

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



April 13, 2016

Program with Abstracts

Image by Courtney Hockett
"Page 1: Driving to M.Y.O.B. Rd"
Graphite Drawing, Watercolor,
Digital, Laser Print
11"x17"
2016



Pembroke Undergraduate Research and
Creativity (PURC) Center
One University Drive
P.O. Box 1510
Pembroke, NC 28372-1510
(910) 775-4586

Dear Students and Colleagues,

The UNC Pembroke Undergraduate Research and Creativity Center cordially welcomes you to the Tenth Annual PURC Symposium, a campus-wide celebration of undergraduate research scholarship, creativity, and scholarly entrepreneurship. This year the symposium features seventy-four presentations, by seventy-six undergraduates and forty mentors from across the university community. The work you see here today represents faculty-mentored work that was funded by PURC this academic year and students who have taken coursework beyond class and developed their ideas with a faculty member further.

PURC provides a trio of opportunities for undergraduates interested in pursuing mentored research. Student Travel Funds (STF) are funds to assist with travel for research, presentation of extracurricular projects or exhibits, meetings, and performances. Student Scholarship Support (S3) funds short-term extracurricular research, creative projects, entrepreneurial, and scholarly endeavors. Undergraduate Scholar Assistantships (USA) funds semester-long extracurricular research, creative, entrepreneurial, and scholarly endeavors.

Contributions from Duke Energy help make this program possible. Duke Energy's commitment to higher education helps PURC continue to offer this extraordinary opportunity to our undergraduates. Thanks also to Alpha Chi Honor Society for their support, which helps make our keynote address possible.

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 the hard work they do throughout the year, the Office of Academic Affairs, Provost Locklear, and Chancellor Cummings.

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

Best,

Dr. Ryan K. Anderson
PURC Director
Associate Professor of History

Table of Contents

Schedule of Events.....	4
Keynote Speaker and Invited Roundtable.....	6
Oral Presentations.....	8
Musical Performance.....	12
Poster Presentations.....	14
Art Exhibits.....	36
PURC Council.....	41

10th Annual

Pembroke Undergraduate Research and Creativity Symposium

Wednesday April 13, 2016

UC Annex

Schedule of Events

8:30-9:00am Registration

9:00-9:15am Greetings – *with morning refresher*
Chancellor Robin Cummings

9:20-10:05am Oral Presentation Panel One:

9:20-9:35 Food for Success: Promoting Summer Feeding Programs
Sonya Hunt, *Sociology & Criminal Justice*
Mentor: **Dr. Brooke Kelly**

9:35-9:50 Does Ethnicity Matter?: Facebook's Effect on Body Esteem
Cassidy Miles, *Psychology*
Mentor: **Dr. Shilpa Regan**

9:50-10:05 How Walmart Affects Small Businesses
Elizabeth Wessinger, *Business*
Mentor: **Dr. Teagan Decker**

10:10-10:40am Roundtable:

“Making the Transition from Undergrad Researcher to Working Researcher”

Dr. Charles Humphrey (c/o 1965)

Rhonda McFleder (c/o 2009):

10:45-11:30am Oral Presentation Panel Two:

10:45-11:00 A Life of Fiction: Writing and Editing in the Publishing World
Zachary Lunn, *Biology*
Mentor: **Dr. Jessica Pitchford**

11:00-11:15 Frank Norris' Mcteaue with a Social Darwinist Perspective: The Biological and Environmental Factors
Laura Spillman, *English, Theatre & Foreign Languages* Mentor: **Dr. Autumn Lauzon**

Schedule of Events

11:15-11:30 **"Freaking" Out the Rural Classroom: A Professor and Students Discuss Queer Pedagogies in the Chambers of the Bible Belt**
Raymond Hunt, *English, Theatre & Foreign Languages*
Hannah Anderson, *English Theatre & Foreign Languages*
Mentor: **Dr. Abigail Mann**

11:30-12:00pm Lunch

Performance:

"Monkin' Around: The Music of Thelonious Monk,"

by The Jeffery Johnson Quartet

Matthew Ellis, tenor saxophone

Rielly Morton, guitar

Andrew Beck, bass

Jeffery Johnson, drums

12:00-12:45pm Keynote Address

"Fried Chicken and the Brain: On My Way to Becoming a Scientist"

Rhonda McFleder, MD/PhD candidate at the University of
Massachusetts (UMASS) Medical School

12:50-1:05 pm Percussion Performance

"Flam for Eight Percussionists"

Hunter Baxley

William Camps

Darius Dawson

Angelis Hernandez

Allison Sontag

Melody Strupe

Brandon West

1:10-2:30pm Posters and Art Exhibits

2:30-2:45pm Closing Remarks

Dr. Ryan K. Anderson, PURC Director

Keynote Speaker 2016

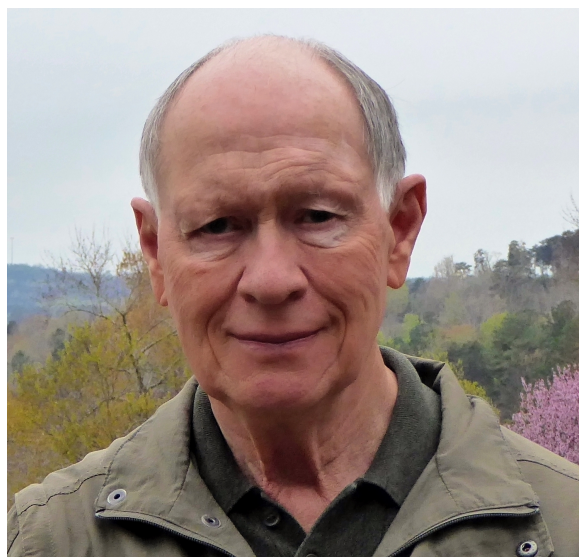


Rhonda Leah McFleder is a fifth year MD/PhD candidate at the University of Massachusetts (UMASS) Medical School in Worcester, Ma. Although her research focuses on neuroscience now, Rhonda began her research career in chemistry as a RISE fellow at UNCP under the mentorship of Dr. Meredith Storms. A native of Red Springs, Rhonda received the NIH AIDs Research Fellowship after graduating from UNCP in 2009, which supported an additional two years of research training at the National Institute of Aging (NIA) in Baltimore, MD in their post-baccalaureate program.

In 2011, Rhonda matriculated into the MD/PhD program at UMASS where she could obtain training to become a physician scientist. She has been in her thesis lab for nearly three years where she focuses on understanding how learning and memory occur, and how these processes are disrupted in autistic disorders. Her work is currently funded by a National Research Service Award, which she obtained in 2015. After obtaining her MD/PhD, Rhonda plans to continue conducting research in neuroscience in her own laboratory where she hopes to be able to help train future scientists, broaden our understanding of the brain, and see patients who will help guide her research questions.

Invited Roundtable

Charles Humphrey graduated from Pembroke State College in 1965 with a BS in Chemistry (*Cum laude*) followed by 2 years as a technician at Bowman Gray Medical School. While there he completed coursework at Bowman Gray and Wake Forest University in anticipation of entering graduate school if financial aid became available. A Fellowship was offered by Clemson University in 1967. Charles obtained a PhD in Nutrition/Biochemistry from Clemson in 1972. Charles' research interests at Clemson involved animal nutrition, infectious diseases, and use of microscopy/electron microscopy. These interests and skill-sets have kept him "hooked" his entire career.



Charles and wife, Jean, moved to Charleston, South Carolina in 1972 where he completed a post-doctorate in gastroenterology/medicine followed by a joint appointment with the Veterans Affairs-Medical University of South Carolina. Charles' gastroenteritis research was involved predominantly with *Clostridium difficile*, *Campylobacter Jejuni*, and *Giardia Lamblia*. His *C. difficile* studies were among the first to associate *C. difficile* with antibiotic associated colitis; a significant public health issue then and now.

Charles received a surprise telephone call in 1983 to interview for an electron microscopy position at the US Centers for Disease Control and Prevention (CDC); he was employed at CDC until retirement (2013) as a Research Biologist/Electron Microscopist. Charles was a member of the CDC Infectious Disease Pathology group that had first-hand involvement with identifying the cause of numerous domestic and international infectious disease outbreaks and cases. The identifications usually resulted in corrective interventions. He has authored/co-authored approximately 100 articles in peer reviewed journals; and still, on occasion, provides scientific peer review. His images of viruses are seen frequently in medical publications and in national and local newscasts.

Oral Presentations Panel One: 9:20-10:05am

1 - Food for Success: Promoting Summer Feeding Programs

Sonya Hunt, *Sociology & Criminal Justice* | Mentor: **Dr. Brooke Kelly**

The purpose of my project is to obtain knowledge of current summer feeding sites in Robeson County and to see if there are possibilities of more feeding sites to open in the county. Robeson County has one of the highest poverty rates in the state of NC. The USDA defines food insecurity as not having enough access to food to maintain a healthy and active lifestyle. In fact 46% of children in Robeson County face poverty, that is almost 1 in every 2 children in Robeson County dealing with poverty. They experience food insecurity or hunger. Research reveals that this greatly hinders their learning in education. This research will address a need for children in food insecure homes to have access to proper nutritious meals in the summer. The purpose is to identify if there are enough summer feeding sites available to meet the needs of children in Robeson County. If not, I aim to find out about possible barriers that exist in order to help develop more avenues to meet this critical need to feed children in the summer months. Upon IRB approval I will interview members of the Robeson County Board of Education, those who work with current summer feeding programs, potential summer feeding site program coordinators and North Carolina Officials. The research may also be able to inform policies to address child food insecurity and potential deficits in summer feeding programs in the county. The purpose of gathering data about food insecurity in this county is to try and ensure that every child in the county has access to proper nutritious meals in the summer months.

2 - Does Ethnicity Matter?: Facebook's Effect on Body Esteem

Cassidy Miles, *Psychology* | Mentor: **Dr. Shilpa Regan**

Social media is widely used by members of today's society for connecting with family and friends, networking, and entertainment. Previous research has indicated that social media has also been linked to body image disturbances among women. However, there is limited research on how ethnicity mediates the relationship between social media and body image. The current study examines the effects of the viewer's ethnicity and the ethnicity of the women featured in social media images on body esteem. The experimental design of this study requires participants to view mock Facebook profiles with participants being randomly assigned to one of four conditions: a) profile of a heavy White woman, b) profile of a thin White woman, c) profile of a heavy African-American/Black woman, d) profile of a thin African-American/Black woman. Participants then completed questionnaires about their perceptions of the Facebook profile, their own social media use, body esteem, contingencies of self-worth, and demographic information. Based on the social comparison

Oral Presentations

theory, it is predicted that the ethnicity of the images on social media and the ethnicity of the viewer mediates the extent of the disturbance. Final results will be presented.

3 - How Walmart Affects Small Businesses

Elizabeth Wessinger, *Business* | Mentor: **Dr. Teagan Decker**

Have you ever considered the negative affects that Walmart might have when it moves into a community? Most people in a community will see having a Walmart as a positive contribution to the area they live in. When Walmart moves in it means lower prices and convenience for consumers, but for local small businesses that compete directly with the large super-center it means the loss of profits, loss of business, and the loss of their livelihood. I have discovered just how much loss and disaster Walmart can cause. In the following presentation I will discuss the wake of disaster Walmart is leaving across the nation. Included in my research are personal accounts of the hurt Walmart has caused my hometown. I also have countless statistics to back up my claim and the claims of others. The problem goes beyond just affecting small businesses in the end it will affect the community as a whole.

Oral Presentations Panel Two: 10:45-11:30am

4 - A Life of Fiction: Writing and Editing in the Publishing World

Zachary Lunn, *Biology* | Mentor: **Dr. Jessica Pitchford**

Pembroke Magazine is an international literary journal that publishes fiction, creative nonfiction, poetry, interviews, and visual art. Over the last nine months, I have served as the editorial assistant for Pembroke Magazine's Editor-in-Chief, Dr. Jessica Pitchford (ETFL). My duties consist of: reading and offering input on submissions, proofreading and copyediting, creating mailing lists and maintaining subscriptions, and pursuing fundraising opportunities. Our work has culminated in the publication of Pembroke Magazine, No. 48, which was showcased at the 2016 Association of Writers and Writing Programs Conference & Bookfair. Today I will speak on the process of editing an international literary magazine.

As a member of the Esther G. Maynor Honors College, I am finalizing the work on my Senior Project. This capstone project is creative in nature—I am writing a short collection of short stories under the mentorship of Dr. Pitchford. My recent experience in editing has shaped my own fiction by training my eye to more easily recognize common narrative flaws in my own work. I will also talk briefly on the genesis of these stories before reading an excerpt from my work.

5 - Frank Norris' McTeague with a Social Darwinist Perspective: The Biological and Environmental Factors

Laura Spillman, *English, Theatre & Foreign Languages* | Mentor: **Dr. Autumn Lauzon**

Frank Norris' *McTeague: A Story of San Francisco* tells the journey of McTeague—an Irish dentist—and his German-Swiss wife, Trina, who seek success and wealth in American society during the turn of the twentieth century. However, because of their ethnicities which made them inferior to the Anglo-Saxon society, the McTeagues soon discover that their plans for success are unobtainable and will ultimately lead to their destruction. This paper analyzes the text from a Social Darwinist perspective and explores the interests of Norris to include the characters' ethnicities in order to provide explanations for the characters' habits, lifestyles, and ultimately, their unavoidable fates. Drawing upon material from the book, as well as other secondary sources which examine the ethnic undertones in the novel, my work suggests that Norris wrote *McTeague* with the intent to expose the xenophobia felt by American Anglo-Saxon society at the time. My work applies the concept of Social Darwinism to Norris' *McTeague* by looking at the characteristics and actions of the main characters, McTeague and Trina, as well as other secondary characters. This paper ultimately argues that *McTeague* provides insight into the mindset of the late nineteenth

Oral Presentations

century American middle class and how they viewed non-Anglo-Saxon Americans and immigrants as a danger to the nation's changing society.

6 - "Freaking" Out the Rural Classroom: A Professor and Students Discuss Queer Pedagogies in the Chambers of the Bible Belt

Raymond Hunt, *English, Theatre & Foreign Languages*

Hannah Anderson, *English Theatre & Foreign Languages* | Mentor: **Dr. Abigail Mann**

In her 1999 "Preface" to *Gender Trouble*, Judith Butler writes that one way to view her work is as "the emergence of theory at the site where cultural horizons meet, where the demand for translation is acute and its promise of success uncertain" (ix). A grandiloquent claim indeed to begin what is, plainly put, a proposal for a pedagogy panel about teaching gender and queer theory in a small state school in rural North Carolina, but one that suggests not just the challenges of introducing and integrating such approaches in the classroom in such a site, but the ultimate stakes. In this panel, a professor and several students from a nineteenth century literature class that relied heavily on gender and queer theory offer their perspectives on the challenges and opportunities of such approaches in an academic and social community where such discussions are rare. In doing so, they return to Butler's point about the "demand for translation," arguing that such approaches, particularly in rural environments, lead outside of the classroom to the recognition, as one of the student presenters writes, that "classes that discuss Queer Theory are helpful because they not only educate individuals about the topic but also raise awareness of a community of people who have been marginalized by a power that they cannot control."

Musical Performance 11:30 – 12:00pm

1 - "Monkin' Around: The Music of Thelonious Monk," by The Jeffery Johnson Quartet

Matthew Ellis, tenor saxophone

Rielly Morton, guitar

Andrew Beck, bass

Jeffery Johnson, drums

Mentor: **Dr. Aaron Vandermeer**

Program

Rhythm-a-Ning

'Round Midnight

Played Twice

Straight, No Chaser

Blue Monk

I Mean You

Thelonious Sphere Monk (1917-1982) was an American jazz pianist, composer, and bandleader best known for the idiosyncrasies that permeated his works, performance style, and personality. Born in Rocky Mount, North Carolina, he would become one of the seminal musicians in the sub-style of jazz now known onomatopoeically as "bebop." Monk's piano style was percussive, marked by sparse playing and tight chord clusters, often performed with splayed fingers. His compositions feature dissonance, rhythmic displacement, heavy use of chromaticism, and an emphasis on the blues. Many of his pieces have become standard literature in the jazz canon.

Musical Performance 12:50 - 1:05pm

2- David Macbride - Flam for Eight Percussionists

Brandon West
Melody Strupe
Angelis Hernandez
Allison Sontag
William Camps

Mentor: **Dr. Joseph Van Hassel**

At the 2015 Percussive Arts Society International Convention, the UNCP Percussion Ensemble performed the world premiere of David Macbride's (Professor of Composition and Music Theory at The Hartt School) "Flam" for eight percussionists. This performance occurred after coaching sessions with the composer via the internet, as well as in person at the convention. Our presentation consists of a performance of this work. We attended many masterclasses, performances, and paper presentations (there were over 120 sessions to choose from), giving us valuable information in a variety of musical genres and musical professions, including performing, educating, music business, musician's health, and music technology. Furthermore, PASIC included the International Drum and Percussion Expo, consisting of over 100 exhibitors showcasing the latest instruments, music, technology, sticks, mallets, publications, educational materials, and more. We conducted research at this Expo on the most current advances in each of these areas from some of the leading percussion / music companies in the world.

Poster Presentations

1 - Finding the History and Place: an Ecocritical Approach

Tyler Scoville, *Biology*

Mary Grace Curiale, *Psychology* | Mentors: **Drs. Scott Hicks and Jane Haladay**

A semester long learning experience of the long term effects of human intervention and it's permanence were observed on the ancestrally owned land of the Nobles family. Through an interdisciplinary approach, ecocritical thought is applied to observations of human interaction with the environment and how it informs personal history. By combining a familial history and observing the present state of the land, an ecocritical plan was developed to benefit the environment without disturbing the native wildlife. To gain a better understanding of the ecological richness of the property, a catalog of species was recorded through both personal observation and trail cameras. This presentation is meant to inform the audience of a different perspective of both history and human interaction with the environment.

2 - Assessment of a Crossed-Beam Spectropolarimeter

Briana Roberts, *Chemistry & Physics* | Mentors: **Drs. Felicia Scott and William Brandon**

Optical rotatory dispersion (ORD) of sucrose was used to assess the efficacy and robustness of a crossed-beam spectropolarimeter, an apparatus previously designed that utilizes dual beam phase measurements in order to determine small optical rotations in transparent chiral materials. Due to its simplicity and affordability, this work was carried out as a foundational experiment addressing some of the more salient features of dual-beam measurement techniques, particularly those aspects that would be encountered when using the latest commercially available autobalanced photodetectors. In this work, the experimentally determined values of the specific rotation of sucrose proved the crossed-beam spectropolarimeter to be a relatively straightforward and accurate method of measuring the specific rotation for various concentrations of sucrose (0.03 – 0.18 g mL⁻¹). This work highlights the dependence of specific rotation (i.e. specific rotation decreases with increasing wavelength) using a homemade dual beam apparatus.

Poster Presentations

3 - The Purification and Kinetic Analysis of Lactate Dehydrogenase from Beef Liver

Neveen Issa, *Chemistry & Physics*

Bhumi Patak, *Chemistry & Physics*

Khadedra Taylor, *Chemistry & Physics*

Devang Upadhyay, *Chemistry & Physics* | Mentor: **Dr. Len Holmes**

Lactate dehydrogenase (LDH) is found in tissues such as blood cells and muscle. LDH enzyme reduces pyruvate to lactate with oxidation of NADH to NAD⁺. In the present research, multiple assays were performed to characterize LDH. The enzyme activity was measured to be 150 ± 6 Units/mg. Michaelis-Menten constants (K_m) of LDH for NADH and sodium pyruvate were determined. In results, from Lineweaver-Burk, Eadie-Hofstee, and Hanes plots, the K_m for NADH was 2.05 mM, 2.06 mM and 2.09 mM respectively. Whereas, K_m for sodium pyruvate was 16.02 mM, 16.38 mM and 16.94 mM respectively. The pH optimum pH for LDH activity was found to be pH 6 with 217 Units/mg activity. Extraction of the LDH enzyme from beef liver and its purification were conducted in the second part of this research. After extraction, purification of LDH was performed using dialysis and anion exchange chromatography. The specific activity of purified LDH was measured at 83 U/mg at a protein concentration of 0.2 mg/mL. On further research, characterization of extracted LDH will be performed.

4 - Sorption Study of Copper ion using Alginate as gel matrix

Starr Cooper, *Chemistry & Physics*

Ashley Arcara, *Biology* | Mentor: **Dr. Sivanadane Mandjiny**

In this study it is intended to decontaminate Cu²⁺ from non-potable water. Alginate is a natural polymer found in seaweed. It is a co-polymer of Glucuronate and Manuronate. This soluble polymer was made as spherical beads in the presence of calcium chloride. The prepared gel in this manner was characterized under different conditions such as pH and different buffers. Sorption capacity of this gel is determined by simple chromatography technique. The experiments were conducted using alginate gel in the presence and in absence of iminodiacetic acid (IDA) to improve the binding capacity. The method used to determine Cu²⁺ in solution was by atomic absorption.

5 - Synthesis of Organic Compounds with Biological Properties

Natasha Wells, *Chemistry & Physics*

Melissa Teel, *Chemistry & Physics* | Mentor: **Dr. Cornelia Tirla**

Through classical organic chemistry methods, a library of derivatives was made from a base compound Z-Phenyl-Alanine-Diazomethylketone (PADK). Target molecules possessed modifications to key functional groups based on prior Cathepsin B expression in mouse hippocampal in slice culture preformed by William C. Friday Laboratory, working in conjunction. The goal of these modifications was to develop compounds, which had a more favorable activity when applied to in vitro cultures. Derivative modifications included addition of varying constants to the amines, elimination/substitution of the diazo-functional group, and differentiation of amino acid sequence. Products were characterized post reactions using Nuclear Magnetic Resonance and Infrared spectral analysis.

6 - Experimenting with the Art of Pop-up Engineering while Incorporating Creative Literacy

Courtney Hockett, *Art* | Mentor: **Prof. Brandon Sanderson**

During the first semester of this two-part grant I researched the art of children's books and created a story that included content directed towards pre-teens and young adults. I researched children's illustrators, such as Maurice Sendak, author of *Where the Wild Things Are*, and created scenes that were simply drawn yet included a variety of colors, perspectives, and textures - similar to that of the classic Harper children's books. The second part of the grant was used to study the complex technique of paper engineering. I used this time to research how to fold, cut, and manipulate paper into three-dimensional forms. Other techniques such as bookbinding were studied as well. The final product was a handmade, interactive book with two classic and two original pop-up templates. Hidden within the pages on a pull down tab is also an original story taken from my childhood titled *M.Y.O.B Street*.

7 - Socioeconomic Status and Self-Compassion

Kimberly Taylor, *Psychology*

Shelley Burton, *Psychology* | Mentor: **Dr. Ashley Allen**

Social class is how a person is identified according to finances, education, and job type (Piff, Stancato, Côté, Mendoza-Denton, & Keltner, 2012). Social class impacts one's ability to obtain a higher education and educational performance, with people from a lower social class falling below people from a higher social class (Stephens, Brannon, Markus, & Nelson,

Poster Presentations

2015). Self-compassion involves being kind to oneself, recognizing that one is not alone in his or her failures, and acknowledging one's emotions (Neff, 2003). Self-compassionate people are more likely to experience psychological well-being and less likely to experience depression and anxiety (Macbeth & Gumley, 2012). Therefore, self-compassion might buffer people from experiencing the negative outcomes associated with lower social class. Self-compassionate participants may also be more likely to have a growth mindset regarding social class particularly when they are from a lower social class. Mindset research shows that people who adopt growth mindsets fare better than those who hold fixed mindsets (Dweck, 2012). People of a lower social class often experience more negative outcomes; however, adopting a growth mindset regarding social class can buffer them from those negative outcomes (Tan & Kraus, 2015). We hypothesize that self-compassion will predict mobility beliefs for participants of a lower social class. Participants will include 150-200 individuals recruited using the Psychology subject pool. Societal benefits of this study include a better understanding of the dynamics between social class, self-compassion, and mobility beliefs. We anticipate we will have preliminary data at the time of the presentation.

8 - Seasonal Abundance of Two Bacterial Groups, Enterics and Staphylococcus aureus, Isolated from Two Sites along the Lumber River

Kameron Richardson, *Biology*

Cristina Clark, *Biology*

Tamer Oxendine, *Biology* | Mentor: **Dr. Velinda Worix**

The community surrounding the Lumber River uses the water for recreational and ceremonial purposes. Little research has been performed to gauge the microbial communities within the Lumber River. A previous experiment done in the summer 2015, isolated two main groups of bacteria, the Enterics and Staphylococcus aureus, from surface water. Both groups have the potential to be pathogenic, leading to possible health concerns for people who use the river regularly. Two sites were chosen based on their recreational and non-recreational use. Water samples were taken at monthly intervals starting in February 2016. Samples were isolated using specific-growth media for the Enteric group and for S. aureus. After growth on plates, microbial counts were performed. Results have showed that during the winter sampling months, although both groups have been isolated from the water samples, their microbial counts were too low for analytical counts. Monthly samplings will continue on into the Fall 2016 semester.

9 - Developing the PADK Cathepsin B Activating Agent for Alzheimer's Disease: Oral Dosing Enhances Cathepsin B in the Brain and Reduces Age-Related Synaptic Decline

Lyndsie Elliott, *Biology* | Mentor: **Dr. Ben Bahr**

In Alzheimer's disease (AD), protein accumulation events disrupt synapses of neurons in the brain leading to compromised memory mechanisms. The lysosomal pathway reduces protein accumulation pathology. In previous studies, it was found that aging and AD lead to not only lysosomal dysfunction but also the deterioration of synapses. The decrease of synaptic markers has also been linked to protein accumulation events, which would suggest that positive lysosomal modulation that disrupts the aggregation of proteins could be an avenue for avoiding and reversing synaptic decline. Thus, it is of interest to further develop positive lysosomal modulation as a therapeutic pathway for treating AD. Cathepsin B (CatB), a lysosomal enzyme that degrades pathogenic forms of A β , has been found by our lab to be upregulated by the compound Z-Phe-Ala-diazomethylketone (PADK). PADK, or an inactive control compound (ZFA), was combined with peanut butter to form 0.5-g pellets, which were fed to rats and mice. Oral administration of 3-18 mg/kg/0.5 d PADK for 10 days led to detection of PADK in plasma and significant increase of CatB in the frontal cortex of adult rats in a dose-dependent manner. Control animals which received 20 mg/kg/0.5 d of ZFA had no effect on CatB levels. In aged mice fed either 18 mg/kg of PADK or 20 mg/kg of ZFA twice a day for 11 days, CatB was upregulated significantly in the frontal cortex and in other brain regions. The aged mice exhibited loss of synaptic markers compared to young mice, but PADK reduced the age-related synaptic decline. Thus, oral administration of PADK may be a therapeutic avenue to treat synaptic loss and memory deficits present in AD.

10 - Rape Culture and Victim Blaming on the UNCP Campus

Haley Bean, *Social Work* | Mentor: **Dr. Summer Gainey**

The project aimed to first explore the concepts of rape culture and victim blaming through their history, as well as their current representation in society. Also, the literature review featured sections on the scope of the problem, interventions attempted, and other information pertinent to understand rape culture. The research for this project was conducted at the University of North Carolina at Pembroke in various locations, and involved a single researcher surveying students. The results of the research were broken into different sections depending on which part of the survey was being discussed. The most important section was the participants' responses to eight scenarios that depicted a person who was raped, and then participants had to rate whether or not the victim had no influence, mild influence, moderate influence, or strong influence on their rape. Although when participants were assigned a victim blaming score the results were positive and indicated low levels of victim blaming, when each individual scenario was analyzed

Poster Presentations

participants tended to blame certain victims more than others based off of stereotypes and common misconceptions associated with rape.

11- Growing Change

Rodnesia Jeffries, *Mass Communications* | Mentor: **Dr. Jason Hutchens**

Growing Change is an organization about transforming old prisons into farms and educational centers for the troubled youth in the area. It not only helps troubled youth but, it helps returning veterans and the community. Growing Change consists of a small group of young teenage males that have been in trouble with the juvenile system. The purpose of Growing Change is to help the youth and returning veterans turn their life around and give back to the community. These individuals work on farm plots and greenhouses to grow food to give away. The old prison site that they are looking to be transformed into a farm and educational center for troubled youth is in Wagram, North Carolina. It has been an honor to work with such a great group on teenagers.

12- The study of planarian reaction to light on a three-dimensional plane

Cora Bright, *Biology* | Mentor: **Dr. Mark Milewicz**

It is known that planarian have a negative photo-taxis response to light on a two dimensional plane, as seen by putting planarian in tracks and showing that they swim in the direction that gets them away from the shining light. However during these experiments I became curious as to how planarian would react if given the Z-plane as a choice of direction away from a shining light. During this experiment I used hair-loop hooks to place planarian directly in the center of a pentagonal cup and then proceeded to turn the light on and observe their behavior in the three dimensional space.

13 - Policing Police: A Critical Analysis on UNC Pembroke Campus Police

Brittany Roberts, *Health, Physical Education & Recreation* | Mentor: **Dr. Jeff Bolles**

This study will analyze the University of North Carolina at Pembroke's Police and Public Safety Department's policies and practices with respect to upholding and acting in accordance to the department's mission statement. This study will consider the police officers on the campus of UNCP located in Pembroke, North Carolina, its police officers mission statement, officers' opinions of their role to determine if the University policing program has been implemented. To maintain anonymity, participants will be referred to by letter: A, B, C, D, and E. The following questions will be used in the interview process:

(1) How do you define university policing? (2) Would you recommend any changes to the way? University policing is being implemented at UNCP Police Department? (3) Do you think university policing is being used to its full potential at the University of North Carolina Pembroke? Please explain your answer. (4) Do you think university policing is being implemented in accordance with the University police Department's mission statement and standard operating procedure? (5) What is the most significant problem the on campus police officers of the University of North Carolina Pembroke encounter on a daily basis? During my questioning and answering interview key words will be very important to my data and study. The key information I will be looking for will be based off the campus department mission statement, officers' opinions of their role to determine if the University policing program has been implemented correctly.

14 - How Trace Theory Affects Chinese Language Learning

Dana Reijerkerk, *English, Theatre & Foreign Languages* | Mentor: **Dr. Yuanyuan Lin**

Mastery of the Chinese characters could probably be considered as one of the most difficult and strenuous tasks for Chinese language learners. The research is designed to address how Chinese characters are processed and organized in the cognitive approaches between memory and reasoning. The Chinese language has logographic characteristics that differ from alphabetical languages in that it builds upon 200 radicals. Radicals themselves are to aid the student in distinguishing the characters; however, they are not in every character. Thus relying on the presence of a radical in a character may not be as effective as other methods. The students that use the strategies, such as repetition and creating their own stories about characters, are able to remember characters in order to become self-sufficient at learning Chinese. In order to find out a competent way for students to acquire Chinese vocabulary, Fuzzy-Trace Memory Recognition Theory is introduced to facilitate and improve Chinese vocabulary acquisition. The findings divulged how Fuzzy- Trace Theory benefits Chinese character learning and helped students to become more independent and effective language learners. The research also suggested that providing cues to the students to form traces and visual-spatial analysis of the Chinese characters significantly increased students' performance. This research study has implications for the daily classroom practices of using certain techniques to best acquire vocabulary in Chinese language learning.

15 - Transcribing and Encoding the Works of Mary Russell Mitford from 1811 for Web Publication

Amber Hester, *English, Theatre & Foreign Languages* | Mentor: **Dr. Catherine Parisian**

Mary Russell Mitford was a prolific writer in the 19th century, who worked with the famous poet Samuel Taylor Coleridge. For the past two semesters, I have been transcribing and encoding Mitford's letters from 1811. This year is especially important because it is the

Poster Presentations

year in which she published her four canto poem, *Christina, the Maid of the South Seas*, a poem that she allowed Coleridge to revise. My mentor and I access the photos of Mitford's letters through a digital archive maintained by the Digital Mitford Project. Using Oxygen Editing Software, we transcribe, annotate, and encode the letters for web publication. When the names of people or places appear in the letters, we use coding guidelines and a site index, provided by the text-encoding workshop we attended in May 2015, to code the names correctly. The site index is a digital document that contains annotations for people and places mentioned in Mitford's letters. Sometimes we find entities that are not listed in the site index. Upon these discoveries, we keep a list of these people and places, so we can create an entry to add to the site index. We also code certain aspects of the letters such as when Mitford crossed out certain words and wrote a new word above them. The goal of our project is to preserve history and to have the digitized form of the letters as accurate to the originals as possible, so scholars will have open access to these documents.

16 - An Analysis of the Vascular Flora of Sampson's Landing, Robeson County, North Carolina

Robbie Juel, *Biology* | Mentor: **Dr. Lisa Kelly**

Floristic inventories aid in understanding the plant diversity of ecological communities. Data from plant inventories (2010 and 2011) of Sampson's Landing (16.5 ha) in Robeson County, North Carolina, will be analyzed for floristic composition. The Lumber River Conservancy acquired the site to protect the biological resources and water quality of the Lumber River, a National Wild and Scenic River. A preliminary analysis identified more than 240 taxa, most of which were perennials, representing > 80 families. The few invasive species on site are of management concern in southeastern forests. Additional analyses will determine the distribution of the taxa among life history characteristics (e.g., growth habit and rarity). Several plant communities have been recognized: blackwater cypress-gum swamp, blackwater bottomland hardwoods, pine oak-hickory forest, pine mixed deciduous forest, and pond shoreline vegetation. The large variety of plant communities is likely caused by various elevational and soil differences on the site. Maps will be constructed to represent site soils, plant communities, and geology. This study could improve approaches to managing native plant communities and biodiversity along the Lumber River.

17 - Diabetes and Alzheimer's: The Diseases of the Aging Population

Donna Porter, *Psychology* | Mentor: **Dr. Ben Bahr**

A significant health risk to the senior population is Diabetes. With 24 percent of men and 18 percent of women age 65 and older being diagnosed with this disease, it has become a modern health issue. In the past, type II diabetes mellitus (DMII) had been present more in older adults, but the lifestyle habits of the younger population led to more common

occurrences of DMII in younger patients. Some of the contributing factors of DMII that are able to be controlled by the patient are diet, activity level, stress, urbanization, and obesity. Other risk factors that are beyond control include age, gender, and genetics. Alzheimer's disease (AD) is associated with tissue death in the brain and cognitive decline. The risk for developing AD increases with age. DMII is a disease that causes the body to not be able to regulate insulin levels. There is currently no cure for Alzheimer's or diabetes. AD is twice as likely to occur in a person with diabetes and has been thought to be a type of diabetes that is selective to brain tissue (Atker et al. 2010). Since these diseases are now thought to be linked (Atker et al. 2010) many researchers are looking into dual treatment uses for drugs designed for diabetes. Based on previous research we designed an experiment to test Metformin (a commonly prescribed drug for DMII) and Z-Phe-Ala-diazomethylketone (PADK) to see if there is a possible dual treatment option using these compounds that will combat increased insulin levels within the brain and reduce amyloid β plaque.

18 - HPLC Determination of Guanfacine and Amphetamine

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.

19 - Disrupted Purine Metabolism: Searching for Clues in a Mathematical Model of Nucleotide Regulation on Airway Epithelia

Ethan Sanford, Biology | Mentor: Dr. Conner Sandefur

The purine nucleotide ATP and its metabolites are important signaling molecules. Airway purine profiles from patients with pulmonary diseases such as chronic obstructive pulmonary disease (COPD) and cystic fibrosis (CF) differ from average non-diseased airway purine profiles. With our partners at the Marsico Lung Institute at UNC-Chapel Hill, we are characterizing patterns underlying disrupted purine metabolism in pulmonary diseases. Our investigatory approach uses open-source tools: the mathematical models are implemented in and analyzed using Python (Anaconda Scientific Python Distribution). Using a mathematical model first published by Zuo et. al. (2008), we tested reduced initial ATP concentrations to assess the change in behavior of the overall model, the enzyme

Poster Presentations

kinetics, and steady state values. ATP concentrations were reduced by factors of 10 from 100mM down to 0.001mM. Because physiological ATP concentrations are much lower than the 100uM used in the original model, it is important to assess the effects of physiologically realistic ATP concentrations. Additionally, we tested the effects of reduced ATP concentrations alongside individual enzyme knockouts as a means of locating candidates for removal from the model. It is critical that less important values are removed from the model if we are to accomplish our goal of applying it to clinical data sets from patients with COPD, as the model in its current state is over-parameterized. This means that the parameters in the model exceed the number of data points in the clinical data set.

20 - College Students' Alcohol and Substance Use: Religious Peers as a Protective Factor?

Andrea Bound, *Sociology & Criminal Justice* | Mentor: **Dr. Renee Lamphere**

Alcohol and illicit substance use remains a prevalent problem on college campuses nationwide, which warrants an in-depth analysis to uncover potential protective factors to assist policy makers and recovery support groups in the future. This study examines the relationships between personal religiosity, attachment to peers, peer religiosity, and collegiate alcohol and drug use. As peer religiosity is understood to be a protective factor against alcohol and drug use, the purpose of this study is to better understand the role between peer religiosity and traditional college students' drug and alcohol use in light of peer attachment. Surveys were administered to a random selection of on-campus classes offered at a rural, southern university until the desired sample size was produced (336). Descriptive statistical analysis, bi-variate correlations, and cross-tabulations of data were ran in order to find significant relationships between the variables. Pertinent relationships between variables and results will then be discussed.

21 - Investigation of the Behaviors of Aged Mice Orally Dosed with the Lysosomal Modulating Compound PADK

Cary Mundell, *Biology* | Mentor: **Dr. Bahr Ben**

Abnormal protein accumulation events are some of the hallmarks of Alzheimer's Disease (AD) and, as such, our lab is investigating a therapeutic method for the reduction of protein aggregation in the aging brain. The lab is studying the potential of using the compound Z-Phe-Ala-Diazomethylketone (PADK) which positively modulates the lysosomal pathway by upregulating the active form of cathepsin B (CatB), an enzyme which degrades A β 42, reducing disease parameters and synaptic decline in transgenic mouse models of early-onset familial AD (Mueller-Steiner et al. 2006: *Neuron* 51:703; Butler et al. 2011: *PLoS One* 6:e20501; Viswanathan et al. 2012: *ACS Med Chem Lett* 3:920). The next step that our lab is to examine the efficacy of upregulation of CatB upregulation through oral administration of

PADK. Aged mice were dosed over the course of eleven days with either the active compound PADK or the inactive compound Z-Phe-Ala (ZFA). The dose was given through means of a peanut butter “cookie” with dosages of 20 mg/kg of ZFA or 18 mg/kg of PADK. As part of this study, behavioral data, including exploratory habituation, was collected. Preliminary analysis shows a slight reduction in exploration in animals treated with PADK vs animals treated with ZFA. Additional trials will be necessary to ensure that there is significance to the reduction. With additional trials this could show that PADK is enhancing the memory of aged mice in regards to familiarity with a habitat. Recognition of habitat is an indicator that memory is functioning in these mice.

22 - Tina Turner A Black Feminist?

Brittani Newtonc Blanchard, *History* | Mentor: **Dr. Ryan Anderson**

During the 1960's, black women showed their frustration with men, racial oppression, and shortcomings in political representations through a variety of cultural forms A split along racial lines developed from the different needs of of black and white women. My project examines how Tina Turner's singing career was shaped by her race. I argue that Turner's fifth studio album *Private Dancer* (1984) took shape from her identity as a black feminist.

23- What is in that soiled diaper: A study on enumeration and characterization of Bifidobacterium and other gut bacteria from an infant

Tod Frazer, *Biology* | Mentor: **Dr. Marilu Santos**

The genus Bifidobacterium contains over 50 known species with new species and subspecies still being discovered today. Bifidobacteria populations in newborns and infants are of particular interest, as these bacteria are among the initial colonizers of the infant gut and comprise the overwhelming majority of the infant's gut microbiome. Bifidobacteria have been shown to prevent allergic diseases, aid in breast-milk digestion, as well as inhibit potentially pathogenic microbes. The study attempted to enumerate and characterize the antimicrobial effects of Bifidobacteria by collecting fresh fecal samples from soiled diapers during the first 6 weeks of an infant's life. The antagonistic effects of Bifidobacterium breve against the pathogens Escherichia coli, Clostridium difficile, and Candida albicans will be tested using the diffusion disk method. Disk assays are predicted to show B. breve inhibiting all three of the potential pathogens used in the study. The fecal samples were collected using nitrogen enriched culture collection/transport device, diluted using tryptic soy broth, and plated onto agar media. The plates were incubated for 48 hours at 37C with and without oxygen. Standard plate counts and optical density readings were used to enumerate bacteria from the fecal samples. Preliminary anaerobic counts showed Bifidobacteria numbers were low in the first three days of life and then increased thereafter. Gram staining of the various colonies from the plates revealed four distinct colony types: three being staphylococci and one being streptobacilli. Biochemical testing of

Poster Presentations

these colonies using enterotubes revealed that indeed there are four separate species of bacterium.

24 - Exploring African Americans' Sentiments of Identity and Belonging

Alexis Wilkerson, *Sociology & Criminal Justice* | Mentor: **Dr. Sonali Jain**

This study will fixate on the African diaspora of African Americans. In particular, the personalized identification and perceptions of belonging of African Americans will be explored. The objectives of this study are to investigate the following: (1) historical and cultural roots of African Americans in relation to identity, (2) the narrative of African Americans struggle with formulating an impression of self and connecting with the ancestral home of Africa, (3) the movement of remembering, re-imagining, and honoring cultural origins and its link with self-hood. The center of this research is essentially around the current culture of African Americans, notably that revolving around the dual expression and conceptualization of identity and sense of kinship.

25 - An Introductory Lab on Optical Interferometry

Toni Mctaggart, *Chemistry & Physics* | Mentor: **Dr. William Brandon**

To experience the separation of different wavelengths of light in an introductory lab an apparatus consisting of a half circled container, a 500 lines per ml gradient, and diode laser pointers was developed. The apparatus allows for the collection of measurements needed to calculate the wavelength of the lasers through both air and water as well as the index of refraction of water using an expression for locations of the lines in the diffraction pattern of a grating and Snell's law respectively. The changes of wavelength between air and water can be observed by the naked eye before any calculations are made enhancing the simplicity of the apparatus. The expression mentioned above and Snell's law requires only two length measurements accurately obtained by fixing the diode lasers in place giving a model of optical interferometry's basic principles of coherent light and the dependence of wavelength on the index of refraction.

26 - An NMR Study of [Co(bipy)2(NO2)2]Cl

Kennedi Stewart, *Chemistry & Physics* | Mentor: **Dr. Mark McClure**

The compound [Co(bipy)2(NO2)2]Cl was synthesized and analyzed using COSY, HETCOR, and J-resolved NMR programs. Due to the coordination of the bipyridine rings to the cobalt center and the symmetry of the two rings, the normal symmetry of the bipyridine is lost. Therefore, the proton and carbon signals received from each carbon in one ring of the bipyridine molecule are nearly equivalent to the signals given by the corresponding carbon in the second ring within the same molecule. The centers and multiplicities of the proton resonances were identified using the J-resolved program, while assignment of the carbon signals was achieved using the HETCOR program. The COSY program was used to establish connectivity between sets of coupled protons.

27- Mathematical Model of Transcription Factor-DNA Binding Dynamics

Tyler Moore, *Biology* | Mentor: **Dr. Conner Sandefur**

Cells utilize changes in gene expression to adequately handle environmental stresses. In eukaryotic cells, gene expression is driven by transcription factors, proteins that bind to DNA and drive transcription of genes into messenger RNA. Understanding genome-wide transcription factor-DNA binding dynamics should allow better insight into cellular stress responses. To capture the wide range of binding dynamics observed in the eukaryotic model organism *S. cerevisiae*, we developed a mechanistic mathematical model of DNA-protein binding. This model incorporates a simplified version of the yeast gal induction system, which we show better captures protein synthesis dynamics as compared to our original model. With the dynamics of protein synthesis within the experimental system captured, we move closer to more accurate predictions of the wide range of DNA-protein binding dynamics.

Poster Presentations

28- Could winter burns help minimize burn injuries and mortality of Eastern Box turtles in a fire-managed system?

Carlisha Hall, *Biology* | Mentor: **Dr. John Roe**

Longleaf pine systems have high biodiversity in part due to natural and managed fires, known as prescribed burns. Despite the demonstrated utility of fire for target species, some organisms are at a higher risk of being harmed by fire due to limitations of mobility, including 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 overwintering site selection, whether turtles bury deep enough to be protected from flames, and when they emerge in spring. Using radiotelemetry and temperature dataloggers, we assessed winter habitat selection, burial depths, and timing of spring emergence over three 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 not managed by prescribed fire. Turtles buried deepest from January–March, with some burying only to the soil/litter interface and others as deep as 20 cm into the soil. Spring emergence ranged from 10 March–5 May, but the majority became surface active during the first two weeks of April. However, few turtles chose overwintering sites within fire-prone habitats. Overwintering and emergence behaviors were similar at both sites. Overall, we conclude that risk to turtles from winter fires at WEWO is low, as long as fires are conducted prior to April. This is supported by the fact that no tracked turtles died in fires during our study. Future studies will examine repeatability of behaviors within individual turtles to determine if patterns are consistent among years and environmental conditions.

29 - A Survey of Animal-Assisted Literacy

Hannah Anderson, *English, Theatre & Foreign Languages* | Mentor: **Dr. Scott Hicks**

Animal-assisted literacy (AAL) programs function by combining reading and literacy development in K-8 students with supervised, guided activity with animals, either in the classroom or as a supplemental program to a student's normal school work. This project made a survey of AAL programs throughout North America, specifically those involving dogs, and included a review of the available literature regarding AAL programs. Determining the benefits and the methods of implementation for AAL programs was an important part of this project, as it will inform further work in this area.

30 - **Observable Self-Compassion**

Lea Tardanico, *Psychology* | Mentor: **Dr. Ashley Allen**

Self-compassion is a personal characteristic defined as an individual's kind treatment toward themselves, particularly during times of adversity (Neff, 2003). While self-compassion is known to benefit individuals on an intrapersonal level through reduced depression and anxiety as well as increased intrinsic motivation (Breines & Chen, 2012; Macbeth & Gumley, 2012) its outward effects on individuals' relationships with others are less known. The ultimate goal of this research study is to determine whether self-compassion is observable and considered a valuable characteristic. Specifically, the study will look at the extent to which an individual's own level of self-compassion is a characteristic that is observable by others who are close to them, and to what degree these others consider it a positive attribute. Participants for this study were 185 undergraduate college students who rated themselves on their perceived level of self-compassion, followed by three informants (a parent or guardian, close female friend, and close male friend,) who rated their perception of how self-compassionate the target participant was. All data was collected through an online survey that introductory-level psychology students signed up to participate in for class credit. Within the survey, students gave a first name and email address for a parent /guardian, close female friend, and close male friend, each of whom were emailed a brief survey. Preliminary findings show more self-compassionate participants were rated as more self-compassionate by all three of their informants. This finding supports our hypothesis that self-compassion is observable by others including parents and friends.

31 - **The Impact of Technology Firms in North Carolina**

Russell Reed, *Geology & Geography* | Mentor: **Prof. Jesse Rouse**

North Carolina is home to several large technology firms, from hardware companies like IBM to software companies such as Red Hat. Like any company, these firms have a measurable impact on the region where they are located. It is possible to look at various aspects of the interplay between the firms and their locations through readily available information. The median income can show the average living standard in the region. Looking at the employment/available job positions would imply economic growth that can be tied directly to tech firms. Finally, the proximity to facilities such as universities can suggest strong ties to related academic programs offered at the institutions. This poster will provide information on how the selected technology firms interact with their locales and the state as a whole.

32 - Determining the ideal environment to place renewable energy plants by using remote sensing applications

Dusty Smith, *Geology & Geography* | Mentor: **Prof. Jesse Rouse**

Carbon based emissions have become a leading issue today as we consider the long term effects of climate change, primarily global warming. Nations around the world strive to become less dependent on energy sources linked to carbon based emissions, such as fossil fuels or coal. Switching to renewable resources seem to be in our best interest as an alternative. However, the placement of a renewable energy plant is very particular as the overall location determines the environment's ability to support its resources. One way to determine if an area can support a renewable energy plant is by using remote sensing to capture and map an area. These methods help map the spatial and temporal scales of the renewable energy resources and can be used to locate potential zones in which renewable energy plants can be placed. As we advance into a cleaner and more sustainable world, it is crucial that we find the best possible placement for these plants to be more efficient. The improvements we will make to our current energy response will have to be one that can support a growing community and do so efficiently.

33 - Preliminary Hazard Maps of Subsidence near Gold Hill, NC

Jay Ritchie, *Geology & Geography* | Mentor: **Dr. Jay Nelson**

The Gold Hill District of North Carolina has been a place of historical significance from Gold Hill's first discovery of proven gold veins in 1824. Since then extensive mining operations continued until operations were ceased in 1915. In the past decade the remains of the Gold Hill mining district has left many existing surface hazards, as well as the potential for future hazards relating to concentrated subsidence from filled mine shafts and stopped areas. The primary concern for the local community of Gold Hill is to know the magnitude of the hazards and to understand where potential hazards are located. To identify potential hazards we have completed some exploratory Ground Penetrating Radar (GPR) surveys that allows us to map the concentrated subsidence at various locations throughout the Gold Hill mining district. The GPR is being used to create both two dimensional and three dimensional transects of the surface. Using various frequencies for different depths, it is possible to see that disturbances in the sediment exist, but the data only shows features to depths as shallow as five to ten meters. These shallow disturbances are of primary interest but could also point to larger scale issues. The application of the GPR technology allow for a better understanding of the past mining network that once flourished in the region and the hazard associated with the subsidence of the material within these old shafts.

34 - Design, Fabrication and Performance of a Microscale Flow Cell for Spectroelectrochemistry

Wei Wang, *Chemistry & Physics* | Mentor: **Dr. Paul Flowers**

Spectroelectrochemistry (SEC) is the term used to describe various experimental strategies involving spectral and electrochemical measurements of samples undergoing electrolysis. SEC techniques are well-established and utilized in many basic and applied fields. As for most chemical analysis techniques, considerable benefit can be derived from the development of measurement technologies that permit the analysis of very small samples. Currently these so-called microscale techniques are desired, and sometimes required, when samples are available only in limited amounts due to cost or natural scarcity, or when they present a safety hazard in large amounts (for example, radioactive materials, extreme toxins, etc.). Work in our lab has recently been directed towards the development of microscale devices capable of analyzing sample volumes of approximately one microliter (about the size of a grain of sand) or lesser. This poster describes our first-generation design and fabrication procedure. Also, it provides a summary of the performance of our device as determined through the measurements of spectral and electrochemical signals for standard chemical systems. This material is based upon work supported by the National Science Foundation under Grant Number 1506817.

35 - A Novel Solid Matrix for Protein Separation Using Alginate and Chitosan

Kody Heubach, *Chemistry & Physics* | Mentor: **Dr. Sivanadane Mandjiny**

This research aimed to develop a novel solid matrix for protein separation using alginate and chitosan. To accomplish this, chitosan was encapsulated within alginate beads. Alginate was selected for this project because it is well known for ability to form beads. The chitosan was chosen because it is a natural polymer found in crab shell, and is effective in binding positively charged substances. After encapsulation the beads were allowed to soak in calcium chloride solution which stabilized the alginate/chitosan beads so they could withstand various conditions of temperature and pH. Once the alginate/chitosan beads were stabilized they were placed into a chromatography column in order to separate a mixture of proteins based upon their isoelectric points. The chromatography column containing the alginate/chitosan beads was able to separate myoglobin and hemoglobin.

Poster Presentations

36 - Toward the Development of a Spectroelectrochemical Assay for Acetaminophen in Human Body Fluids

Ereny Gerges, *Chemistry & Physics* | Mentor: **Dr. Paul Flowers**

Spectroelectrochemistry (SEC) is a term that refers to the simultaneous application of spectroscopy and electrochemistry techniques. SEC methods are widely used to evaluate the redox properties of various chemical substances. Acetaminophen is a pharmaceutical compound that is the active ingredient in Tylenol and many other common nonprescription pain relievers. The widespread use of this drug and its toxicity at high dosage have motivated the development of appropriate analytical methods for determining its concentration in body fluids such as serum and urine. Current methods for the measurement of acetaminophen include colorimetry, immunoassays and chromatographic procedures, each having advantages and disadvantages with regard to accuracy, selectivity, speed and expense. Work in our lab is focused on developing new assays for various compounds of biological importance that are based on SEC measurements, with the potential of providing advantages with regard to existing methods. In this poster, we present results obtained in preliminary studies of acetaminophen spectroelectrochemistry as a first step toward the development of an SEC assay. The electrolysis of this compound involves a sequence of electrode and solution reactions that could be exploited to provide an enhanced selectivity, avoiding the need for time-consuming specimen preparation. This material is based upon work supported by the National Science Foundation under Grant Number 1506817.

37 - Revolutionary American Women's History in the North Carolina School Systems and Young Adult Literature

Laura Spillman, *History* | Mentor: **Dr. Rose Strelau**

What kind of influence does historical studies have on our school systems and adolescent literature? This project seeks to make a connection between the histories of America's Revolutionary Era women and how they are portrayed in adolescent literature and textbooks. Drawing upon several historical works, primarily during and after the second wave feminist movement of the 1970s, this project argues that while Revolutionary Era women's histories have progressed greatly in the past 40 years, there is still much that is overlooked. Women are still marginalized in historic research and are often viewed as optional additions to the overall story. Consequently, the nature of women's historical research is carried over into the school systems and is best observed by looking at the textbooks and literature that are incorporated in the classrooms. This project focuses on middle grades (6-9) social studies textbooks and historical fiction for young adults that include—or are about—the American Revolution. This project argues that because women's histories are still predominately understudied and generalized in today's society,

classroom textbooks and adolescent literature also portray women as contributors to history, rather than critical components.

38- Development of an In Vitro Calibration Protocol for In Vivo Microiontophoresis

Natasha Wells, *Chemistry & Physics* | Mentor: Dr. Paul Flowers

Microiontophoresis is a technique permitting the direct delivery of drugs to specific regions of live brain tissue, a technique that is increasingly used in neurochemical studies. Despite its widespread application, a convenient approach to quantifying the amount of compound delivered via this technique has yet to be reported. Our goal is to develop an in vitro protocol for reliable quantification of in vivo ejections. A model compound is ejected into an optical cuvette at varying iontophoretic currents using carbon fiber iontophoresis probes. Simultaneously, cyclic voltammetric measurements are collected. The iontophoresis is then stopped and the ejectate is subjected to a photometric analysis to determine the amount of compound ejected. The voltammetric and the photometric measurements are correlated to yield a calibration relation that may be used to quantify in vivo ejected compounds. This work was supported by grant #5R25GM077634-04 from the NIGMS (National Institute of General Medical Sciences) supporting the UNCP-RISE Program.

39 - On the Magneto-optical Behavior of Aqueous Ferric Chloride

Sean Downes, *Chemistry & Physics* | Mentor: Dr. William Brandon

When a beam of polarized light traverses a transparent medium subject to a magnetic field the direction of polarization rotates due to the splitting of atomic energy levels in the medium. Named for Michael Faraday, who discovered and described the effect, this phenomenon became known as the Faraday Effect. Because of the vast array of practical applications, the ongoing evolution of magneto-optical polarimetric measurement techniques has continued to attract attention over that past several decades. The Verdet constant is the magneto-optical parameter characterizing the strength of the Faraday Effect for a particular material at a particular wavelength of light. This work is concerned with the concentration (i.e. Molarity) dependence of the Verdet constant of aqueous ferric chloride (FeCl_3) at various wavelengths. Although the concentration dependence of the Verdet constant of ferric chloride has been previously measured at several wavelengths by independent researchers, the dispersion (i.e. its wavelength dependence) has not been mentioned. Here, we use a combination of data mining and our own independent measurements to elucidate the dispersion of the Verdet constant from the red (670nm) to the green (532nm) part of the visible spectrum.

40 - Self-Compassion and Perceptions of Judgement

Bobbi Sampson, *Psychology* | Mentor: **Dr. Ashley Allen**

Self-compassion is showing kindness to oneself to cope with personal suffering (Neff, 2003a). Self-compassion is not used to avoid suffering, but to acknowledge it and understand that everyone suffers throughout life. Research suggests that self-compassionate people judge themselves and others less; they are more accepting of their flaws and failures, thus there is no need to compare themselves to others (Lindsay & Creswell, 2014; Neff, 2003b). The main purpose of this research study is to see if self-compassionate people perceive others as judging them less than low self-compassionate people. Participants (N= 138) were randomly assigned to two conditions: fault or no-fault. The fault and no-fault conditions consisted of two counter-balanced scenarios. In the first scenario, participants imagined that they failed an assignment. In the second scenario, participants imagined that they could not ride a roller coaster because they were overweight. However, in the fault condition participants were at fault for their failure/embarrassment. In the no-fault condition participants had no control over their failure or embarrassment. Following the scenarios, participants rated their emotions, self-perceptions, and anticipated perceptions from others. Finally, participants completed trait measures of self-compassion and compassion for others as well as several demographic variables. Our results found partial support for our hypothesis that self-compassionate participants would perceive less judgment from others. This relationship was more pronounced for the weight scenario but not the failure scenario. Implications will be discussed.

41 - Gender Among Concentration Camp Guards

Jordyn Roark, *Social Work* | Mentor: **Dr. Jessica Abbott**

This study seeks to assess gendered actions and interactions of Nazi female concentration camp guards during WWII in the context of the “doing gender” framework. Doing gender argues that gender is an ongoing accomplishment and is not simply confined to roles or identity—indeed, gender is action, something that we actually do. Using eyewitness testimony from trial transcripts and other secondary sources, we assess whether female concentration guards carried out their duties and atrocities in gendered ways—that is, did female concentration camp guards “do gender” while committing heinous acts?

42- Studying Alzheimer’s Disease in a transgenic mouse model to understand the protection by lysosomal modulator Z-Phe-Ala diazomethylketone (PADK) to increase levels of Cathepsin B.

Tamille Rhynes, *Chemistry & Physics*

Lyndsie Elliott, *Chemistry & Physics*

Morgan Pait, *Chemistry & Physics* | Mentors: **Dr. Ben Bahr** and **Ms. Heather Romine**

Alzheimer’s Disease (AD), one of the most recognized neurodegenerative diseases, is delineated by protein accumulation in brain neurons that leads to the inhibition of neural activity, particularly in the hippocampus. Protein fragments of the amyloid precursor protein (APP) cause buildup of intracellular oligomers and the extracellular A β plaques in the brain. These and other protein accumulation events need improved clearance mechanisms in order to treat the proteinopathy (Butler et al. 2011; PLoS One 6:e20501). The lysosomal pathway has been analyzed greatly and lysosomal modulators such as PADK, Z-Phe-Ala diazomethylketone, have been identified to reduce protein accumulation. To further the work in this study, we will examine an APP processing pathway that generates broken down fragments of protein that are found capable of compromising neuronal activity in the hippocampus. We look to see if PADK influences Arginase 1 (Arg 1) which is known to modulate tau deposits in tau transgenic mouse models (Hunt et al. 2015; JNeu 35e: 14842). Formation of carboxyl-terminal fragments (CTFs) of APP was found, and this generation is referred to as eta-secretase activity. CTFs that are produced by eta-secretase are heavily nourished in dystrophic neurites in human and mouse AD brains (Willem et al. 2015; Nature 526:443). We are testing whether PADK promotes clearance of fragments produced when eta-secretase processes APP. Further research is underway with the antibody 6E10 which will be used to assess eta-CTFs. In conclusion, this type of work includes efforts to explain how the lysosomal modulator PADK may be able to protect the brain from AD.

43 - Occupational Therapy Techniques, Over Time, on Children with Developmental Delays

Madison Wilcox, *Health, Physical Education & Recreation* | Mentor: **Dr. Jeff Bolles**

Two therapies that have been identified to target sensory modulation needs associated with developmental delay are the Wilbarger Protocol and Therapeutic Listening. This study examined several patients from an outpatient pediatric occupational therapy facility. These patients have some sort of developmental delay and need intervention to help them modulate their sensory input, so that their lack of appropriate sensory modulation will not interfere with their daily occupations. This study looked at the effects of the Wilbarger Protocol and Therapeutic Listening over multiple sessions to determine how those techniques effected four overall themes to which research has demonstrated a correlation: modulation, calmness, communication, and challenging behaviors. Both treatments

Poster Presentations

demonstrated weak correlations, with the Wilbarger Protocol being a negative correlation (-0.19) and Therapeutic Listening being a positive correlation (0.22). Therefore, the hypotheses that the Wilbarger Protocol and Therapeutic Listening would positively affect the four overall themes were rejected. A review of the raw data demonstrated positive responses to the Wilbarger Protocol for subjects D, E, and F, but those responses were independent of the number of sessions provided. These three subjects demonstrated consistently positive effects early on in the treatment process and the effects remained positive throughout the treatment. It appears that the effect is more influenced by patient-dependent variables than by temporal markers. It is also likely that the limited number of subjects (n=7) and changes in the treatment protocols, over time, led to the results being inconclusive

Art Exhibits

1 - Contemporary Ukiyo-e

Aysha Belem, Art | Mentor: Prof. Sanderson Brandon

This project uses the traditional Moku Hanga printing methods to create a contemporary take on the Ukiyo-e style of printmaking. Three prints were made to emulate the three periods of techniques, scroll imagery and Nishiki-e. Moku Hanga is the process of printing Ukiyo-e prints, Nishiki-e is a multiple color print and Aka-e is an Ukiyo-e print where red predominates. The works I created adopted the style of Ukiyo-e prints to my own imagery, namely images of my childhood.

2 - Sculpture Park Bench

Jessica Wyre, Art | Mentor: Prof. Adam Walls

Art extends beyond the confines of the gallery. Public art is just such an opportunity to do this. North Carolina artist Jim Gallucci is an artist known for work in this area. His park benches can be seen in major cities across the south east. It is his work that has inspired my interest in this project. For the summer semester of 2015, I fabricated a painted steel sculptural bench that can be displayed on campus and later submitted to public art exhibitions or sold to art collectors.

3 - The Foundations of Animation

Vivienne-Sarai Leaven, Art | Mentor: Dr. John Labadie

In the coming semester, I will be continuing my research creation of two-dimensional computer animation, this time focusing on character and story development. In the past semester, I received a grant for a proposal titled, “The Foundations of Animation”. The project was successful and I have learned so much, however, I discovered much more that I have yet to learn. During the past semester, I have created and developed an original animation project titled, “Basha” in the process. I am eager to continue my research and push “Basha” to another level because as an artist or as any individual in any profession, it is not wise to stop learning and researching. I will learn the process of creating well-known feature films and animation series, such as “The Lion King”, “Disney’s Tarzan”, and “Avatar: The Last Airbender”. For this proposal, I will be creating a series of 3 original, completed, animated scenes. Thanks to modern technology, an individual with a computer and a digital

Art Exhibits

tablet can create the same quality animation. A digital tablet is just like drawing on a piece of paper with a pencil, except that one would draw directly on a monitor with a stylus. The tablet that I will be using is the Wacom Cintiq.

4 - Art and Healing: Drawing to Mend the Mind

Jada Jackson, Art | Mentor: Prof. Brandon Sanderson

This USA will investigate the use of art therapy to stimulate, improve and maintain a healthy mind. I am interested in pursuing a graduate degree in the field when I finished my studies at UNCP and this grant will help me determine whether it is a good fit. First, I will first study different historical and contemporary art therapy methodologies and develop an approach to applying them to my studio practice. Next I will create a series of drawings that reflect a variety of emotional states and their improvement. These drawings will then be reinvestigated through printmaking techniques. Throughout the USA I will reference art historical depiction of emotion that people go through.

5 - An Investigation of Drawing Medium: Techniques for Creating Narrative Illustrations

Jai Woods, Art | Mentor: Dr. Carla Rokes

This research focused on developing familiarity with using traditional and experimental drawing media. The majority of this grant focused on demonstrating and practicing with drawing media to develop more accuracy with illustrating two-dimensional compositions. In addition, we produced a series of demonstration videos that recorded the technical steps in working with different drawing media and iconographic subjects. The materials used during this research included graphite, charcoal, Inktense pencils, and Prismacolor pencils.

6 - A Study of Narrative Sculpture: Transitioning Ceramic Portraiture Into Figurative Narrative

Jai Woods, Art | Mentor: Prof. Scott Ziegler

My research centered on gaining familiarity with sculpting the human form and the technical approaches related to integrating stronger narrative into sculptural work. I was specifically interested in contemporary ceramic artist, Tip Toland, and her sculptural work related to the human condition. In the first phase of my research, my mentor and I concentrated on progressing sculptural form related to the human figure. I wanted to graduate from a basic foundation of sculpting the figure, to achieving stronger visual

realism. We produced two compositions using the subject of the aged-figure. For the second phase of this research, I attended Tip Toland's workshop, *The Figure Dynamic: Creating Narratives in Half-Scale and Under* at Haystack Mountain School of Craft. During this two-week class, we studied approaches for sculpting with anatomical accuracy, facial proportions, the mechanics of expression, using non-traditional surface finish, and techniques related to sculpting the full figure using 16" figures and 8" figurines.

7 - Identity Crisis

Joshua Chase, Art | Mentor: **Prof. Brandon Sanderson**

This SSS brings attention to the ideas of identity and social anxiety in my generation. Because college is such a large social playground I have had the opportunity to meet many people from all walks of life. Everything from Greek life to campus events and even time spent in the on campus game room has allowed for me to connect with my peers. It has come to my interest that many are incapable of comfortable social interaction due to some degree of social anxiety and identity issues. The artwork on view demonstrates these aspects of social identity through the use of thematic imagery, animalistic characteristics as a metaphor, and the use of color to set the tone. I selected this style of paint on woodblock because it is a relatively contemporary approach to vocalizing current issues.

8 - Reprobate Critters in Reductive Woodcut

Katherine Davenport, Art | Mentor: **Prof. Brandon Sanderson**

This presentation demonstrates the development of my skill as a printmaker in the past year. I started with zero knowledge of printmaking and through practice and trial and error I have learned how to create an interesting and dynamic piece. The reductive woodcut process required me to attain skill in the carving, planning and printing of the relief matrix. With the help of my mentor I have incorporated my love of the natural world with that of all things strange and absurd. The final project resulted in two to three finished reductive wood block prints.

9 - The Hive

Desiree Thomas, Art | Mentor: Prof. Brandon Sanderson

“The Hive” is based on the decline of the honey bee populations and their global impact on the lives of humans. Bees play such a crucial role in the ecosystem and help produce at least 90% of our global food supply. Because agricultural is nearly entirely dependent on pollination, without bees, humans would eventually die out. This project investigates the decline of the honey bee population and their impact on human life. These themes are illustrated in the traditional printmaking process of stone lithography.

10 - Embrace

Desiree Thomas, Art | Mentor: Prof. Scott Ziegler

The focus of this grant was to experiment with spraying and making glazes. I have glazed multiple test tiles so that I can have a tangible example of how glazes turn out once fired. Test tiles are essential when refining work because they help you test various glazes in an easy and inexpensive way. For this study, I have created a teapot using sculptural elements of octopus tentacles to see how a specific gaze reacts to a textured surface.

11 - Consumer

Desiree Thomas, Art | Mentor: Prof. Brandon Sanderson

“Culture” is based on the globalization of American culture. This grant is based on the reduction of cultural diversity through the popularization of American cultural symbols. This work is an introduction into global culture that can impact the national identity by industries and multinational media. The homogenization of various cultures reduce cultural diversity where it evolves into global culture. These themes are illustrated through the fine art prints using linoleum printmaking process.

12 - Magazine about UNCP Campus Life

Frida Mejia Diaz, Art | Mentor: Dr. John Labadie

Golden Gaze is a free digital magazine for current and incoming students. The information available in Golden Gaze will allow students to experience a more comprehensive campus life at the University of North Carolina at Pembroke. This magazine was created to present the UNCP campus through professional photography and original content. Golden Gaze will help students appreciate the culture, heritage, and diversity of their campus. The design for this digital magazine was inspired by the diverse university community, the rich southern culture, and park-like landscape of the UNCP campus.

Additionally, Golden Gaze is an opportunity for this student to become a creator of a well designed, published magazine where she applies lessons learned from the Art Department Digital Arts program at UNCP. The creative research necessary to produce this publication explores how the elements and principles of design can be applied towards effective magazine layout. Golden Gaze has a cohesive model because each element and principle works together for a more effective interaction with the reader. Finally, this student is responsible for all photography included in the magazine for which advanced photographic skills were used.

13- The Four Elements

Ashley Nordquist, Art | Dr. Carla Rokes

This project is my visual representation of the four basic elements in life: Water, Earth, Fire and Air. Each of the four elements are accompanied by a specific flower that is known to reflect one of the four elements and is displayed in a balancing contrast of accident and control. Through the use of Micron Pens and Crystal Colors, I explore both the pleasant and chaotic sides of the elements and the significant role that they play in our daily lives.

2016 Pembroke Undergraduate Research and Creativity Council

Dr. Ryan Anderson

Director of Pembroke Undergraduate
Research and Creativity Center
Associate Professor
Department of History
Email: ryan.anderson@uncp.edu
Phone: 910.775.4263
Office: Dial 211

Dr. Michele Fazio

Assistant Professor
Department of English and Theater
Email: 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
Phone: 910.521.6598
Office: Old Main, Room 249

Dr. Sonali Jain

Assistant Professor
Department of Sociology and Criminal
Justice
Email: sjain@uncp.edu
Phone: 910.521.6474
Office: 219 Sampson

Dr. Robert Poage

Associate Professor
Department of Biology
Email: 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
Phone: 910.521.6406
Office: Locklear 213

Dr. Maria S. Santisteban

Associate Professor
Department of Biology
Email: maria.santisteban@uncp.edu
Phone: 910.775.4274
Office: Oxendine 2232

Dr. Zhixin "Richard" Kang

Associate Professor
School of Business
Email: zhixin.kang@uncp.edu
Phone: 910.775.4368
Office: Business Admin, Room 212

Dr. Jose Rivera

Associate Professor
Department of Music
Email: jose.rivera@uncp.edu
Phone: 910.521.6290
Office: Moore Hall, Room 136

Dr. Cornelia Tirla

Associate Professor
Department of Chemistry and Physics
Email: cornelia.tirla@uncp.edu
Phone: 910.522.5709
Office: Oxendine 3227

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



UNIVERSITY *of* NORTH CAROLINA
P E M B R O K E

This publication is available in alternative formats upon request.
Please contact Accessibility Resource Center, DF Lowry Building, 521-6695