is a better investment of a student’s time and money from economic viewpoints. It further investigates the differences and similarities of both types of degrees, and it would help the prospective students to decide which career is best for them. Various aspects of these degrees will be analyzed. These include how heavy a class load these degrees might require, whether a graduate degree would be a good investment, and the types of skills learned in both degree programs. Job prospects after graduation such as starting wages, chances of wage growth and position advancement, as well as the differences in job opportunities will also be investigated. Articles from various sources will be cited to help answer these questions. One of them includes a four part series written by Malvik from Rasmussen College that covers many topics ranging from skill-sets needed for

both types of degrees to the expected salary ranges. Salary figures for both types of professions are cited from Payscale.com.

### **- Documentary Video Workflow**

**Michael Litty**, *Mass Communications*

Mentor: **Prof. Nathan Phillippi**

I am assisting professor Phillippi on a video project exploring the cultural identity and heritage of Scotland County through the use of documented interviews, cultural events, place names, religious practices, food, and other cultural symbolism.

My PURC presentation will use excerpts and work byproducts from the project to explain our creative workflow from concept to final product. Using screenshots, work samples, transcripts, and other media from the project, I will create a video presentation that demonstrates the basic structure of the workflow and discuss the technical and conceptual aspects that I have learned as a contributor to the project. I am refining my skills working with professional equipment used in video and television production. My contributions to the project include helping to collect video assets, logging and transcribing, creating some of the graphics, assisting with editing, color correction, audio sweetening, and rendering the final product.

The presentation video will start with defining the goal of the project through to creating the final video master. My intent is to produce a seven to ten minute video (DVD), leaving the remainder of the time for the question and answer session.

### **- Jibber-Jabber**

**Riley Morton**, *Music*

Mentor: **Dr. Aaron Vandermeer**

I wrote "Jibber-Jabber" in the fall of 2014 and submitted it as my Final Project of MUS 3460 Jazz Composition. It is so named for its Bebop-esque elements. The presentation will describe my compositional process with respect to specific theoretical elements such as song form, harmonic progression, harmonic rhythm, motivic development, range, and climax point. The song will be performed in its entirety at end of the presentation. I will be assisted by Matthew Ellis (tenor saxophone), Andrew Beck (bass), and Darius Dawson (drums).

## **Poster Presentations/ Exhibits**

### **1- Screen Printing Original Art onto T-Shirts**

**Andrew Alekseev**, *Art*

Mentor: **Prof. Brandon Sanderson**

Presentation Format: Poster

In this presentation I will be showing my original artwork that I have printed on T-Shirts. I have been learning how to screen print this semester and have even constructed an exposure unit. At the symposium, I will present my shirts along with the tools I used to make them. I will explain how the process works and show the printed images at different stages of development. I am very excited to be learning this method of printmaking and to have the opportunity to create art that people can wear.

### **2- Establishing a Sustainable Farming Model in Southeastern North Carolina**

**Mark Anderson**, *Biology*

Mentor: **Dr. Maria Pereira**

Presentation Format: Poster

This study has been conducted in order to determine if the fertile but poorly drained soils of Southeastern North Carolina can be utilized for the growing of high value crops and establishing sustainable farming for small, financially disadvantaged landowners. The research methods used during this study included monitoring of the soil hydrology at the UNCP campus garden, which typifies the fertility potential and the drainage challenges common to the region. Also incorporated into the research was the efficacy of raised bed production and surface water control by means of ditching and levees. Resulting success of organic vegetable production demonstrates the potential of these sites for significant financial return on labor and investment. The failures that were experienced due to hydrologic conditions have the potential to be reversed by growing crops suited to wetland farming, such as rice, crawfish, or sugarcane. In conclusion, the results demonstrated that small acreages of relatively wet soil can be used to produce a sustainable farming system that will support a family and provide the opportunity for rural residents to improve the economic stability of the region.

### **3- Alfred, Lord Tennyson's In Memoriam and Victorian Norms of Grieving**

**Hannah Anderson**, *English, Theatre & Foreign Languages*

Mentor: **Dr. Susan Cannata**

*In Memoriam A.H.H.* is Alfred Lord Tennyson's poetic response to the death of his lifelong friend Arthur Henry Hallam. Tennyson wrote several poems over the course of seventeen years as an expression of mourning. Those individual poems were eventually compiled into *In Memoriam*, which was published anonymously. In this evolution from private poem to public poem, *In Memoriam* showcases Tennyson's grief in its most elementary form, expressing emotions that were often repressed in Victorian society. Tennyson revealed his doubts, his fears, and the depth of his bond with Hallam and when he published *In Memoriam*, he shared his innermost being with the rest of the world. My research will explore Victorian

norms of mourning and grieving, and my paper will examine Tennyson's poem in the context of its surrounding history and culture to determine the extent to which *In Memoriam* challenges those norms.

#### **4- Innovative Ways to Teach Native American Art**

**Joan Blackwell**, *Art*

Mentor: **Dr. Tulla Lightfoot**

Today, the UNCP NAEA Art Club Team will show the presentation/workshop "Innovative Ways to Teach Native American Art" given at the National Art Education Association Conference in New Orleans on March 26-28, 2015.

In the fall 2014, we presented the original workshop for Lumbee Tribe students at Deep Branch Elementary school. By using their tribal colors red, yellow, white, and black, the 64 students, 4th graders, each created original designs. A few months later, we were selected to present the workshop at the 2015 NAEA conference. Now teachers/art education students from across the world are learning how to incorporate grounds into lesson plans. Gourds are historically important because they have been part of Native American culture for thousands of years. They were used as vessels to hold food, beverages, and supplies. Long neck gourds were used as dippers to retrieve water from the streams and rivers before utensils were invented. As a presenter, my leadership skills were enhanced by presenting this workshop/presentation to help other teachers learn new innovative ways to teach Native American art. I would like to thank the NAEA conference leaders, the UNCP Art Department, and my peers for helping to assist with the presentation and assisting the conference organization team.

Being a small part of this prestigious organization was exciting. We learned how to set up an art education conference successfully. These skills are valuable tools that we will continue to use in our community and in the field of art education.

#### **5- Stay or Go: A Study on Oxygen Tension on the Biofilm Formation of Cystic Fibrosis Bacteria**

**Brandon Blackwell**, *Biology*

Mentor: **Dr. Marilu Santos**

*Pseudomonas aeruginosa* is an opportunistic pathogen commonly associated with cystic fibrosis. In cystic fibrosis where the airway is obstructed by mucous, the availability of oxygen is greatly reduced (Eschbach, 2004). Biofilm of *P. aeruginosa* contributes to its survival and virulence in the bronchial airways (Haley, 2012). This study investigated the effect of reduced oxygen tension on the biofilm formation of *P. aeruginosa* and that of a "mock community" of bacteria that are known to thrive with *Pseudomonas* biofilms in cystic fibrosis patients. It was predicted that with oxidative tension, *Pseudomonas sp.* and the mock community would form biofilms.

Using BD™ *Pseudomonas Isolation Agar*, an overnight culture of *Pseudomonas aeruginosa* ATCC 27853 was grown and spot inoculated on solid, semi-solid, and liquid culture media. *Klebsiella pneumoniae* ATCC 700603 and *Streptococcus aureus* ATCC 17503 were grown separately and together with *P. aeruginosa* in a "mock community" for 1 to 10 days at the human body temperature of 37°C and the ambient temperature of 25°C. The biofilm colony morphology on solid media was characterized, the depth of growth was measured from semi solid media and the optical density readings were obtained in liquid media. Results showed that biofilms grew larger and deeper when incubated at 37°C suggesting that the human body temperature favors biofilm formation. Oxidative tension favored the "go" or

dispersal of biofilm cells both from single bacteria and mock community resulting to remarkably giant colonies. This study provided evidence of biofilm formation and a better understanding of biofilm behavior during oxidative tension.

## **6- Testing whether the Lysosomal Modulator PADK is Involved in the Lysosome-to-Nucleus Pathway that Promotes Longevity**

**Justin Branch**, *Biology*

Mentor: **Dr. Ben Bahr**

Oleylethanolamine (OEA) is a naturally occurring lipid that regulates feeding and bodyweight in mice. OEA involved in the lysosome-to-nucleus pathway in *Caenorhabditis elegans*, a microscopic worm, has been recently shown to promote longevity in the microorganism by binding to lipid chaperones that allow entrance into the nucleus (Folick et al., 2015). Binding of OEA and lipid chaperone (LBP-8) to Nuclear Hormone Receptors (NHR-49 and NHR-80) within the nucleus initiates transcription of the target gene *acs-2*, and this pathway is suspected to promote longevity. Most longevity studies are carried out in microscopic organisms. In this study, we have identified the genes in mammals homologous to the *C. elegans* pathway to determine if they are regulated by the lysosomal modulator Z-Phe-Ala-diazomethylketone (PADK) in mice. PADK has been shown to reduce the loss of synaptic markers associated with age as well as protect against pathogenic protein accumulation events linked to age-related disorders (e.g. Alzheimer's disease). Thus far our studies involve treating a nitrocellulose blot containing hippocampal protein samples from wild type mice, mice treated with PADK and mice treated with the inactive PADK analog Z-Phe-Ala-OH (ZFA) with anti ACSF2 antibody, the *acs-2* gene homolog. Results show no significant regulation of the *acs-2* gene by PADK. In the future we plan to investigate PADKs involvement with Peroxisome Proliferator Activated Receptor Alpha (PPAR $\alpha$ ), the NHR-49 and NHR-80 mammalian homolog, to further investigate PADKs involvement in the lysosome-to-nucleus pathway.

## **7 - Oral Dosing with Z-Phe-Ala-diazomethylketone (PADK) Increases Active Cathepsin B in Brain Independent of PARK9/ATP13A2 Pathway**

**Aaron Byrd**, *Biology*

Mentor: **Dr. Ben Bahr**

Alzheimer's disease is a result of a malformed protein, Amyloid- $\beta$  (A $\beta$ ). This malformation of A $\beta$  causes the neuron to have trouble recognizing and therefore removing the protein; causing an accumulation that results in extracellular plaques. One of the therapeutic methods under investigation is the modulation of lysosomal enzymes. Z-Phe-Ala-Diazomethylketone (PADK) is known to upregulate the lysosomal enzyme Cathepsin B (CatB), by reduction and the inhibition of A $\beta$  deposits. Since previous studies have been performed to demonstrate the efficiency of PADK through IP injection, oral dosing was investigated by administration of drug using non-stressful methods to mice. PADK or the control compound, ZFA, was mixed with peanut butter and fed to the mouse. Dosages ranged from 3-18mg/kg for PADK and 20mg/kg for ZFA. PADK is confirmed to upregulate CatB activity but the exact biological pathway in which PADK operates has yet to be elucidated. One possibility that has been under investigation is the PARK9 pathway. Mutations in PARK9 has been associated with other neurodegenerative disorders, specifically, familial Parkinson's disease. While the exact role of PARK9 has yet to be determined, it is believed to be an important regulator of lysosomal function. PARK9 protein concentrations were determined by performing immunoblots of PADK treated mouse brain tissue samples. The blots were then analyzed measuring optical density of each lane. There were no significant changes in PARK9

between wild type, PADK or ZFA mouse tissue. This demonstrates that PADK does not upregulate PARK9 but does upregulate CatB.

## 8- Analysis of GST Specific Activity in Aged Mice Treated with PADK

**Mundell Cary**, *Biology*

Mentor: **Dr. Ben Bahr**

Alzheimer's disease (AD) is characterized by pathological assembly states of A $\beta$ 42, tau pathology, and associated synaptotoxicity. A therapeutic method being investigated for reducing protein accumulation pathology is the modulation of the lysosomal pathway, in this case using the compound Z-Phe-Ala-diazomethylketone (PADK). PADK increases efficiency of Cathepsin B (CatB), a lysosomal enzyme, and reduces the formation of amyloid-beta (A $\beta$ ) deposits. PADK has also been reported to upregulate the CatB pathway through intraperitoneal (IP) injection. In order to conduct early drug development to further understand PADK's characteristics, oral dosing was investigated. Oral dosing was carried out by creating a mixture of PADK or the control compound ZFA in peanut butter "cookies" that were fed to aged mice. Dosages ranged from 3-18 mg/kg for PADK and 20 mg/kg of ZFA. Here the physiological effects of PADK on glutathione s-transferases (GST) were investigated. GST is a series of enzymes that breakdown glutathione to detoxify cell environments, higher levels of activity are an indicator of cytotoxic events. Activity of the samples was measured through use of the Sigma-Aldrich GST assay kit. A positive GST control was used to ensure the assay was performing correctly. Samples were then measured using harvested aged mouse plasma. GST activity was found to be low. PADK caused elevated GST activity when compared to ZFA, but no significant increase above normal activity levels. Future work involves the GST assays of triple transgenic mice treated in the same manner. This study will help to establish whether or not PADK can safely upregulate the CatB pathway with no adverse effects.

## 9- The Expression of What We Already Know

**Joshua Chase**, *Art*

Mentor: **Prof. Brandon Sanderson**

In the year that I have been at UNCP I have noticed that a significant portion of the student body is disconnected from or unaccustomed to the person to person interaction due to increasing reliance on virtual alternatives. The artwork on view demonstrates these aspects of alienation and separation through the use of disparate foreground/background, relationships that decay as a metaphor, and the juxtaposition of mechanical and organic form. I selected the woodcut technique as a vehicle for this project as it is the oldest and most direct form of printmaking, and as such, provides a stark contrast to the content of the work.

## 10- Immobilization of Lysozyme

**Sara Croom**, *Chemistry & Physics*

Mentor: **Dr. Siva Mandjiny**

Lysozyme is a catalytic enzyme found in any body openings and functions by breaking down the Peptidoglycan cell wall of Gram Positive Bacteria. Our research explored different techniques that would allow immobilization of the enzyme on the surface of suitable solid matrices. Previous research shows that the immobilized enzyme would leach out of solid matrices in due course of time. Therefore, we focused our research on reticulation of the same protein within the gel beads so that *Micrococcus*

Lysodeikticus, the substrate, could diffuse across the gel beads, react with enzyme, and then diffuse out. A protocol was established to immobilize the enzyme in calcium alginate gel beads and to characterize the gel beads for different operating conditions. The activity of the enzyme was measured over a period of time and monitored for reduction in activity. It was determined that enzyme activity was retained over a period of 3 months.

### **11 - Regional Native American Theatre: *Strike at the Wind!***

**Mary Grace Curiale**, *Psychology*

Co-Authors: **Tyler Scoville** *Biology*

Mentor: **Dr. Teagan Decker**

The story of Henry Berry Lowry, the most famous member of the Lumbee tribe is retold through the theatrical production, *Strike at the Wind!* Lowry's story is one of great importance to the Lumbee Tribe of North Carolina, which is also home to the University of North Carolina at Pembroke. During the Civil War and Reconstruction era, Lowry made a name for himself nationwide by becoming a Robin Hood figure to the Lumbee people. Lowry is a man of legend, which is why the community chose to commemorate his heroic actions with a theatrical production. The purpose of this presentation is to explain the importance of the production of *Strike at the Wind!* and why it should return to production in Robeson County.

### **12- The Business of Marijuana: An Interdisciplinary Examination of the Consequences and Benefits of Legalization**

**Jeremy Deck**, *Business, Esther G. Maynor Honors College*

Mentor: **Dr. Mohammed Ashraf**

As the marijuana legalization debates continue here in the United States, those that supply illegal drugs will be forced into making business decisions like any legal business. As a result, illegal drug suppliers, like their legal business counterparts, can be expected to diversify, change their product mix, and find ways to compete in a changing market. This research explores the possible externalities of the United States' legalization of cannabis, and considers the potential positive and negative outcomes through an integration of business and social science principles. The application of these principles is derived from an analysis of consumer behavior with respect to drug use, market supply, and demand factors; as well as the pricing strategies employed by both domestic and international drug suppliers. This blending of interdisciplinary principles suggests, in contradiction to growing a national belief, that legalization will not force illegal businesses into legal business, rather into other potentially more violent business opportunities.

### **13 - The Effect of Triclosan on Individual & Mock Community Human Gut Bacteria**

**Marcus Dial**, *Biology*

Mentor: **Dr. Marilu Santos**

Triclosan (TCS) is an antimicrobial agent that was first used in the 1970's as a hospital scrub (2005). Since then, its commercial use has sky rocketed and the substance can be found in a wide variety of products ranging from children's toys and kitchen utensils to soaps, toothpastes, and mouthwashes. The Environmental Health Perspectives reports that nearly three quarters of human urine tested from 2003 to 2004 contained some concentrations of TCS (2007). With the substance's efficacy as an antibacterial

agent controversial and its effects on the natural bacteria of the human intestinal system understudied, the focus of our experiment was to test the effects of TCS on human gut bacteria and on a mock biofilm bacterial community. This study will develop knowledge on the effect of triclosan on the species composition and stability of biofilms, and hence addressing the possible impairment of their functionality upon exposure to a very common antibacterial agent. The experiment involved treating 6 bacteria and two mock communities to different concentrations of TCS and observing the results. Results indicate that triclosan is effective as an antimicrobial agent against human gut bacteria individually and in mock communities at concentrations higher than 0.05 ul. Triclosan has equal potential to cause antibiotic resistance mutations among individual bacterial species and mock community. For further study, the pattern of growth, stability and species composition of the biofilm will be compared with and without TCS, and compared to the characteristics of the individual species. The study was funded through the Pembroke Undergraduate Research and Creativity Center (PURC).

#### **14- HPLC Determination of Guanfacine and Amphetamine**

**Kendra Dorn**, *Chemistry & Physics*

Co-Authors: **Destinee Oxendine** *Chemistry & Physics*

Mentor: **Dr. Meredith Storms**

Stimulant medications are most often prescribed for the treatment of attention deficit hyperactivity disorder (ADHD) and fetal alcohol syndrome (FAS). However, about 20% of the children taking stimulants do not have much symptom relief or they suffer from side effects. As a result, adjunctive therapy is often recommended. One approach is to prescribe Intuniv (guanfacine) with an ADHD stimulant medication such as Adderall (amphetamine). Many research studies report that Intuniv given in combination with a stimulant leads to significant improvements in ADHD and impulsivity symptoms. Therefore, the purpose of this research is to develop an HPLC method to simultaneously determine the concentration of amphetamine and guanfacine which could then be used in the analysis of biological fluids.

#### **15- Wildflower Field Guide for the Green Swamp Preserve**

**Lindsey Ebaugh**, *Biology*

Mentor: **Dr. Lisa Kelly**

The Green Swamp Preserve is known for its longleaf pine savannas, carnivorous plants, and beautiful wildflowers. The preserve is located in Brunswick County, North Carolina, and is owned and managed by The Nature Conservancy. While there are numerous wildflower field guides for different regions of North Carolina, there is not one for the Green Swamp Preserve. The preserve is a highly visited area and, in 2012, members of the biology faculty at UNC Pembroke began creating a field guide of the wildflowers found in the preserve. Roughly 100 species of wildflowers will be featured, each illustrated with a full-page color photograph. Each facing page will include a brief description of the species, a literary excerpt, and a natural history blurb. During spring 2014, we photographed several species of wildflowers in the Green Swamp for inclusion in the field guide. We used technical field manuals to compile descriptive information for each species (e.g., habitat, physical characteristics, ecological range, flowering months, etc.). We have created numerous draft pages containing wildflower photographs and descriptions. We hope that when the field guide is complete, it will serve as a helpful tool to visitors of the Green Swamp Preserve. By creating a wildflower field guide of the preserve, we are reinforcing the ecological rarity and importance of that area, which may, in turn, illustrate the importance to visitors of keeping the Green Swamp Preserve in a pristine condition.

## 16- Continuing Watercolor Drawings Inspired by Contemporary Music

**Lauren Ellerbe**, *Art*

Mentor: **Prof. Brandon Sanderson**

I will discuss the development of my series of fantasy drawings, which are based on various contemporary songs. Each song flows to create one central story tying each drawing together, while also allowing each of the drawings to exist with their own independent narrative. I have spent a large amount of time on the research involved in this series, including but not limited to: color psychology, the horror genre, facial expressions, and the interpretation of song lyrics. In doing so, I developed a semi-realistic style that is similar to comic book illustration while also relating to classical artists (such as Albrecht Durer, Pieter Bruegel, and Hieronymus Bosch). I have worked at perfecting my style instead of working to make it more traditional and entirely conforming to realism. But, I have still utilized my references in order to maintain realism to a degree. In these drawings I have experimented with many different painting and coloring techniques, as well as mediums that I try to make blend and flow into one another. Pen, ink, and watercolor are my primary mediums; however, I have used markers and cut paper techniques for this series in order to deviate from the norm but to also enhance my ability. In the future, I wish to continue creating story-based art influenced by the Bible.

## 17- Food Insecurity among College Students at UNC Pembroke

**Kelsey Evans**, *Sociology & Criminal Justice*

Co-Authors: **JP Linney** *Sociology & Criminal Justice*, **Sandra Torres** *Sociology & Criminal Justice*,

**Brittany Wilkes** *Sociology & Criminal Justice*

Mentor: **Dr. Brooke Kelly**

As part of an undergraduate service learning course on the sociology of poverty during two semesters, fall 2013 and fall 2014, students focused on gaining a better understanding of food insecurity of students on campus to share with the campus community. During the fall 2013 semester, our campus opened a food pantry due to the needs of students. When the pantry was in the process of opening, members of the campus community had trouble understanding how students could be hungry when there is so much food on campus. Our class projects aimed to find out more about the extent of food insecurity on campus by surveying students across campus with a modified USDA self-administered food insecurity measure. The USDA defines food security as enough access by all people at all times to enough food for an active healthy lifestyle. During the fall 2013 semester, a non-random sample of 200 students across campus found 82% of the students surveyed to be food insecure based on the USDA measure. In the most recent study in 2014, a non-random sample of 180 students across campus found that 71.7% of students suffered from some level of food insecurity. The purpose of gathering data about food insecurity on campus is to better inform the campus community and potential need for future programming or assistance.

## 18 - Characterization of the Impedance Associated with a Short Wire: UNCP Physics vs. Cal-Tech JPL

**Alex Foster**, *Chemistry & Physics*

Mentor: **Dr. William Brandon**

A previous pedagogical journal article on precision electronic measurements utilizing AC voltages in conjunction with a lock-in amplifier [Hirata, et.al., *Am. J. Phys.*, 71, 11 (2003)] asserts that the frequency dependence of the resistance due to a short segment of brass wire (i.e. the complex impedance) is

attributable primarily to emergent capacitive effects from the measurement apparatus. We question these conclusions not only based on the data presented in that paper, but also based on our own AC voltage characteristics associated with a short length of AWG 22 Cu wire. One of our conclusions – that the complex impedance is mainly attributable to inductive reactance, and not capacitive reactance as previously ascribed – follows quite naturally from using the lock-in amplifier as a vector voltmeter, and is based primarily on elementary notions of impedance. Our results, consisting of the characterization of in-phase (real) and out-of-phase (imaginary) voltage drops across the resistive wire as functions of frequency show that inductive reactance is indeed the major contributor to the complex impedance. Although the measurement technique surely qualifies as an advanced undergraduate physics lab, the analysis is deliberately constrained to a level appropriate for first and second year university physics students.

## 19- The Effects of Gravity on Human Biochemical Processes

**Trae Griffin**, *Chemistry & Physics*

Mentors: **Drs. Rachel Smith, Timothy Ritter, and Sivanadane Mandjiny**

Since the beginning of manned space flight NASA has extensively studied the effects of microgravity on human biomechanisms. Two such biomechanisms are: i) the Cori Cycle, which produces Adenosine triphosphate (ATP) during anaerobic glycolysis in order for muscle cells to use as an energy source during intense muscular activity, and ii) the human specific immune response, which occurs when an antibody binds with an antigen. During previous flights on board NASA's microgravity research aircraft, we found that performing the experiment in a reduced gravity environment had an effect on both reactions. While our results show that both reactions are altered in microgravity, we believe that the dominant gravitational effect on the processes observed is a reduction in convective flow within the fluid samples while in 0-g, not gravitational effects on the actual biochemical process. In order to better understand the convective effects on our experiment we will be flying a modified version of both experiments, during which we will visually observe and record the diffusion process as our biochemical reactions occur in the presence of dye. Having a better understanding of the convective effects on the mixing process will allow us to re-interpret our results, focusing on the chemical reaction.

## 20- Comments on AC Methods Used to Measure Low Level Resistance

**Austin Griffin**, *Chemistry & Physics*

Co-Authors: **Alex Foster** *Chemistry & Physics*, **Robert Wardell** *Chemistry & Physics*

Mentor: **Dr. Bill Brandon**

In an engineering “whitepaper” article (Tufta, "AC versus DC Measurement Methods for Low-power Nanotech and Other Sensitive Devices", 2007), it is claimed that the common mode rejection ratio and low input impedance of a lock-in amplifier limits resistance measurements to a lower limit of about  $100\text{m}\Omega$  at low applied power ( $1\mu\text{W}$ - $1\text{nW}$ ), when constrained to below 1% accuracy. Furthermore, it is claimed that lock-in amplifiers are usually employed with user constructed current sources, which results in poor source accuracy when results are obtained as current or voltage readings. In this investigation, we question the validity of these claims and present a fixed frequency, phase sensitive detection technique, utilizing a commercial lock-in amplifier without a separate current source. In spite of the article's claims, we conclude that a lock-in amplifier, when utilized effectively, does indeed provide 1% accuracy in the measurement of such a low resistance ( $R_{\text{exp}} \sim 31\text{m}\Omega$ ) acquired within the low power limit ( $P_{\text{exp}} \sim 30\text{nW}$ ) without a separate current source. The experimental method, the data, a corresponding uncertainty analysis, and some suggestions for future improvements are included.

## 21- Overwintering Behavior of Eastern Box Turtles (*Terrapene c. carolina*) in a Fire-Managed Ecosystem

**Carlisha Hall**, *Biology*

Mentor: **Dr. John Roe**

Longleaf pine systems have high biodiversity due to natural and prescribed fires. Despite the use of fire for target species, some are at risk of being harmed by fire due to mobility limitations, such as box turtles. It has been suggested that timing burns to coincide with overwintering periods may reduce impacts of fire on turtles, but this depends on whether turtles bury deep enough to be protected from flames and when they emerge in spring. Using radiotelemetry and temperature loggers, we assessed winter burial depths and timing of spring emergence over two years for box turtles at Weymouth Woods Sandhills Nature Reserve (WEWO), a fire-managed longleaf pine system compared to turtles at the Lumber River State Park (LRSP), a bottomland hardwood forest where fire-management is not used. Burial depth did not differ between sites. Turtles were deepest from January – March (3.3 – 5.1 cm below litter), with some buried at the soil/litter interface and others 20cm deep. Spring emergence ranged from 11 March – 5 May, but the majority surfaced within the first two weeks of April. LRSP turtles emerged two weeks earlier than WEWO turtles in the first winter, but not in the second winter. These results may have important implications for box turtle conservation in fire-managed systems. Fires employed when turtles bury deepest (Jan – Mar) would lower risks of burn mortality and injury, but due to overall shallow depths of burial, several turtles would likely be at risk throughout the winter. To explore strategies that may minimize impacts of fire on turtles, future studies will examine overwintering habitat selection and the predictability of spring emergence.

## 22- Protection

**Emily Hester**, *Art*

Mentor: **Prof. Carla Rokes**

When things would get bad when I was a child my only escape would be my toys. So when conceptualizing a drawing, I came up with the idea of toys covering a gas mask. I choose a gas masking because when poisonous materials try to enter your mind or lungs you put that on to protect yourself. In my work, the mask is a metaphor for the way my toys protected me. The medium I used for this drawing is Prisacolor pencils on black paper. The message I wish to convey to the viewer is that no matter how dark things get..there is always something that will bring a little bit of joy to your life.

## 23- Creating North Carolinian Flora + Fauna Illustrations and Prints

**Courtney Hockett**, *Art*

Mentor: **Prof. Brandon Sanderson**

The works of John James Audubon, Walton Ford, and Beauvais Lyons were studied to create two 12"x18" copper etchings based on the naturalistic series which focused on the anatomical structure of animals and how they are depicted historically. Reference pictures and research was conducted at the North Carolina Botanical Gardens in Chapel Hill.

## 24 - Creating 2-D and 3-D Underwater Flora and Fauna Hybrid Species

**Courtney Hockett**, *Art*

Mentors: **Profs Brandon Sanderson and Adam Walls**

The two and three dimensional work of artist Beauvais Lyons was researched to create a life-size replica of hybrid underwater creatures based off North Carolinian wildlife. Six zinc etchings were created as identification tags for six ceramic hybrid animals. Also the artist Miko Morita was researched to help better understand how to incorporate living carnivorous, and exotic, plant species while successfully maintaining the care of the plants.

## 25- Acetamide as an Inhibitor of Lactic Dehydrogenase

**Kody Heubach**, *Chemistry & Physics*

Mentor: **Dr. Siva Mandjiny**

The aim of this research was to determine whether acetamide acts as an inhibitor of L-Lactic Dehydrogenase which is the enzyme that converts pyruvate to lactate and oxidizes NADH to NAD<sup>+</sup>. Because inhibitors decrease the rate of an enzyme-catalyzed process, the rate of the reaction in the absence and presence of acetamide was determined by UV-Vis spectrometry. The  $\lambda_{max}$  of NADH is 340nm and therefore its rate of decrease in concentration could be used as a measure of the reaction rate. The reactions were mixed in a cuvette and the absorbance was measured every 30 seconds over a 180 second interval. The research results indicated that acetamide was an inhibitor. Then by applying the Michaelis-Menten equation, it was determined that acetamide was a competitive inhibitor rather than a non-competitive inhibitor.

## 26- Make an IMPACT on Your Campus! Join the Movement and Start Your Own College Campus Food Pantry!

**Ja'Kayla Hill**, *Social Work*

Co-Authors: **Dayna Guzman** *Biotechnology major and Criminal Justice minor*, **Natural Breeden** *Social Work major and Substance Abuse minor*

Mentor: **Ms. Christie Poteet**

In an attempt to advocate for hunger awareness on college campuses this workshop was created to present to other colleges that face similar circumstances, the basic foundations of developing a program that would target any social issue that seems fit to address within that particular community. This workshop introduced efforts towards addressing needs of food insecurity issues amongst student populations to students, faculty, staff, and other professionals in this field at the National IMPACT Conference in Los Angeles, CA. This endeavor consisted of a survey study based on responses collected from several students that identified as not knowing where their next meal would come from. The CARE Resource Center was then established to improve the quality of life of those within the Pembroke community both personally and professionally. The services offered consist of a food pantry and clothing closet accessible to all students, faculty, and staff of UNCP.

## **27- Serving as One: Uniting Your Campus through Interdisciplinary Service-Learning Partnerships**

**Jordan Hunt**, *Mathematics*

Co-Authors: **Kevin Melvin** *American Indian Studies major and History minor*

Mentor: **Ms. Christie Poteet**

Service-Learning is a teaching and learning strategy that incorporates meaningful community service to enhance academic learning objectives. Cross-discipline service-learning projects can unite a campus and community to address social needs and provide opportunities for students to gain valuable experiences while applying learned concepts, theories, and skills. Based on research and experience with interdisciplinary service-learning partnerships at UNCP, we developed a workshop to help participants at the National IMPACT Conference on Community Service, Service-Learning, and Civic Engagement identify best practices for building community partner relationships, designing projects that reach across a variety of disciplines, and fully engaging students in the service process.

## **28- Revealing a Criminal History in a Job Interview May Make You More Likeable, but Not Necessarily More Hireable**

**Melanie LaBeau**, *Psychology*

Co-Authors: **Demetrius Edwards** *Psychology*

Mentor: **Dr. Kelly Charlton**

In a continuing effort to study the effect of revealing criminal history in a job interview, Mturk participants read about an applicant who did or did not disclose a larceny conviction prior to a background check. Mturk was used in order to gather data from an older population to determine whether or not the individual was suitable for the job, willing to stay on the job, or could be trusted with important tasks in relation to whether or not the individual disclosed their criminal history. Results indicate that disclosure affected evaluations but not hiring assessments, which suggests that we might like the people who disclose, but considering them suitable for hire is a different story.

## **29- The Impact of Society on Literature and Reflection of Victorian Society in Oscar Wilde's *The Importance of Being Earnest***

**Miriam Letson**, *English, Theatre & Foreign Languages*

Mentor: **Dr. Susan Cannata**

In Oscar Wilde's *The Importance of Being Earnest*, two of the main characters, Jack and Algernon, discuss modern life and modern literature. To them, the term modern was used in relation to the Victorian Era, a time period that lasted just under seventy years. Towards the end of the Victorian Era, the connection between life and literature became a popular concept to debate for many, including Oscar Wilde himself. Was literature reflecting life, or life reflecting literature? I will analyze Wilde's *The Importance of Being Earnest* and examine how the presentation of the events and characters in the literary work is a product of the Victorian Era and reflects its societal expectations as well as criticizes its values and ideals.

### **30- Enhancement of the Cannabinoid Pathway Provides Protection against Seizure-Related Brain Damage**

**Christopher Long**, *Biology*

Mentor: **Dr. Ben Bahr**

Seizures are known to cause brain damage, decreasing the viability of both neurons and astrocytes \_ astrocytes are a component of the Blood Brain Barrier (BBB).As part of a potential protection avenue against seizure damage, endogenous agonists of the cannabinoid system, the endocannabinoids anandamide (AEA) and 2-arachidonoylglycerol (2-AG), have been linked to on-demand protective responses. The excitotoxin kanic acid (KA) induces seizure events and has been observed to raise AEA levels in the brain. In order to positively modulate the endocannabinoid response, we have utilized various classes of inhibitors that block the AEA-deactivating enzyme fatty acid amide hydrolase (FAAH) - these include AM (6642, 5206, and 6701). KA injected i.p. in rats caused seizures, calpain-mediated spectrin breakdown, declines in synaptic markers, and disruption of neuronal integrity. In addition to reducing seizure severity, the pre- and postsynaptic proteins were protected by the FAAH inhibitor AM5206 to levels comparable to those found in healthy control brains. Using antibodies to glial fibrillary acidic protein (GFAP), KA was also found to have an effect on these astrocyte markers. GFAP levels decreased after the KA injections. Rat groups also treated with AM5206 exhibited recovery of GFAP levels 24 h post-insult. GFAP was reduced by the KA insult, and AM5206 treatment returned GFAP to normal levels. Note that FAAH inhibition with AM5206 protected against the neurodegenerative and astrocyte degradative cascades.Our data support the idea that endocannabinoids are released in response to excitotoxicity preventing excitotoxic progression that targets both neurons and astrocytes.

### **31- Macrohabitat Selection of Eastern Box Turtles**

**Zachary Lunn**, *Biology*

Mentor: **Dr. John Roe**

Prescribed fires are used as a conservation and management tool in longleaf pine ecosystems. The periodic disturbance of fire promotes healthy longleaf communities and their associated biota, but we are unsure of the fires' effects on box turtles. Here, we examine box turtles within two defined study sites: Weymouth Woods-Sandhills Nature Preserve (WEWO), where prescribed burns are utilized, and Lumber River State Park (LRSP), which does not employ fire as a management tool. Turtles are tagged with transmitters and regularly tracked using radiotelemetry technology. Their locations are recorded and superimposed on maps that demonstrate the density and distribution of each of three categories of trees: hardwoods, longleaf pines, and non-longleaf pines. We predict that the impact of fire at WEWO will result in stronger habitat selection and avoidance behavior compared to the LRSP. We expect turtles at WEWO to avoid longleaf pine macrohabitats due to threat of fire. Conversely, we expect them to prefer and select hardwood forests due to the potential refuge from fire. We predict turtles at LRSP will show no preference for a particular habitat due to the lack of danger from prescribed fire. Proximity to water, as opposed to the presence of hardwood trees, may be a strong motivator for the turtles' macrohabitat selection at both sites, and should be considered when analyzing our results. Examining the degree of macrohabitat selection by box turtles will give biologists insight into box turtle behavior, edify the scientific community on the potential impact of prescribed fires on box turtles, and help guide park and forestry officials when developing burn regimens and schedules.

### **32- Further Development of Z-Phe-Ala-diazomethylketone (PADK) for Alzheimer's Disease: Oral Dosing Increases Active Cathepsin B in Brain without Causing Adverse Effects**

**Elliott Lyndsie**, *Biology*

Mentor: **Dr. Ben Bahr**

In Alzheimer's disease, protein accumulation causes toxicity in the brain's synapses and neurons. The lysosomal pathway reduces protein accumulation pathology through amyloid beta ( $A\beta$ ) and tau clearance (Bendiske & Bahr 2003: JNEN 62:451; Butler et al. 2011: PLoS One 6:e20501). Thus, it is of interest to find a therapeutic pathway to increase lysosomal efficiency. Previous studies found that Z-Phe-Ala-diazomethylketone (PADK) increases the lysosomal enzyme cathepsin B (CatB), which allows the lysosomal pathway to degrade and reduce pathogenic forms of  $A\beta$  (Mueller-Steiner et al. 2006: Neuron 51:703; Butler et al. 2011). Previous papers reported on the efficacy of i.p. injection of PADK in mice. Our lab began researching the efficiency of upregulating CatB through PADK oral dosing. PADK or control compound (ZFA) was combined with peanut butter to form 0.5 g "cookies," which were fed to the animals. Oral administration of 3-18 mg/kg/0.5 d PADK for 11 days increased CatB levels in the brains of young adult rats in a dose-dependent manner. Control animals which received 20 mg/kg/0.5 d of ZFA for the same length of time had no effect on CatB. HPLC detected 4.4 pg/ $\mu$ l of PADK in the plasma; PADK had reached the bloodstream. Aged mice ate "cookies" with either 18 mg/kg of PADK or 20 mg/kg of ZFA twice a day for 11 days. In the aged mice, CatB was upregulated in the hippocampus, frontal cortex and hindbrain regions. Oral dosing produced no abnormal behavioral effects in either group of animals. PADK also appears to reduce decline of the postsynaptic marker GluR1. Thus, oral dosing of PADK may be a viable avenue for dose-dependent, therapeutic treatment for Alzheimer's disease.

### **33- The Design Process for a New Student Recreation Center**

**Gamal Marlowe**, *Music*

Mentor: **Dr. Marian Wooten**

This project is a plan for a fictitious recreation facility on the campus of the University of North Carolina at Pembroke. The mission in mind when creating this proposed facility was for it to be all-encompassing and available to UNC Pembroke students, faculty, and staff, as well as members of the surrounding community. This creative project explores the process of facility and site design, which entails many features. Project research, regional and site analysis, feasibility study, programming, functional analysis, site planning, risk management and accessibility, construction, bidding processes, funding, and management structuring were all vital components of this endeavor. In order to establish the potential need for this new facility, the subject of survey writing was also studied to determine how to effectively compile useful information in order to reach this goal. Gender neutral restrooms, a revolutionary addition to this project, make this facility an unprecedented venture in the history of UNC Pembroke.

### **34- The Effect of Progressive Strength Training on the Performance of a Recreational Runner**

**Nicole Marple**, *Health, Physical Education & Recreation*

Mentor: **Dr. Jeff Bolles**

Debate exists regarding the value of strength training for endurance athletes, particularly runners. Considerable attention has been focused on VO<sub>2</sub>max and anaerobic threshold (AT). Further, traditional thinking suggests that concurrent strength and endurance training compromises the effectiveness of both.

For a long time, people have believed that endurance runners need to focus on aerobic training and not anaerobic. Runners have been hesitant to partake in anaerobic workouts due to concerns that strength training will lead to a decreased VO<sub>2</sub>max and hypertrophied muscles (Yamamoto et al., 2008). However, there is a trend toward runners using strength training in hopes of improving VO<sub>2</sub> max and AT (Jung, 2003).

This study will investigate if strength training has a beneficial effect on VO<sub>2</sub>max, and AT in a recreational female runner. Procedurally, the subject will be required to not change her running mileage or style. Additionally, the subject will be coached with a linear periodization model strength training regimen. The subject will be required to strength train three days/week for the entire program (6 months). Quantitative data will include: 5K time (from a time trial), VO<sub>2</sub>max, AT, lower body muscular endurance, upper body muscular endurance and body composition. Data will be collected prior to the intervention (pre-test), after three months (mid-treatment) and after six months (post test). All data will be analyzed using an ANOVA with a Tukey post hoc test, and the critical value will be established at P = 0.05.

### **35- Testing Endocannabinoid Enhancement for Protection against Paraoxon-induced Oxidative Damage and Corresponding Synaptic Decline in Rats**

**Sara McEwan**, *Biology*

Mentor: **Dr. Ben Bahr**

Endogenous cannabinoids (endocannabinoids) are generated naturally in the body as components of homeostatic regulation in addition to a neurological repair pathway. Fatty Acid Amide Hydrolase (FAAH) is an enzyme that inhibits the natural effects of endocannabinoids through regulated break down. By slowing down FAAH activity, endocannabinoids can persist longer and function at a rate that will be beneficial for the prevention of neurodegeneration. AM5206 is a recently developed compound that inhibits FAAH. Its efficacy as a treatment of anticholinesterase-induced excitotoxicity was tested through in vivo rat models. The purpose of this study was to test whether AM5206 prevents/slows a pathogenic cascade of oxidative stress and associated synaptic deterioration in rats. AM5206 showed signs of neuroprotective capability by reducing the cytotoxic effects created by the paraoxon insult (an acetylcholinesterase inhibitor), including reduced protein staining with an antibody against 4-hydroxynonenal (4-HNE) 1. The 4-HNE marker is implicated as a mediator of oxidative stress-induced cell death that is an effective marker for oxidative damage. So far in this study, the paraoxon-treated rats appear to have higher levels of hippocampal and frontal cortex protein bands stained by anti-4HNE, indicating evidence of oxidative stress. The neuroprotectant AM5206 appears to also reduce this sign of oxidative stress and prevent the negative impact on synaptic function and plasticity. AM5206's preventative capabilities on FAAH shows promise as a combatant against the enzyme's inhibitory effects on endocannabinoids, ultimately making it an effective treatment for seizure-related disorders.

### **36- A Comparison of Three Techniques Used to Measure Resistance Values In the Milliohm Range**

**Alexander McGirt**, *Chemistry & Physics*

Mentor: **Dr. William Brandon**

The effort of trying to utilize relatively easy and inexpensive methods to measure low resistance values can be a subtle process. It is also, potentially, a great way of implementing experimental methods to accomplish a task usually handled by technologically advanced equipment or procedures. Carrying out relatively straight forward high precision electronic measurement techniques encourages students to embrace the art of various signal processing techniques used in physics experiments. In this experiment, three different techniques will be used and then compared to analyze their effectiveness. These techniques include: single instrument 4-wire sense, component 4-wire current method, as well as phase sensitive detection scheme at a fixed frequency (90 Hz) using a lock-in amplifier. The resistance values were obtained from 0.5 – 40 cm segments of AWG 22 copper wire, corresponding to a range of recorded resistances of 0.3 – 20 milliohm. The data and a comparison of the different techniques, along with a discussion of their respective ranges of validity, are presented.

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### **38- The Development of an Edible Cover Crop and its Efficiency on Tomato Yields**

**Travis Michael**, *Biology*

Mentor: **Dr. Debby Hamner**

One of the main problems with growing a crop such as tomatoes is the amount of time and work that must be spent clearing the plots of weeds and also unwanted pests. The potential of lowering the amount of labor could allow for yields to be produced cheaper and allow for a higher profit at the market. Pair this with an edible cover crop and profits could be even higher. In my research I have developed two separate multispecies cover crops and will be monitoring the effects they have on weed suppression, soil moisture, and edible biomass yielded. I will provide a detailed list of the species in each mix, pictures of the tomato beds that I have been preparing and future

plans for continued research throughout the summer growing season. Data will be collected as the plants mature and will be compiled in a future research project.

### 39- **Modern Mythology**

**Dina Nobles**, *Art*

Mentor: **Prof. Brandon Sanderson**

This project allowed the study of the tradition in art of animal illustration through the medium of the bestiary vocabulary, or bestiary. Most historical bestiaries depict creatures from written or oral record, such as Albrecht Durer's Rhinoceros while the minority are fairly accurate naturalistic renderings. I then constructed five creatures using elements of both social satire and naturalist drawing techniques with the objective of creating a contemporary bestiary that also serves as a reflection of our society and culture. These images were translated to copper etching plates using historical methods of engraving and etching. The plates were then printed in editions of 10 each. The finished works will become part of a larger bound volume that will contain a total of 10 to 15 creatures.

### 40- **Digitizing the UNCP campus**

**Veronica Oquendo**, *Geology & Geography*

Mentor: **Prof. Jesse Rouse**

Maintaining an inventory of facilities on a campus is integral to the administration's ability to make timely and sound decisions. This project focuses on the data collection and attribution process to support an ongoing effort to create and update the UNCP campus Geographic Information System (GIS). The main objectives of the project presented here are to create data for the UNCP campus and build upon existing location data with additional GIS attributes. The focus of this portion of the project is on data for people moving around campus including building use (residential, educational, or administrative), as well as the location and number of bicycle racks and benches around campus. The use of GIS programs such as ArcMap allows the data to be easily edited and viewed, making it possible to create a map of the campus that includes items that are relevant to a particular need/use case. In addition, the project is beginning to look at the campus in 3D. While the first steps are being conducted using SketchUp, the role of Building Information Management (BIM) software is also being considered.

### 41- **A Study in the Realization of 2d Media to a 3d Medium**

**Katina Oxendine**, *Art*

Mentor: **Prof. Adam Walls**

One of the greatest skills of an artist is the ability to create from the heart. These expressions of imagination are sometimes, regrettably, limited to a two-dimensional lane of existence. There are artists who are capable of taking two-dimensional rendition and pulling it out into the three-dimensional plane where it can be engaged. Jim Henson Studios teaches those who intern and work there to do such a thing, yet their processes have been kept away from prying eyes until the show *Jim Henson's Creature Shop*. Inspired by this approach and by Dreamworks' *How to Train Your Dragon*, this work was created to not only practice the method of creating large articulated skeletons, but also to bring a beloved character out to where it could be seen and touched. Though original work in this field is often encouraged, this study was also about being able to stay true to a design that was already well established and well known as a

test of craftsmanship and attention to detail that will come in very handy should a job in the field be sought.

#### **42- Tunnel of Oppression: Setting the Scene for the ULTIMATE awareness experience.**

**Nygel Robinson**, *Musical Theatre*

Mentor: **Ms. Christie Poteet**

This workshop was for those who were determined in raising awareness on a variety of “touchy” topics on their campus presented at the National Impact Conference in Los Angeles, California. The Tunnel of Oppression is a multimedia, interactive, experience designed to raise awareness of oppression of individuals locally, nationally, and globally. The Tunnel offers the opportunity for participants to walk through spaces designed by students to gain insight and information about oppressed groups being highlighted. In this workshop we modeled what a scene might look like in Tunnel and showed how our experiences have allowed us to maximize our campus’s engagement. We also enable participants to set their own scene, compose a seamless robust awareness event, and develop meaningful learning outcomes.

#### **43- Youth Mentoring Program: 3 Steps to Developing a Lasting Impact on Youth Today**

**Robert Sam**, *Business Administration*

Co-Authors: **Joshua Elliott** *Criminal Justice*

Mentor: **Ms. Christina Poteet**

Brave Impact Mentoring is a mentorship program formed by UNCP students in partnership with the local Pembroke Housing Authority. Since this program was created in the Fall semester of 2013, it has shown positive results with at risk youth that actively participate ranging from 6th grade to 12th grade. In February 2015, we presented a workshop at the National IMPACT Conference in Los Angeles, California on our development of Brave Impact. This conference is historically the largest national gathering of individuals who are committed to engaging students in service, activism, advocacy, etc. During our presentation we educated students, faculty, and staff from institutions nationwide about how to successfully implement a youth mentoring program in their communities. During the conference we attained very valuable feedback that will positively impact our local mentoring program and our local community in the future.

#### **44- “There and Back Again,” or, the Importance of a Study Abroad Experience**

**Ethan Sanford**, *Biology and English*.

Mentor: **Dr. Laura Dobson**

On 16 September, 2014, I embarked on one of the most incredible, enlightening, and autonomously liberating experiences of my life—a semester-long study abroad program at Bangor University in Gwynedd, Wales. During the course of three months, I experienced a vast improvement in character, academics, and cultural literacy. The purpose of this presentation, then, is to demonstrate the virtually endless benefits of a study abroad experience in three key areas. First, a student who chooses to study abroad has the opportunity to improve his or her understanding of academics not just as a local, confined discipline, but as a persistent global discourse; second, a student studying abroad will develop a degree of autonomy and independent capability that is granted by almost no other experience as well as a high level of skill in interpersonal relations from interacting with the local student environment; and finally, a student studying abroad will become more culturally literate and acquire a deep appreciation for a culture

that is both diverse and different from his or her own. These three developments of character are the inevitable and infinitely rewarding result of any long-term study abroad program.

#### 45- Flashbulb History

**D'Angelio Scott**, *History*

Mentor: **Dr. Jeff Frederick**

My research explores the probability of accuracy when it comes to distinguishing between memory and historical events. When individuals remember any event in their lives, two occurrences will happen. 1) Individuals would remember the event partially; however, some of recollection would be exaggerated or forgotten. 2) Individuals would remember the event clearly and vividly, detailing the scenery and emotions that brought upon memory. Historical events would stand to reason with memory due to it being recorded and having been evident that such event has happen. The historical event that this research was investigated on was the Civil Rights Movement that lasted from 1949 to 1980. Two interviews were conducted with individuals that lived and experienced the events of those years. The research compared whether the individual accounts and the historical accounts of the Civil Rights Movement are aligned to some degree.

#### 46- Colony Social Forms of Invasive Fire Ants (*Solenopsis invicta*) in Wetlands of North Carolina

**Mycah Sewell**, *Biology*

Mentor: **Dr. Lisa Kelly**

*Solenopsis invicta* Buren, the red imported fire ant, has two social forms that are key to the fire ant's reproductive biology and possibly to its invasive strategies. The social form of a colony is determined by one gene, Gp-9. A genotype of BB results in a monogyne colony that has only one egg-laying queen, while a Bb genotype results in a polygyne colony that has multiple egg-laying queens. To study the distribution of these social forms, living ants were collected in 2013 from two wetlands in southeastern North Carolina and then genotyped using multiplex PCR and agarose gel electrophoresis. Similarly, ants collected from five additional wetlands in 2014 will be genotyped. Monogyne and polygyne colonies were nearly equally represented in the wetlands sampled in 2013. We wish to compare the incidence of social forms across all wetlands sampled. These wetlands supported a wide range of vegetation types, from completely herbaceous to nearly closed canopy forest. This study could reveal different patterns of environmental selection for the two social forms. Factors that could be important include tree cover, flooding, and the availability of suitable microhabitats.

#### 47- CHEER (Cursive Handwriting in Elementary Education and Reading)

**Alisa Shelley**, *Elementary Education*

Mentor: **Dr. Betty Brown**

In this research project, we will complete an in-depth study of the relationship between handwriting and literacy in a classroom. The students will range from 3rd grade to 5th grade because that is the beginning of teaching cursive. Handwriting is a skill that research shows is essential to students' brain development. Due to an increase in the use of technology in the classroom, handwriting's importance has almost diminished. Even though handwriting is not consistently taught in a school setting, this ability affects many portions of a student's educational career, including his or her literacy. If cursive handwriting were

to be taught, would a difference be made in a student's achievement in his or her literacy scores? This unique topic has limited research, but its significance could be proven as an asset to a student's knowledge base.

#### **48- Differential Genomic Profiling of *Solenopsis Invicta* Buren Dubtypes via Gene Counter-regulation and Functional Annotation**

**Marcus Sherman**, *Biology*

Mentor: **Dr. Conner Sandefur**

*Solenopsis invicta* (red imported fire ant) poses a significant ecological threat to the southeastern United States by way of outcompeting native species and disturbing native ecological communities. The two social forms of red imported fire ants, polygyne (multiple reproducing queens per colony) and monogyne (one reproductive queen per colony), have major morphological and behavioral differences. Polygyne colonies tend to have populations with much greater density. We developed a custom Python pipeline to first identify differentially expressed genes ( $p < 0.001$ ) across genotypes and developmental stages and then characterize the gene profiles using Gene Ontology (GO). Using *S. invicta* queens our model, we found the differentially expressed genes across genotype for each age class (pupa, 1 day virgin, 11 day virgin, and fully reproductive). For the pupa class, 193 probes were differentially expressed and 39 probes were counter-regulated. For 1 day queens, 147 probes were differentially expressed and 44 probes were counter-regulated. 11 day queens had 1135 differentially expressed probes and 40 probes were counter-regulated. Lastly, reproductive queens had 657 differentially expressed probes with 53 counter-regulated probes. GO interrogation of differentially expressed genes showed a consistent trend in major biological processes from pupal stage throughout. However, changes to that trend appear starting in 11 day queens with changes in response to pheromone, pheromone binding, and methylation—all of which continue through development. Lastly, signal transduction is enriched only in 11 day queens.

#### **49- Topping the Classroom Charts: Teaching Criminological Theory using Popular Music**

**Nakita Shumpert**, *Sociology & Criminal Justice*

Mentor: **Dr. Lamphere Renee**

Today's students are entering college having been immersed in media to an extent that has not been seen previously. The media-driven influence on college students has led many educators to use non-traditional mediums to engage their classes in meaningful learning experiences. As discussed by Hinds-Aldrich (2012), many educators advocate for the use of music and/or musical lyrics as a non-traditional teaching tool, specifically to illustrate the basic concepts of criminological theory. While many types of songs and lyrics could be used to teach criminological theory to undergraduate college students, the emphasis of this particular paper is on the use of popular music. Included is a discussion of using non-traditional instruction in the college classroom, student examples of theory application to popular music, and suggestions for implementing popular music in the classroom.

## 50- Service Learning: The Impact of Community Partnerships

**Caleb Smith**, *Biology*

Co-Authors: **Cassidy Miles** *Psychology*

Mentor: **Dr. Teagan Decker**

In this poster, we will be discussing the effects of service learning and community partnerships in a rural educational setting. As part of our service-learning requirement for Composition II, we volunteered at Purnell Swett High School through the Literacy Commons, a program established at UNCP with a focus on promoting literacy in the surrounding community. We visited the school on a weekly basis to assist in the facilitation of a creative writing seminar for ninth grade students. This seminar was a collaborative partnership between The Literacy Commons, UNCP faculty and students, a community organization, and high school teachers and administrators. Students that participated were encouraged to write short-stories and poems based on assigned topics and ideas. The assignments were objectively created to encourage student participation and involvement and to improve their creative writing and critical thinking skills. In order to fulfill the final project requirement of Composition II, we decided to incorporate this rewarding experience into our research. Our final papers focused on dropout prevention methods and problems frequently associated with rural education. We investigated the role of service projects, such as our project with The Literacy Commons and Purnell Swett High School, and their potential to lead to improvement.

## 51- First Freeze and Last Freeze of Lumberton, North Carolina: Is our Climate Changing?

**Dusty Smith**, *Geology & Geography*

Mentor: **Dr. Dennis Edgell**

The idea of climate change has become a big argument among our generation and will continue to be until we can fully understand it. Some people believe that climate is changing at a fast rate while others don't believe our climate is changing at all. To completely understand our climate, we need to look at at least 30 years of data and determine what changes have occurred. For my project, I will be looking at the first and last day the temperature reaches freezing (32 degrees Fahrenheit) for the last 100 years in Lumberton, North Carolina. I will compare the years and look for an overall trend that will determine if the first freezing occurs earlier or later in the year. I will also do this with the last freeze of the year. With this data, I will be able to determine if our climate has changed over the last 100 years.

## 52- Teenage Girl Culture of the 1950s

**Laura Spillman**, *History*

Mentor: **Dr. Ryan Anderson**

Did teenage girls of the 1950s conform to the gendered roles established by adults of their day? This project explores that question by considering how teenage girls spent money and prepared for womanhood. Many of them accepted that they would become the wives and mothers suburban America expected of them, but my work suggests that they did so on their own terms, despite the histories of the period which emphasize conformity at the expense of autonomy. My thinking on this topic is shaped by the memoirs and writings they produced throughout their lives. This project draws on secondary sources that explain how the mass consumer-culture, the influence of media and movies, and the tight-knit Levittown neighborhoods shaped teenage girl culture of the 1950s. Stuck between social expectations and individual needs, teenage girls recounted that while they felt a tremendous amount of pressure to fit in and

conform, they also believed that as teenagers they had the ability and right to decide for themselves how they thought and acted. The popular culture of the fifties affected how they thought about love, sex, and careers; they often shocked and worried their parents by expressing controversial ideas regarding these topics. Furthermore, my work suggests that young people did not accept their role as teenagers as entirely subordinate to adults, even when it looked like they were preparing to emulate their parents' lives. In my future research, I wish to look at teenage girls from various racial and ethnic, socio-economic, religious, and geographical backgrounds. I would also like to consult more memoirs, personal writings, and records of teenage girls of the 1950s.

### **53- Investigating Cryptic Initiation Between Synthetic Lethal Mutants *htz1Δ* and RPB2-2SL in *Saccharomyces Cerevisiae***

**Caleb Stubbs**, *Biology*

Mentor: **Dr. Maria Santisteban**

Histone H2A.Z is a H2A variant form of the highly conserved Histone H2A.Z/F family, which is found among most vertebrates. In yeast *Saccharomyces cerevisiae* H2A.Z (encoded by HTZ1) is not necessary for life, but *htz1* mutants exhibit many different phenotypes in several cell processes including transcriptional regulation, gene silencing, and preventing the spread of heterochromatin, and mitotic chromosome transmission. Htz1 containing nucleosomes have been shown to poise quiescent genes for activation and transcriptional initiation. Research has shown that mutations in the HTZ1 gene together with mutations in RPB2 (encodes the second largest subunit of the RNA polymerase II), causes synthetic lethality. Some transcription elongation mutants have been shown to have cryptic initiation phenotypes and a mutation in one of them, SET2, has turned out in our screen for suppressors of the *htz1/ RPB2-2SL* synthetic lethality. Using a pGal-KanMX-FLO8-HIS3 cassette designed by the Winston lab we decided to look for cryptic initiation phenotypes that would cause for the activation of cryptic promoters in the coding region of FLO8 and expression of, otherwise out-of-frame, HIS3 gene. Five different yeast strains (WT, *htz1*, *htz1/ RPB2-2SL*, *htz1/ RPB2-2SL sup*) to help identify if cryptic initiation was occurring in these strains by observing positive histidine expression with growth on –His plates. PCR amplification was done with designed primers to check if our cassette was inserted correctly by replacing the functional FLO8 gene. Following experiments we saw strains containing the *htz1/ RPB2-2* double mutation where showing signs of cryptic initiation.

### **54- Exploration of Patter and Nature**

**Chelsea Summers**, *Art*

Mentor: **Dr. Carla Rokes**

In the world that we travel, we tend to ignore the patterns and the nature that surround us. In this series, I would like to bring attention to microscopic patterns in nature: the small overlooked details that surround us in the human environment. The series of mixed media drawings I plan to create will utilize patterns and images from nature and will also depict a message for the viewer to translate through their own aesthetic interpretation. I want to achieve a balance of accident and control with the material. I plan to use a combination of wet and dry media; acrylic inks will allow for the unexpected and more fluid forms to emerge, while the pen offers more control. In many ways, the process of making this series mimics patterns found nature, a combination of visible regularities of form with unexpected growth. I will be gathering information and imagery by visiting a variety of gardens as well as researching botany. The research in botany will be helpful because it explains the symbolic meanings and botanical anatomy of different flora and fauna. I will also research the cultural significance and the geographic location from which a variety of flora and fauna originate.

## 55- Forgotten Truth

Desiree Thomas, *Art*

Mentor: Prof. Brandon Sanderson

“Forgotten Truth” is based on the aftermath of the African Diaspora. The term diaspora describes the forced migration of Africans during the Atlantic Slave Trade. This project investigates imposed religion, white ignorance and identity. These themes are illustrated through fine art prints using traditional printmaking processes such as woodcut, intaglio, and stone lithography. My objective is to grant insight into the history of African Americans and the struggles they are facing today.

## 56- Does Colony Social Form of Invasive Fire Ants (*Solenopsis invicta*) Affect Microhabitat Choice in Wetlands of North Carolina?

Haylee Trotter, *Biology*

Mentor: Dr. Lisa Kelly

For fire ants (*Solenopsis invicta* Buren), colony social form is a major factor in terms of reproduction and possibly in the invasion ecology of this species. During summer 2014, fire ants were collected from one or two transects within five wetlands in southeastern North Carolina. We will examine the effects of colony social form on the choice of microhabitat and on the distribution of colonies relative to habitat edge. In an earlier study, we found both monogyne and polygyne fire ants in two other wetlands within the region. However, the monogyne social form (one egg-laying queen) appears to be more common than the polygyne form (multiple egg-laying queens) within the southeastern United States. Multiplex PCR will be performed on the ant samples to detect the Gp-9 gene, which is responsible for colony social form. Colony locations will be mapped using topographic software and GPS coordinates. We predict that monogyne colonies will be more common than polygyne colonies. We also predict that polygyne colonies will be more common near the edges of these habitats. Such outcomes may be related to differences in invasion strategies.

## 57- Optimization of Biodiesel Production through Manipulation of Reactant Ratios and Temperature

Allishia Tyson, *Chemistry & Physics*

Mentor: Dr. Rachel Smith

The quest for alternative energy will be one of the most important mission this millennium. The optimization of biodiesel has the potential to dramatically decrease reliance on petroleum based energies, however its production must be economized to increase viability. Reaction conditions for microwave transesterification of soybean oil with methanol and choline hydroxide were manipulated to increase production yield, while reducing necessary amounts of catalyst. Microwave heating was employed to maximize conversion rates and decrease reaction time, allowing for increased production of biodiesel. Methanol and choline hydroxide ratios were manipulated to obtain acceptable conversion rates, while minimizing the amount of catalyst, specifically the relatively expensive choline hydroxide, required. Initial reactions showed a % yield by mass of 44%, which is comparable to commercial conversion rates of 70%.

## 58- Ads through Time: From Dickens & Steam to Interactive Ads Today

Zach Ubaldini, *English, Theatre & Foreign Languages*

Mentor: **Dr. Cynthia Miecznikowski**

Charles Dickens and his relationship with interactive ads today is relevant to how ads are developed. With research and knowledge in English and Marketing I have noticed certain similarities to the ways Dickens advertised his periodicals in the 19th century to interactive ads today. While Dickens incorporated ads with connections to his writing, ad agencies today have algorithms that connect the right type of ad to the right consumer. While a great deal of scholarship is already done on Victorian Fiction and their advertisements, my hypothesis is that advertisers still have a great deal to learn from the first mass advertiser. I am exploring how Dickens meshed the prominence of mass literature, technological advancements, and creative advertisement methods to become a precursor for modern methods today. Although he did not title them, recognizable forms of marketing today were introduced by Dickens such as avante garde advertisement, content marketing, snob appeal marketing, and, the most recognizable, product placement advertising. Dickens created a connection between the ad and its content that has since been roaring in television, radio, and most recently the internet. This project gives credit to Dickens and the purpose for modern marketers to get back to original motive of marketing rather than the unethical appeals they shoot for today.

## 59- Innovative Authors: Charles Dickens & Modern Marketing

Zachary Ubaldini, *English, Theatre & Foreign Languages*

Mentor: **Dr. Cynthia Miecznikowski**

Charles Dickens is often called a sell-out in conversation about the sales of his literature. In contrast, Dickens was a canonical author and marketing genius. Currently, I am researching in both fields of English and Marketing attempting to mesh both of my interests. While reading copies of original installments, I noticed advertisements lacing the pages of his monthly periodicals such as *Bleak House*, *Nicholas Nickleby*, and other works. Dickens also connected the ads with his literature starting the first connective ad campaign. I found Dickens to have integrated the marketing process, streamlining the needs of different consumers to the manufacturing of his product. He understood modern day marketing principles such as the Four P's by developing products for multiple target audiences in England from rich to poor. Additionally, Dickens employed advertising methods like content marketing, guerrilla advertisement, snob appeal, and product placement. Dickens was not a typical hermit artist; he was a savvy capitalist setting the standard for marketing any product. Dickens used the popularity of his literature, technological advancements, and creative marketing techniques to succeed in the capitalist society; making him an innovator rather than a sell-out. Unfortunately, the marketing and ad industry are stereotyped as shady and fake with depictions like *Mad Men* and contemporary ad campaigns targeting unethical stimuli on the consumers. This research will look at Dickens as a marketer who stayed above the emotional line that contemporary marketers fail to see all while promoting his product unlike anyone before him.

## **60- Color with Pen and Ink Illustrating a Children's Book (The Red Shoes)**

**Allyson Watts**, *Art*

Mentor: **Prof. Brandon Sanderson**

Through the PURC grant that I received, I had the chance to further my skills in pen and ink and water color. I created 5 illustrations that will be a part of a larger project. I am collaborating with the Lumberton writer Debbie Stuckey to illustrate her children's book, *The Red Shoes*. The final product will be a collection of 32 illustrations.

## **61- The Consumption of Consumers in M.T. Anderson's Novel Feed.**

**Richard Weis**, *English, Theatre & Foreign Languages*

Mentor: **Dr. Susan Cannata**

In M.T. Anderson's modern young adult novel, *Feed*, we see a close look at many issues in a dystopian society. We also see how these issues highlight our own contemporary issues by elevating them to extremes. In the novel we see the importance different social classes place on consumerism and how it makes them a pliant and easily controlled society. Then through one girl's act rebellion against the system, in creating a completely unpredictable consumer profile, we see how this society devalues people who deviate from the normal controlled patterns of behavior. Through the interactions of characters in the novel, we see how consumerism affects several classes of people differently and how consumerism atrophies the talents and skills of young people to reduce them to mindlessness. I will use Marxist theory to research other examples of class conflict and show how I believe the author implies consumerism devours the various characters intellectually.

## **62- Sports Empowerment Program**

**Madison Wilcox**, *Health, Physical Education & Recreation*

Co-Authors: **Ian Fennell** *Education*

Mentor: **Dr. Marisa Scott**

The Sports Empowerment Program is a day camp designed to bring children of all abilities into an inclusive environment that promotes equality and acceptance of all abilities through athletics. The student coordinators of this event have been working closely with the Accessibility Resource Center, the Office of Civic and Community Engagement, Campus Recreation, the School of Education and Innovative Approaches of the Robeson County Health Department to plan this program. The goal is to bring students from the self-contained classes from local high schools to UNCP's campus to create inclusive and unified teams. These teams will be created by placing students with disabilities on teams with student participants without disabilities from UNCP and surrounding high schools.

The goals of this program include inspiring players who are not normally included in sports or physical activity to engage in an active lifestyle, breaking down barriers between people of different abilities, and familiarizing high school students with disabilities, with the campus setting. The surrounding community of UNCP has a need for inclusive and unified programming as it lacks such opportunities. The university itself already has an inclusive program on the visual arts basis but has never had sports or athletics based levels of inclusion. The UNCP Sports Empowerment Program will give students with cognitive and physical disabilities the chance to participate in a physical activity simultaneously with students who do

not have disabilities. Therefore, this program will be increasing the cooperative effort for improved quality of life and inclusion between the university and the community.

### **63- Migration, Ethnicity and Belonging: Second-generation Indian Americans in India**

**Alexis Wilkerson**, *Sociology & Criminal Justice*

Mentor: **Dr. Sonali Jain**

Our research focuses on second-generation Indian Americans who “return” from the US to their parental homeland, India. It places the second-generations’ lives in India at the heart of the research, while remaining attentive to the ways in which it is shaped by forces beyond it. Drawing on the sociological literatures on transnationalism, return migration and ethnicity, it asks: Why do highly-skilled, second-generation Indian-Americans return from the US to India and how do they construct and manifest their ethnic identities in their new situations? We answer this question by integrating macro-level (economic and political) with micro-level (individual) factors. The larger project addresses the salience of economic opportunities in India, transnational attachments to India, and to a lesser extent, the role of the Indian government in prompting respondents’ return decisions. For the purposes of the PURC fellowship, we will specifically focus on the ways in which respondents construct and reconstruct their ethnic identities as they go about their everyday lives in India, and how they do so by drawing from their experiences in both the US and India.

### **64- A Review on Techniques to Fuse Protoplasts among Anaerobic Bacteria**

**Catheryn Wilson**, *Biology*

Mentor: **Dr. Maria Pereira**

In biotechnology, alternative fuel development is an ever-increasing area. Specifically, biofuels address critical topics such as growing energy demands, environmental concerns, and economic impact. Butanol, an elite biofuel type, serves to resolve the aforementioned issues thanks to its impressive high-octane content and low hygroscopic properties. This project seeks to encourage insights into the optimization process of butanol production from crude glycerol through the protoplast cell fusion of anaerobic microorganisms, *Clostridium thermocellum* and *Clostridium pasteurianum*. In the future, the goal of this project is to create thermophilic (heat-tolerant) chimeras able to produce butanol at high temperatures ranging from 45<sup>o</sup>C to 60<sup>o</sup>C. Therefore, preliminary literature explorations contribute to this pilot study. Moreover, the literature ascertained and analyzed will add to the body of knowledge related to the overall subject of biofuels

### **65- A Study of the Human Figure: Techniques of Sculptural Form at Fetal and Adult Stages**

**Jai Woods**, *Art*

Mentor: **Prof. Adam Walls**

My project explored the foundations for figurative sculpture using both sand molded and ceramic hand-building technique. I used this grant to research the differences in these methods, as well as develop an understanding of how these processes affected the overall sculptural form. In the first phase of research, my mentor and I focused on designing one composition that included both a fetal and adult form. This phase utilized oil-based clay and produced a composition that we used for our later sand-molded casting. This project developed my understanding of the metal casting process by emphasizing the correct

methods for mold making and achieving detail through casting. In the second phase of our research, we transitioned to ceramic hand building, using stoneware. This phase focused on constructing nine fetal forms, which outlined the differences in monthly development in terms of human gestation. With this research, I found that ceramic stoneware provided more control over surface detail, and oil-based clay provided extended work time and flexibility in terms of alterations. Reflecting on this research, I am interested in utilizing both processes for figurative sculpture in later projects.

### **66- A Study of Sculptural Portraiture: Techniques for Achieving Realism in Ceramics**

**Jai Woods, *Art***

Mentor: **Prof. Scott Ziegler**

My presentation will center on the research of technical strategies for realistic ceramic portraiture. In past work, I struggled to depict the complexity of the human form accurately in three-dimensional media. This assistantship focused on improving past difficulties such as facial symmetry, proportionate features, and a balanced form. For this project, we used stoneware, which is the same clay body used in our introduction class. Originally, we planned to study the representation of an aged-male, young woman, and child using ceramic material. Throughout the duration of this project, my mentor and I focused our research on the subject of the aged-male to better progress my understanding of facial construction. Although I struggled with facial symmetry and matching the features on both sides of the face, this project provided me with hands-on experience, and instruction on how to better represent a realistic figure in clay. In our research, we studied the figurative work of several ceramic artists including Tip Toland, Curt LaCross, Janis Mars Wunderlich, Philippe Faraut, Adrian Arleo, Nan Smith, Beverly Mayeri, and Linda Ganstrom. In the future, I plan to continue using the human figure in ceramic work; however, I would like to focus on integrating narrative with this process of portraiture.

## **Alpha Chi Honor Society Panel**

### **- The New Approach to Management in the 21st Century**

**Michelle Hernandez**, *Business*

Mentor: **Dr. Stewart Thomas**

The 20th century revolutionized the way organizations manage their business. It also gave women a new role in society, in the workforce and more specifically, in leadership positions in organizations. The purpose of this paper is to examine the change that management has gone through in the last century and how it has affected women. To do this, the differences between the way men and women manage are discussed. Ultimately an appropriate management style for the 21st century is identified, as well as the role that women play in the new approach to management.

### **- Be Brave; Recreating the Lumbee play "Strike at the Wind"**

**Sam Miles**, *Business*

Mentors: **Dr. William Thomas, Dr. Howard Ling**

Strike at the Wind is a play that describes the history of the Lumbee people and was a source of pride for the local community. In 2007, to the dismay of the local Lumbee people, the play was abandoned. After doing my research into *Strike at the Wind*, I realized that this play has huge potential not only in a business sense but also to make a difference in the community. I formed a detailed business plan which shows my intention to reinvent the play by targeting three separate consumer markets, using a new location, and aggressively promoting the play over it's first 12 months. My business plan proves that it is possible to aggressively focus on improving a community through a theatrical production while also providing a profit for investors.

### **- Understanding and Managing Supply Chain Risk**

**Terri Ledlow**, *Business Administration*

Many companies do not yet understand the complications associated with supply chain risk. My poster proposes the steps hospitals need to better address their supply chain risk.

### **- Rural Homelessness and Potential Privatization: A Community Needs Assessment in Southeastern North Carolina**

**Hannah Roberts**, *Social Work*

Homelessness is a national problem with responsibility shared by individuals and communities. My presentation explores community efforts in Rockingham NC to address rural homelessness, a problem worsened by government undercounting and underfunding and potentially remedied by privatization.

## **2015 PURC Symposium Judges**

### Posters Session

#### *STEM 1:*

- Dr. William Brandon
- Dr. Paul Flowers
- Ms. Heather Walters Romine
- Dr. Maria Santisteban

#### *STEM 2:*

- Dr. Cornelia Tirla
- Dr. Steven Singletary
- Dr. Patricia Sellers
- Dr. Bob Poage

#### *STEM 3:*

- Dr. Marilu Santos
- Ms. Sally Vallabha
- Dr. Xinyan Shi
- Dr. Dennis McCracken

#### *Humanities:*

- Dr. Rose Stremlau
- Dr. Andrea Benjamin
- Dr. Susan Cannata
- Dr. Jaime Martinez

#### *Social Sciences, Business, Education:*

- Dr. Bishwa Koirala
- Dr. Heather Higgins Lynn
- Dr. Sonali Jain
- Dr. David B. Oxendine

### Oral Presentations

#### *Oral 1:*

- Dr. Abigail Mann
- Dr. Michael Spivey
- Dr. Joe Sciulli
- Dr. Lindsay Leach-Sparks

#### *Oral 2:*

- Dr. Marisa D Roach
- Dr. Wendy Miller
- Dr. Frankie Powell
- Dr. Valerie Austin

#### *Alpha Chi Panel:*

- Mr. Michael Alewine
- Mr. Robert Arndt

## **2015 Pembroke Undergraduate Research and Creativity Council**

**Dr. Ryan Anderson**, Associate Professor  
Interim Director of Pembroke Undergraduate  
Research and Creativity Center  
Department of History  
Email: [ryan.anderson@uncp.edu](mailto:ryan.anderson@uncp.edu)  
Phone: 910.775.4263  
Office: Dial 211

**Prof. Hal Davis**, Assistant Professor  
Email: [hal.davis@uncp.edu](mailto:hal.davis@uncp.edu)  
Phone: 910.521.6881  
Office: Moore 103

**Dr. Michele Fazio**, Assistant Professor  
Department of English and Theater  
Email: [michele.fazio@uncp.edu](mailto:michele.fazio@uncp.edu)  
Phone: 910.775.4371  
Office: Dial 113

**Dr. Jason Hutchens**, Assistant Professor and  
Chair Department of Mass Communications  
Email: [jason.hutchens@uncp.edu](mailto:jason.hutchens@uncp.edu)  
Phone: 910.521.6598  
Office: Old Main, Room 249

**Dr. Sonali Jain**, Assistant Professor  
Department of Sociology and Criminal Justice  
Email: [sjain@uncp.edu](mailto:sjain@uncp.edu)  
Phone: 910.521.6474  
Office: 219 Sampson

**Dr. Robert Poage**, Associate Professor  
Department of Biology  
Email: [bob.poage@uncp.edu](mailto:bob.poage@uncp.edu)  
Phone: 910.521.6635  
Office: Old Main 252

**Prof. Brandon Sanderson**, Associate Professor  
Department of Art  
Email: [brandon.sanderson@uncp.edu](mailto:brandon.sanderson@uncp.edu)  
Phone: 910.521.6406  
Office: Locklear 213

**Dr. Maria S. Santisteban**, Associate Professor  
Department of Biology  
Email: [maria.santisteban@uncp.edu](mailto:maria.santisteban@uncp.edu)  
Phone: 910.775.4274  
Office: Oxendine 2232

**Dr. Xinyan Shi**, Assistant Professor  
Department of Economics, Finance, and  
Decision Sciences  
Email: [yan.shi@uncp.edu](mailto:yan.shi@uncp.edu)  
Phone: 910.775.4351  
Office: Business Administration, Room 152

**Dr. Rachel Smith**, Associate Professor  
Department of Chemistry and Physics  
Email: [rachel.smith@uncp.edu](mailto:rachel.smith@uncp.edu)  
Phone: 910.521.6426  
Office: Oxendine 3223

PURC and UNC Pembroke are grateful for the continuous support from Duke Energy. Additional financial assistance for the symposium was provided by Alpha Chi Honor Society North Carolina Kappa Chapter



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