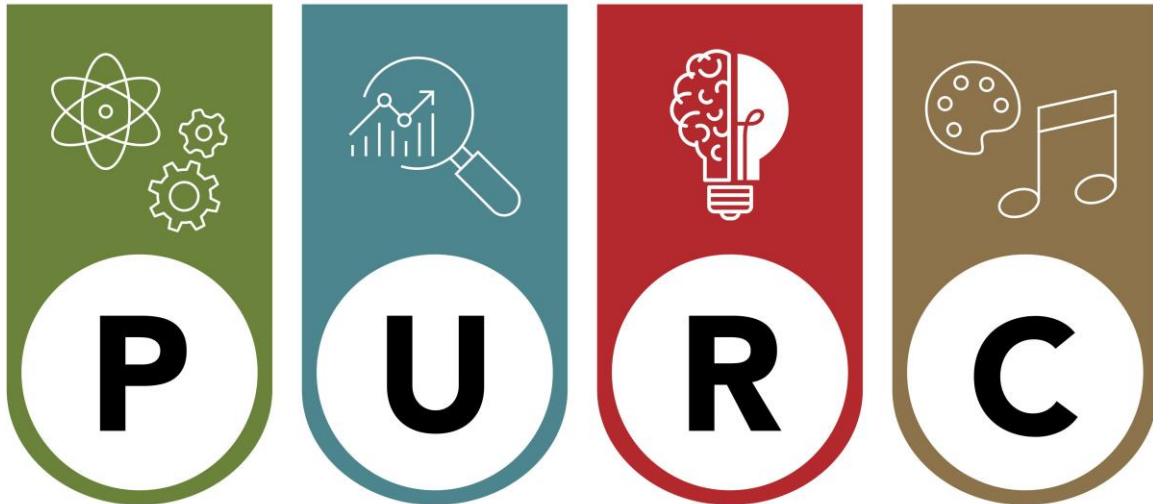


**Seventeenth Annual
UNC Pembroke
Undergraduate Research and Creativity Symposium**

THE UNIVERSITY OF NORTH CAROLINA AT PEMBROKE



**PEMBROKE UNDERGRADUATE
RESEARCH AND CREATIVITY CENTER**

April 12, 2023

Program with Abstracts

Pembroke Undergraduate Research and Creativity (PURC)
Center
One University Drive
P.O. BOX 1510
Pembroke, NC 28387-1510
purc@uncp.edu

1 University Drive
P.O. Box 1510
Pembroke, NC 28372



Pembroke Undergraduate Research
and Creativity (PURC) Center
910.521.6841

Dear Students, Colleagues and Guests:

Welcome to the 17th Annual Pembroke Undergraduate Research and Creativity Symposium! This event is a campus-wide celebration of undergraduate research and creativity. The faculty-mentored student research projects on display represent a wide variety of fields. We are pleased to include 93 presentations of scholarly ventures by approximately 79 students and 49 faculty mentors, representing 15 academic departments.

The mission of PURC is to promote, develop, and celebrate undergraduate student research, with the overall goal of enhancing undergraduate education and preparing students for careers in all disciplines. Through faculty-mentored research experiences with faculty and other regional, national, and international scholars and professionals, students engage in scholarly discovery and become fully engaged members of the research community. In this way, the Center facilitates and coordinates preparation in research skills necessary for professional fields and graduate study.

Participation in undergraduate research continues to grow at UNCP. During this academic year, 20 PURC-funded students presented research or creative works at approximately 2 international, 18 national and 15 regional conferences. Please join us in acknowledging and celebrating the accomplishments of these students.

At UNCP, some students have been participating in research that is a component of a larger project where faculty mentors have tasked them with substantial responsibilities, whether individually or collaboratively. Others have initiated independent individual and group research projects and creative activities under faculty mentorship. While some students are reporting on completed projects, others are presenting the latest data on in-progress research.

A big thank you to the faculty mentors, undergraduate researchers, donors, supporters, staff, and everyone else that makes undergraduate research happen at UNCP! It is truly a group effort. Thank you to Dr. Timothy Ritter and Dr. Charles Humphrey for their continued support of undergraduate research on our campus. I would also like to recognize the efforts of Alesia Cummings, Gordon Byrd and Elizabeth Jones, without whose efforts this event would not be possible. Next, I would like to thank the PURC Council whose many years of expertise are invaluable.

Employers and graduate programs increasingly look for skilled people who not only excel in their research and scholarship, but also are able to collaborate and communicate meaningfully with all peoples across many disciplines. This event is a celebration of our student's demonstrated ability to do so. I wish everyone a great conference and thank you for bringing out the best in our campus!



Brandon Sanderson

Director, Pembroke Undergraduate Research and Creativity Center

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*17 Annual
Pembroke Undergraduate Research and Creativity Symposium*

Wednesday April 12th, 2023

Mary Livermore Library Commons Area & Reading Room

Schedule of Events

- 9:45-10:00 Registration**
- 10:00-10:15 Greetings and Opening Remarks – Commons Area**
Dr. Richard Gay, Dean, College of Arts & Sciences
Brandon Sanderson, Director, PURC
- 10:15-10:30 Keynote Speaker – Dr. Lee Phillips, Director of the Undergraduate Research, Scholarship and Creativity Office at the University of North Carolina at Greensboro**
- 10:30-11:45 Poster/Exhibit Session – Commons Areas**
- 11:45-12:15 Deli Lunch Service**
- 12:15-1:10 Oral Presentations and Musical Performances – Main Reading Room**
- 12:15-12:30 “*Surviving Battleship Row: An Autoethnographic Heritage Study*”
Logan Bossert, Speaker
Mentor: **Dr. Michael Spivey**, Sociology & Criminal Justice
- 12:35-12:50 “*How to Safely Remove Honeydew Insects using HistoClear prior to DNA Amplification*”
Kinsley Adams, Speaker
Mentor: **Dr. Lisa Kelly**, Biology
- 12:55-1:10 “*Chaotic Evil*”, “*That Look in Your Eyes*” and “*Sendejas*”
Silas Seigler, Jackson Mills and Wyatt Radford, Composers
Zhaire Carter, Trumpet
Wyatt Radford, Alto Saxophone
DeWhitt Locklear, Tenor Saxophone
Phillip Brown, Vibraphone
Jackson Mills, Keyboard
Logan Jackson, Bass
Silas Seigler, Drums
Mentor: **Dr. Aaron Vandermeer**, Music
- 1:15-2:15 Awards Presentation, Reception and Closing Remarks – Commons Area**
- 1:15-1:25 Dr. Timothy M. Ritter & Marie A. Amero Endowed Research Scholarship – Reese Hicks
- 1:25-1:35 Dr. Charles Humphrey Undergraduate Conference Travel Award – Hunter Ivey & Limari Vasquez
- 1:35-1:45 Undergraduate Research Mentor Award – Dr. Kaitlin Campbell
- 1:45-1:55 Undergraduate Research Mentor Award – Dr. Michele Fazio
- 1:55-2:05 Library Resources and Research Support – Ms. Elizabeth Jones, MLIS
- 2:05-2:15 Closing Remarks

Keynote Speaker 2023



Dr. Lee Phillips is Director of the Undergraduate Research, Scholarship and Creativity Office at the University of North Carolina at Greensboro. He has a strong commitment to student learning through faculty engagement, especially as it involves undergraduates in research and/or creative inquiry both in and out of the classroom. He was one of the co-founders of UNCP's Undergraduate Research and Creativity Office serving along with Dr. Jesse Peters, and later became the director of PURC. Lee served on the Executive Board of the Council on Undergraduate Research (CUR) for six years, is a past-Chair of CUR's Geosciences Division, is a past-Chair the UNC Undergraduate Research Directors Consortium (URDC), and is a past-President of the Carolina Geological Society. He currently serves as a member of the UNC URDC, and is Chair of the University of Iowa's Earth and Environmental Sciences Alumni Board.

Lee, a North Carolina native, earned the B.S. and M.S. in Geology from UNC Wilmington, and after a brief teaching interlude at Western State Colorado University, he attended the University of Iowa to earn the Ph.D. in Geoscience in 2004. He started his academic career at UNCP, where he was a member of the Department of Geology and Geography. He holds memberships in the American Association of Colleges and Universities, Carolina Geological Society, Council on Undergraduate Research, and Geological Society of America.

Posters

1 - Programming in Chemistry: Solving Simple and Complex Chemical Equations on TI-84

Dina Abumohsen, *Biology*

Lindsay Branch, *Biology*

Mentor: **Siva Mandjiny**

Abstract:

Chemistry is known to be one of the most challenging introductory courses. The purpose of Programming in Chemistry: Solving Simple and Complex Equations on TI-83/84 is to allow the learning curve of complex topics in chemistry to become much smoother, while simultaneously giving tutors and educators a quicker resource to work through equations. The book includes a step-by-step approach to Balancing Equations, Finding Limiting Factors, and solving for Redox Equations (Basic and Acidic), Vapor Pressure, and Phase Change via Ti-83/84. This new approach to solving chemical equations has been proven to fraction the time.

2 - Exploring the Lives of the Imperial Consorts and Empresses in Qianlong's Court Through the Story of Yanxi Palace

Peace Ajirotutu, *History*

Mentor: **James Hudson, Jamie Mize**

Abstract:

The most googled show on earth in 2018 was a 70-episode Chinese drama titled Story of Yanxi Palace. Even though Yanxi was a success internationally it was censored in China shortly after airing. This begs the question; why would China censor its most popular television show in 2018? The speculation for why Yanxi could have been censored led to this paper's central research questions: How accurate is the portrayal of Qianlong's empresses and imperial consorts in Story of Yanxi Palace? Furthermore, should historical accuracy be mandatory for historical fiction television shows? This paper uses primary and secondary sources about imperial consorts of the Qing dynasty to describe the historical and cultural points viewers can learn about Qianlong's consorts through Yanxi. After watching all 70 episodes, viewers will understand that a consort's life begins when entering the Forbidden City, for which death is the only way out. Furthermore, as viewers watch the women deal with the highs and lows of the ranking system, they become familiar with the internal complexities of the Forbidden City. Thus, historical accuracy is not the primary explanation for Yanxi's censorship.

3 - Elderflower extract improves health of a cancer model in *C. elegans*

Sydney Allen, *Biology*

Mentor: **Courtney Alexander**

Abstract:

Medicinal plants represent an untapped resource for numerous potential therapeutics. The goal of this research study is to use *Caenorhabditis elegans* as a model organism to find novel plant therapeutics that can shrink tumors. *Caenorhabditis elegans* is an ideal model for studying tumor growth because of its short life cycle and transparent body. This study exposed *C. elegans* to *Sambucus nigra* (elderflower) extract and measured their overall health by egg laying potential. Both a wild type *C. elegans* (N2) and a mutant strain *C. elegans* (MT10430) were used. The strain MT10430 was selected because this mutation causes tumors in the reproductive area, resulting in fewer eggs being produced. This allowed for the eggs to be used as an effective

measurement of their health. Four plates, a control wild type (NGA N2), a control mutant strain (NGA MT10430), an experimental wild type (EF N2), and an experimental mutant strain (EF MT10430) were created after age synchronization. The EF MT10430 experimental plate showed a drastic increase in egg laying capacity when compared to the control NGA N2 plate, suggesting that the treatment is shrinking the tumors.

4 - The Current Lived Experience of Tuscarora in North Carolina

Chandler Allred, *History*

Mentor: **Zachary Laminack**

Abstract:

My poster is based on three interviews I conducted concerning the current lived experiences of the Tuscarora people in North Carolina. The three interviews detail the trials and tribulations that the Tuscarora people have faced in the present century. Since contact with Europeans, the Tuscarora people have been in a state of war. From generations of warfare, protest, and riots, Tuscarora people in North Carolina today live with generations of ethnocide and genocide.

5 - Adding Nuance to History Through Investigation Into the Lumbee Experience: Desegregation of Schools in Robeson County, North Carolina in the 1970's

Unmai Arokiasamy, *American Indian Studies*

Mentor: **Michele Fazio**

Abstract:

This oral history project highlights the perspective of Lumbee women's education in Robeson County, North Carolina during the desegregation of schools in the 1970s. Even after 1954 *Brown v. Board of Education*, the Robeson County board of education remained reluctant to integrate until the Department of Health, Education and Welfare threatened to take legal action in 1970 (Lowery 146). Robeson County is primarily comprised of three racial demographics: White, Black and Native. Therefore, documenting and analyzing the experiences of Lumbee people becomes a valuable source of understanding a more authentic picture of desegregation since U.S. history has been centered around the experience of Blacks and Whites. The participants in this project worked in schools or were students. Their lived experiences reveal a wide range of topics about race, education, and immense social change. I will present recurring themes in the interviews and how the creation of a new special collections archive to be housed at the Livermore Library at UNCP will preserve these stories not only for future research but help to build community between the university and local region.

6 - Cloud seeding: An examination of the technology, issues and ethics of human modification of precipitation from clouds.

Ashley Barez, *Geology & Geography*

Mentor: **Dennis Edgell**

Abstract:

Farmers and scientists have tried for decades to find solutions to rain shortages in arid regions. The most common strategy used to produce man-made precipitation is by "cloud seeding". Typically, particles of Silver Iodide (AgI), dry ice, or salt is released into developing clouds so that the particles will form freezing nuclei in the clouds. The particles stimulate the growth of snowflakes which fall, melt and form rain. The silver iodide is released by aircraft, from drones, or from ground generators. Clouds must be present for the technique to work. A precipitation increase of 5% to 15% is successful. There is some debate as to the cost effectiveness of these techniques. The purpose of this project is to evaluate the research on rain-

making techniques. Issues and ethics involved with cloud seeding are also presented. There is concern as to the effect of silver iodide in ecosystems. Furthermore, seeding a cloud in one area may prevent natural precipitation from falling in another area downwind. Thus, moisture "stealing" becomes a water rights and ethical issue.

7 - The Daily Life of a Police Officer: A Futuristic View Examining Racial and Socioeconomic Impacts

Madison Bathke, *Sociology & Criminal Justice*

Mentor: **Miranda Reiter**

Abstract:

The purpose of this study is to examine race-related and social class-related beliefs of Criminal Justice and Sociology majors at the University of North Carolina at Pembroke who plan to become police officers. Participants will be asked via an online survey to indicate how race could potentially play a role in their lives as police officers, and how race and social class, combined, could affect how potential offenders are perceived by police officers. This research is important we are asking future police officers about their beliefs related to race and social class, and to our knowledge, existing research focuses ideas and concerns of active police officer and former police officers. This research will define the gray area within the existing research acknowledging the ethical decisions made by police officers and what they may find themselves acting upon in the field in the future.

8 - Evaluating the Quality of LGBTQ+ Representation on Television

Stephie Bertorelli, *Interdisciplinary Studies*

Mentor: **Abigail Reiter**

Abstract:

Television, as a major component of traditional media, serves as a significant agent in the socialization of members of the LGBTQ+ community. While there is a measurable improvement in the number of LGBTQ+ characters on popular television, there is not currently any research which examines the quality of this inclusive representation. This research seeks to utilize the Vito Russo Test to determine if the quality of representation is growing in concert with the increase in the number of LGBTQ+ characters. The importance of evaluation of the quality of representation in addition to the quantity of characters portrayed will help to inform the public and media executives as to improvements which may be necessary when creating new series characters.

9 - Tensile Strength vs Infill Percentage for 3D Printed Beams

Toni Blackwell, *Chemistry & Physics*

Mentor: **Steven Singletary**

Abstract:

In this project, the objective is to test the strength of 3D printed beams with different infill percentages. The goal is to determine the strongest and most cost-effective infill percentage for 3D printed objects. The "dog-bone" test samples were printed using a Makerbot Method 3D printer. In this experiment an infill percentage of 10%, 25%, 50%, 75%, and 100% were tested. The strength testing will be completed by using two different testing methods tensile testing and three-point flexural test. The machine being used to test the materials is a Mecmesin Omnitest-50, a universal testing machine. The universal testing machine is used to test the tensile strength and compressional strength of the materials at the different infill percentages. Each dog-bone of a given infill percentage was tested on the machine to see at which load they break. I present the results of the strength tests and calculate material costs for each sample.

10 - Characterization of Dyspnea in Dysautonomia: A Patient-Reported Outcome Study

Lindsay Branch, *Biology*

Charmaine Mavhiya, *Mathematics & Computer Science*

Mentor: **Silvia Smith, Andrew Latham**

Abstract:

Dysautonomia is a disorder of the autonomic nervous system which can present with dyspnea (shortness of breath). To date, there is no systematic assessment of dyspnea in this patient population. The hypothesis driving this study is that dyspnea is a prevalent and underrecognized symptom in dysautonomia. To determine the prevalence of dyspnea in dysautonomia in the absence of comorbid conditions that can also cause dyspnea, we administered two questionnaires to 340 dysautonomia patients: the PROMIS(R) Dyspnea Characteristics and Comorbid Conditions questionnaires. Individuals who are affected by conditions that can cause dyspnea (n=165) were not included in subsequent analyses. We determined that there is a statistically significant difference in the occurrence of dyspnea in individuals with dysautonomia compared to those without. To discover this, we utilize a one-proportion z-test comparing the individual sampled to the proportion of individuals with dyspnea in the United States.

11 - Bee Conservation!

Nia Brown, *Biology*

Mentor: **Velinda Worix, Hannah Levenson**

Abstract:

Bees visit flowers to actively collect pollen and nectar - their sources of protein and carbohydrates. However, they may sometimes unintentionally pick up tiny mites and bring them back to their nests. But, little is known about what dictates the presence of these mites or the health impacts - if any - to the bees. Since bees are critical pollinators worldwide, their health is of high concern. Does the pollinator conservation of habitat increase mite abundance on bees? To investigate the presence of mites on bees, we utilized samples collected over different time periods from six NCDA&CS Experimental Agricultural Research Stations across North Carolina. Bees samples were collected either from pollinator habitats and soybean crop fields. We then inspected each specimen under the microscope and documented the location on the bees' bodies and how many mites were found. For this study, we are comparing the data to habitat characteristics, to better understand what factors are important in mite abundance on the bees and how the different time periods from these different locations have on the bee and mites.

12 - Forensic Analysis: Impact of Hair Treatments on Opioid Detection

Kae Burns, *Chemistry & Physics*

Mentor: **Steven Singletary**

Abstract:

Hair has been used in forensics to determine the timeline of drug usage. Previous studies have shown a bias to some cultural groups, which may be linked to hair treatment use. The goal of this research is to determine the impact of hair treatments on detection of codeine and codeine derivatives. The treatments being focused on are bleaching, dying, and a combination of both, with untreated hair as a control. Permanent hair dye enters through the cuticle and deposits in the cortex, the entrance of the dye into the cuticle can cause damage to the hair shaft. Semi- and demi-permanent hair dyes deposit color on top of the cuticle and can deposit nutrients that also attach to the cuticle helping to "repair" some of the damage. Bleach enters through the cuticle and strips

the color from the cortex, which is damaging and drying for the hair shaft. These processes may or may not affect drug detection. Here we present our results from this study.

13 - Why Women's Wellness Works: A Literature Review of the Benefits and Importance of Homogenous Exercise Groups

Lucas Butt, *Kinesiology*

Mentor: **Teri Schlosser**

Abstract:

Recent research has shown an increase in the percentage of women who are meeting the requirements of physical activity. The requirements of active adults include 150 minutes of aerobic activity and two days of strength training. While this is escalating, the percentage of women meeting such requirements is just below 37%. However, the rates of obese, overweight, and sedentary females in college are also on the rise. To overcome this, women must have access to an area where they can exercise comfortably; however, fitness facilities are seen as masculine places. This is shown in the height and grip size of the equipment. Women report feeling uneasy and unsafe as a result of sharing space with men; this has been coined “gym-timidation.” This has led to the creation of women’s only gyms, hours, and classes. Ongoing research on homogenous exercise groups has found various positive physical and psychological benefits. The majority of students at the University of North Carolina at Pembroke (UNCP) are female, but the on-campus wellness center is dominated by men. The purpose of this paper is to identify the benefits and importance of women’s only hours for the students at UNCP.

14 - Perceptions of Risk Factors for Child Maltreatment and Social Service Utilization in Robeson County.

Elizabeth Chavis, *Sociology & Criminal Justice*

Mentor: **Corey Pomykacz**

Abstract:

Child maltreatment is an ongoing and costly issue in the United States and Child Protective Services (CPS) agencies are task with combating this issue and reuniting families. However, research has shown the utilization of reunification services is low. This study focuses on child maltreatment and the utilization of services in Robeson County, NC, from the perspectives of social service workers. Focusing on Robeson County is important because the area is characterized by several risk factors for child maltreatment (CHRR, 2023). Data included six semi-structured interviews with social service workers with the DSS. Interviews were transcribed and analyzed using a deductive approach. Two themes have begun to emerge: 1) systemic inequalities and 2) personal characteristics of parents/caregivers negatively impact service utilization and reunification efforts. These findings suggest that improving communication efforts focused on the needs of racially diverse communities and those characterized by high rates of substance abuse may increase service utilization and reunification.

15 - Utilizing CRISPR-Cas9 to engineer early senescence in *Arabidopsis thaliana*.

Anahi Ciriaco Sanchez, *Biology*

Mentor: **Timothy Anderson**

Abstract:

The model organism *Arabidopsis thaliana* is being investigated by Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)–Cas9 genome editing of senescence regulatory genes. When a senescence regulator gene is knocked out, or rendered nonfunctional, then the plant will display an early senescence phenotype. However, gene knockout prevents the plant from reaching full maturation stage. It has been shown that the senescence regulatory gene, AT1G11700, increases stress resistance in *A. thaliana* when exposed to dark treatment. Knocking out this gene results in early senescence, however, the effect on production yield is not known. The goal of this research is to develop a CRISPR-Cas9 construct of AT1G11700 gene in *A. thaliana* targeting upstream cis-regulatory element in the hope of creating early senescence capability while maintaining its normal growth and maturation. This research is being conducted so that once the desired results are obtained in *A. thaliana*, it can be implemented into major food crops. This investigation can lead to a breakthrough of the prospected global food crisis by increasing potential crop yield since crops will have early senescence capabilities.

16 - Gendered Toys

Kiki Cohen, *Sociology & Criminal Justice*

Mentor: **Brooke Kelly**

Abstract: This presentation examines the different types of toys that are marketed to different genders of children. Think of a time that you visited a common store such as Walmart or Target, what types of toys were marketed to boys and what types were marketed to girls? That is what this study is looking at. Are there certain types of careers pushed towards boys and girls through toys? What colors do companies use to attract the attention of children based upon their gender? What messages about gender do toys marketed to girls and boys relay? I used content analysis of four different online toy stores: Walmart, Target, Toys R Us, and FAO Schwarz. Through my analysis of the top 10 toys that initially appeared when searching “boys toys” or “girls toys” I found that at big corporations such as Walmart and Target toys are definitely still gendered, but in smaller toy only companies gender is not even mentioned in the filter section. Therefore this evidence shows that the gendering of toys is unevenly applied amongst different storefronts. But this still leads us with the question of what those large corporations consider to be “boy toys” and what they consider to be “girl toys.”

17 - Jewish Feminism: An Exploration

Julia Colborn, *Philosophy & Religion*

Mentor: **Jamie Mize**

Abstract:

The conducted research follows the trajectory of Jewish Feminism, specifically American Ashkenazi theology and practice, as a case study for the relationship between human nature and human culture. Upon seeing how that has unfolded over time, I believe it exemplifies the root cause of not just sexism, but other systemic problems such as classism and racism as well; this cause being an assumption of merit within hierarchical social organization. I argue this is not just a byproduct of urbanization but an errant belief in how best to value our nature of categorical thinking. The argument is laid out thusly, and then continues on to point out some examples practiced in dominant US culture that emphasize the implicit value of unequal power dynamics to normalize aforementioned structures of hierarchy.

18 - Viticulture Problems and Prospects in a Changing Climate

Ellissa DeFeyter, *Biology*

Mentor: **Dennis Edgell**

Abstract:

The purpose of this project is to describe the range of issues faced by viticulturists due to climate change. All types of wine sold in stores comes from a specific varietal. Each grape varietal requires a specific environmental terroir. This makes grapes a good climate change indicator species. The geographic distribution of where varietals can thrive is changing with the climate. There are also economic concerns to be considered in terms of how wine quality and production will be influenced. The primary goal of this project is to understand the problems faced by viticulturists as well as potential adaptive strategies and techniques. A secondary goal is to examine future outlook for the wine growing industry in a time of climate change. A literature review of these issues is presented.

19 - Pathway Analysis of Pulmonary Fibrosis Candidate Gene Set

Chinemerem Blossom Edoh, *Biology*

Mentor: **Silvia Smith**

Abstract:

Interstitial Lung Disease (ILD) refers to a group of diseases that causes scarring (fibrosis) of the lungs. The scarring causes loss of elasticity in the lung interstitium, impairing gas diffusion and causing dyspnea. Lung damage from fibrosis is often irreversible and progressive. Various genetic variants have been identified with the most lethal type of ILD, idiopathic pulmonary fibrosis (IPF), and for other ILDs. In this study we analyzed potentially deleterious variants identified as part of a previous study from whole exomes of 737 -ILD affected individuals and unaffected and affected related and unrelated controls. We tested the following null hypotheses: 1) the genes included in this set do not directly interact in the context of pulmonary fibrosis, 2) there are no upstream regulators that target the genes in the set, and 3) the genes in the set are not enriched in known canonical pathways. We used Ingenuity Pathway Analysis(R) to characterize the canonical pathways related to lung fibrosis in which these candidate genes were featured.

20 - Utilizing Cis Editing Techniques to Alter Plant Senescence with CRISPR/CAS9

Dean Foggan, *Biology*

Mentor: **Seth O'Connor**

Abstract:

World hunger is still a major problem throughout the globe. To curtail this, scientists utilize the molecular editing tool CRISPR-cas9 to engineer advantageous crop traits such as altered senescence. This project has three goals: 1) clone a CRISPR construct to target cis regulatory regions of atNAP—an Arabidopsis thaliana transcription factor involved in senescence, 2) using bioinformatic tools, explore a connection between senescent tissue and gene evolutionary age, 3) generate a cis-editing gRNA database for all Arabidopsis genes with a lethal knockout phenotype. Nine gRNAs targeting known transcription factor binding sites in the atNAP promoter region were designed. Expression analyses revealed atNAP is strongly and uniquely expressed in the senescent leaf petiole and global analyses demonstrated that many evolutionarily conserved genes have their highest expression in the senescent leaf petiole. Further, to make cis-editing easier, a cis-editing gRNA database was created for “lethal phenotype” genes that contained 1,988 gRNAs. In summation, we developed cis-editing tools in *A. thaliana* as well as discovered an interesting connection between evolutionary age and senescence.

21 - Relationship Between Pollen Composition and the Gut Microbiome of Western Honeybees and Mason Bees.

Leah Frazier, *Biology*

Mentor: **Crystal Walline**

Abstract:

Studying pollinator foraging habits and the presence of gut microbes in bees is important for identifying variables related to colony health. Since many food crops are dependent on pollination, pollinators play a significant role in ensuring food security. Previous studies have investigated the plant, fungal, and bacterial makeup of pollen to determine if the gathered pollen influences the composition of the gut microbiome of *Ceratina australensis*. However, these ecological studies have been performed on a limited number of bee species. Here, we questioned if pollen composition and intestinal microbial patterns co-varied in the *Apis mellifera* and *Osmia*. Initial results showed that the target DNA concentration of >10 ng/microliter was not achieved when purifying DNA from one intestinal sample. Future directions include DNA library preparation using bead-linked transposons to cut and tag ~350 bp fragments of DNA with dual-index sequencing primers. Pooled samples will be sequenced using the Illumina MiniSeq Sequencing System to identify the microbial species present in the guts of Western honeybees and mason bees and the fungal or microbial communities present in foraged pollen.

22 - Hurricane-Induced Tornadoes: Hurricane Frances and Jeanne

Gretchen Gillenwater, *Geology & Geography*

Mentor: **Dennis Edgell**

Abstract:

Hurricanes and tornadoes are usually considered two separate phenomena, but most landfall hurricanes produce at least one tornado. This project aims to investigate why some hurricanes spawn more tornadoes than others. A case study of the synoptic meteorology of the 2004 hurricanes Frances and Jeanne are reviewed. These two storms were similar, occurred less than a month apart, and took similar paths. Hurricane Frances spawned more than a hundred tornadoes, while Jeanne spawned less than ten. Most hurricane-induced tornadoes form in the outer rainbands of the front-right quadrant of the storm. Wind shear created by land surface friction creates rotation which may be enhanced by surface instability. Due to the jet stream's favorable position to tornado development, extreme wind shear was provided for Frances but not Jeanne. Still poorly understood, hurricane-induced tornadoes are a unique safety hazard. This literature review offers a new outlook on the variable settings for tornados within hurricanes, which may assist in planning for these unique windstorms.

23 - Environmental Conditions Affecting Barometric Efficiency Data

Cody Gless, *Geology & Geography*

Sydney Nadeau, *Biology*

Mentor: **Madan Maharjan**

Abstract:

Confined aquifers are a reliable source of water for coastal regions like eastern North Carolina, and the communities in those regions rely on them for industry and agriculture. However, aquifers may not have the same level of confinement everywhere, especially under the streams that have vertically cut the confining layer or where the confining layer is thin or even missing. It is also noteworthy that this region is experiencing storms of higher frequency and magnitude recently, causing more frequent and longer floods that could deteriorate groundwater quality allowing surface water infiltration into semiconfined aquifers. We've been monitoring groundwater levels and barometric pressure within Robeson County since December 2017 using a network of 13 monitoring wells and data collected from 13 state monitoring wells up to April 2022, which are all connected to the Black Creek Aquifer. Using the measurements recorded from the wells, we calculated the barometric efficiency of the aquifer for the whole timeframe with emphasis on three hurricanes that occurred during our timeframe (Florence, Michael, and Dorian). The results were then compared to the conditions found on normal days.

24 - **Geology of Eastern North Carolina**

Annika Hanson, *Geology & Geography*

Mentor: **Amy Gross**

Abstract:

Requirements for Geology of Eastern NC, 1 credit special topics course, included learning about the Geology of the Piedmont Physiographic Province. Many locations in the Piedmont showcase rocks that tell the Geologic story of eastern NC. Pilot Mountain contains metamorphosed beach sands from an ancient ocean that existed between Gondwana and Laurentia, which was a passive margin at the time, 620 Ma. That same quartzite is found at Hanging Rock. Both locations are part of the Sauratown Mountains. During the Taconic Orogeny, a continental fragment that had likely broken off Gondwana accretes onto Laurentia, forming the Carolina Terrane (within the Piedmont). Our field trips focused on the Carolina Terrane. Around 500Ma subduction zones appear on either side of the ancient Iapetus Ocean. Island arc volcanism occurs along eastern Laurentia. This produced bimodal volcanism (typical of island arcs), which can be seen in the meta-rhyodacite dome and basalt/gabbro boulders at Morrow Mountain State Park in the Uwharrie National Forest. Raven Rock State Park also has the same quartzite, with gneiss and schist that were metamorphosed mud and silt.

25 - **United States Swine Farms At-Risk from Feral Hogs as Vectors of African Swine Fever if Outbreak Occurs**

Cassandra Helms, *Biology*

Mentor: **Dennis Edgell**

Abstract:

Feral hogs are an invasive species predominating the southern United States that cost millions of dollars annually in damages to agriculture. Their presence has the potential to become even more costly should an outbreak of the deadly viral disease known as African Swine Fever occur in the US. African Swine Fever (ASF) was first recorded in 1921 in Kenya and has slowly in the decades since began its spread to become a worldwide epidemic affecting both domestic pigs (*Sus domesticus*) and closely related species such as Eurasian Wild Boar and Warthogs. This is no different for the feral hogs that roam North America, where the potential for these feral hogs to become vectors of ASF could have huge and disastrous implications to the swine industry as a whole if an outbreak were to occur. ASF has no vaccine or treatment available, with the only available solution to cull individual animals or whole operations that come into contact with it. This presentation seeks to provide a review of the current literature on AFS, and assessment of abatement strategies. Included in this analysis is an assessment of the geographic areas that would be hit the hardest by an outbreak.

26 - **Bias in the Classroom Survey**

Ronald Henderson, *Psychology*

Mentor: **Brian Smith**

Abstract:

This project examines whether there are political, personality, and cognitive factors associated with perceptions of bias in the classroom. Study participants are UNCP Students enrolled in PSY 1010. Participants will answer a series of questions via Qualtrics. This is linked via the SONA system, an experimental sign-up system connected with the Department of Psychology). The questions are on their political beliefs, perceptions of bias in the classroom, and other psychological factors.

27 - **Food Insecurity Among UNCP Students**

Jenna Humble, *Sociology & Criminal Justice*

Aaliyah Valdez, *Sociology & Criminal Justice*

Christopher Green, *Sociology & Criminal Justice*

Ashlynn Cox, *Sociology & Criminal Justice*

Chiara Coppin, *Sociology & Criminal Justice*

Mentor: **Brooke Kelly**

Abstract:

Food insecurity is a prevalent issue in our society. College students may not have the funds to afford excellent and healthy food and may be forced to skip meals or eat all processed foods to survive. Additionally, in rural, low-income communities, some individuals may need extra assistance from their community to fight food insecurity. At UNCP, the CARE Resource Center provides materials such as cleaning supplies, fresh food, canned food, etc., that are collected by those in need, both students and community members. Students of a Sociology of Poverty course surveyed students on campus to better understand the need for the CARE Resource Center, and additionally make students more aware of its existence. These surveys include the USDA measure of food insecurity.

28 - **The Propagation and Optimization of Bacillus Thuringensis**

Anyla Hunt, *Chemistry & Physics*

Mentor: **Leonard Holmes**

Abstract:

This project is focused on growing Bacillus Thuringensis and cause the Bacillus Thuringensis to produce spores. We use Lb agar and LB broth. We are going to change the pH to see how fast spores can be produced and Bacillus Thuringensis will grow.

29 - **The Interdisciplinary Effects of the Humanities and Creative Arts through the lens of Hamilton**

Aria Huntley, *History*

Mentor: **Misti Harper**

Abstract:

For some students, studying history can be a mundane and tiresome experience that leaves them wondering why they should care about history. However, through the lens of a Broadway musical, students can experience a new level of understanding. As someone who enjoys interdisciplinary learning, I would like to know if including creative arts could be an asset for history teachers. Studies have shown that adding music to the classroom can aid students in grasping information better. Based on my research, the musical Hamilton opened new creative doors for history teachers to utilize this unique art form in their classes. I found that high school students better understood the American Revolution after they watched 'Hamilton.' Given that this groundbreaking musical is rooted in academic historical research, it shows that new ideas can help open the mind of students nationwide.

30 - Understanding Connections Between Diets of Honeydew Insects and Fire Ants in Longleaf Pine Savannas of North Carolina

Hunter Ivey, *Biology*

Mentor: **Lisa Kelly, Kaitlin Campbell**

Abstract:

Fire ant (*Solenopsis invicta*) diets consist of many different foods, including sugary plant juices obtained from honeydew insects, facilitating rapid colony growth and possibly invasion of new sites. Longleaf pine savannas are areas of conservation concern in the coastal region of North Carolina. Our previous work in 2017 indicated fire ant invasion, and ryegrass (*Lolium* spp.) was a significant component of fire ant diets, despite ryegrass not appearing in these sites. We hypothesized that mutualistic relationships between fire ants and honeydew insects are allowing fire ants to access ryegrass. We used ITS2 and *rbcLa* DNA barcodes to compare plant diets of fire ants collected in 2017 with plant diets of honeydew insects collected in 2021. The ITS2 showed ryegrass in the diets of both honeydew insects and fire ants, while the *rbcLa* showed no ryegrass in the diets of either. We plan to use Sanger and next-generation sequencing to compare the diets of honeydew insects and fire ants collected during the summer of 2022 to determine if there is a strong connection between their diets.

31 - Impact of Presenting at the Entomological Society of America Annual Conference November 2022

Hunter Ivey, *Biology*

Mentor: **Lisa Kelly, Kaitlin Campbell**

Abstract:

In November 2022, I traveled to the Entomological Society of America's annual conference, which was held in Vancouver, BC. I presented my research entitled "Understanding Connections Between Diets of Honeydew Insects and Fire Ants in Longleaf Pine Savannas of North Carolina". Presenting at this conference allowed me to make connections with undergraduates and graduate peers from all across the continent. I was able to

practice my presentation skills, show my research to others, and receive feedback from my peers on the methods we used. Outside of presenting, I was able to see the work others are doing in the field of entomology, allowing me to better understand what research in the field is like.

32 - Impact of Attending and Presenting at the Association of Southeastern Biologists annual conference in March 2023

Hunter Ivey, *Biology*

Mentor: **Lisa Kelly, Kaitlin Campbell**

Abstract:

In March of 2023, I attended the Association of Southeastern Biologists annual conference in Winston-Salem, NC. While there, I presented my research entitled "Understanding Connections Between Diets of Honeydew Insects and Fire Ants in Longleaf Pine Savannas of North Carolina". I was able to see a much wider range of research, and meet people who research much more varied topics. This let me see all the different fields of research that biology has to offer and allowed me to connect with peers that are doing work in fields that I may want to pursue a career in.

33 - **Kids Behind Bars**

Leisha Jackson, *Sociology & Criminal Justice*

Mentor: **Renee Lamphere**

Abstract:

This poster looks at the different ethical perspectives of charging juveniles as adults. The poster also gives a little background on cases that have been ruled in the Supreme Court. The poster describes the brain function of a juvenile to set the tone for the rest of the poster. It then goes into looking at juveniles being charged as adults/being in adult facilities from a utilitarian and deontological point of view.

34 - **The Queen Mothers Ikegobo: A Symbol for the Achievements Expected of Benin's Royal Women.**

Brennan Jenkins, *Art*

Mentor: **Beata Niedzialkowska**

Abstract:

The altars of the hand, or ikegobo, are one of the many ritual objects that begin to appear in the Kingdom of Benin's royal court during the 18th century. Since the reign of Akenzua I these objects, which were usually made of wood, was now produced in brass for the kings and queen mothers of Benin. Each altar is filled with symbolism that legitimizes its patron's own dominance and power. However, out of the handful that survives the majority are dedicated to Queen Mothers, not the Kings. In a patriarchal society where the Queen Mother is the only woman allowed to possess such an object, what are the requirements of possession? The Queen mother's altar, like all Queen Mother ikegobo, lack the aggressive symbolism characteristic of the altars made for the king and his chiefs. My project analyzes how the altar of the hand produced for the Queen Mother was designed to celebrate her achievement as a mother who gave birth to the king and her role as a supportive agent during the 18th-century intensification of ritualized kingship.

35 - **Stigma, stressors, and silence: the mental health of police officers**

Hunter Levy, *Sociology & Criminal Justice*

Mentor: **Tracy Vargas**

Abstract:

Few studies have examined the mental health of police officers. By surveying 18 police officers, this pilot study offered deeper insight into the stresses they experience both on and off the job, lack of public awareness of their mental health needs, and their under utilization of departmental mental health services. Implications for future research, community partnerships, and mental health programming in police departments will be discussed.

36 - Strategies for School Social Workers to Improve Attendance Rates

Erika Locklear, *Social Work*

Mary Smith, *Social Work*

Mentor: **Alice Kay Locklear**

Abstract:

There is a high rate of truancy among students in Robeson County. Truancy leads to poor academic performance, decreased engagement with school, poor social-emotional skill development, increased risk of dropping out of school and decreased lifetime earning potential. The purpose of this literature review is to analyze the current literature to find the best interventions for school social workers to utilize to decrease the truancy rate among students in Robeson County. To do this, the authors reviewed eleven peer-reviewed articles found using Academic Search Ultimate. All articles utilized were published within the past five years. Three key interventions were uncovered in reviewing the current literature on improving truancy rates: implementation of attendance report cards, implementation of the Perfect Attendance Wins Stuff (PAWS) program, and involving community member in encouraging school attendance.

Keywords: Truancy, Attendance, Absenteeism

37 - Plants in Space: Developing assays to test effects of microgravity on *Arabidopsis thaliana*

Kyra Locklear, *Biology*

Sophia Hammett, *Biology*

Mentor: **Seth O'Conner**

Abstract:

As interest in space flight and potential colonization grows, efforts are being made to explore the genetic mechanisms of plant growth in space. Without sending a plant to space, a clinostat can be used to simulate microgravity by slowly rotating plants. Using an AC motor rotating at 3 rpm and a continuous servo motor connected to an Arduino UNO board, tests were run using *Arabidopsis thaliana* (*A. thaliana*) seeds plated on an agar plate. To explore genetic influences on spaceflight, data from RNA-seq experiments on *A. thaliana* root tip growth of plants grown on the international space station was analyzed to identify genes with altered expression in microgravity. One such gene was AGP24. Further analyses showed that AGP24 appears to be an orphan gene and while it is robustly expressed, there is no evidence it is translated into a protein. To determine if AGP24 is involved in microgravity response, guide RNAs were designed to target AGP24 using CRISPR-CAS9. In summation, this work approaches microgravity research in three ways: technologically, by creating two clinostats, bioinformatically, by analyzing RNAseq data, and molecularly by designing CRISPR guides for future cloning.

38 - A New Blood Test for Acetaminophen

James Locklear, *Chemistry & Physics*

Mentor: **Paul Flowers**

Abstract:

Acetaminophen is a pain-relieving drug used as an active ingredient in hundreds of prescription and nonprescription medications. Though safe when taken as directed, exceeding the recommended dosage of acetaminophen can have serious health consequences that include severe liver damage and subsequent fatal multiple organ failures. Clinical diagnosis of an acetaminophen overdose requires the measurement of the drug

concentration in a patient's blood, and so the availability of efficacious lab tests ("assays") for this purpose is essential to successful patient management. We are developing an assay for acetaminophen in human serum and plasma that relies on measuring the change in ultraviolet light absorption that occurs when a sample is subjected to electrolysis. This measurement strategy is called spectroelectrochemistry (SEC) and, compared to other assays, it may provide advantages in both cost and time. Results of our experimental studies indicate the SEC assay can reliably measure serum acetaminophen at toxic levels without the need for costly chemical reagents and with analysis times of approximately five minutes per sample.

39 - A Study of Quantum Cryptography Using the BB84 Protocol

Caleb Locklear, *Chemistry & Physics*

Kendrick Oxendine, *Chemistry & Physics*

Billy Pait, *Chemistry & Physics*

Edward Jeffries, *Chemistry & Physics*

Mentor: **Quinton Rice**

Abstract:

To study quantum cryptography, a pseudo-quantum system, $g_2(0) = 1$, was used to employ the BB84 protocol, which combines the quantum key distribution method with the one-time pad encryption method. A laser diode emits polarized photon pulses which can be represented by 2×1 matrices which are treated as transmitted bits. Because of the inherent randomness of polarized photons through a polarizing beam splitter, any intermediate detection and attempted re-transmission of bits by a third party can immediately be detected. For one intercepted transmission of a 20-bit key and 52-bit message, an error rate of 45% was observed. Over longer transmissions, the theory shows that an approximate error rate of 25% will occur, alerting the sender and receiver that an eavesdropper is present.

40 - Just Pray About It: Religious Attitudes Towards Mental Health

Isabella Locklear, *Psychology*

Ashlyn Anderson, *Psychology*

Mentor: **Shilpa Regan**

Abstract:

The hypothesis that greater religiosity was related to higher mental health stigma was not found. While we had a strongly religious sample, they engaged in lower levels of mental health stigma and did not tend to conceal mental health problems.

41 - Mapping of the Lumber River in Robeson County

Lillian Matthews, *Geology & Geography*

Mentor: **Nathan Phillippi**

Abstract:

The scope of this research was to accurately portray the Lumber River through the cartography software, ArcGIS Pro and to describe the process of creating river maps. The available data and maps prior to this research were lacking detail and were simple outlines of the river. This research intends to provide the public with a detailed scope of the Lumber River. Data was obtained from U.S. Geological Survey (USGS), the USDA, Natural Earth, the U.S. Census Bureau and local documents.

42 - **Temporal Abundance of Eastern Box Turtle Predators**

Catarina Mauldin, *Biology*

Mentor: **John Roe**

Abstract:

The Eastern Box Turtle is North Carolina's only terrestrial turtle, but their populations are in decline. To better manage the Eastern Box Turtle and understand why, it is important to know what predators are in the turtles' habitat and how abundant those predators are to determine the turtles' risk of being depredated. We sampled mammal predator communities at two sites, the Lumber River State Park and Weymouth Woods Nature Preserve. Concurrent research has shown that turtles from Weymouth had a 5% higher mortality. The goal of this project was to determine if there was an overlap between predator and box turtle activities. To determine predator abundance, we set camera traps at 48 randomly chosen points for at least three weeks from January – December. We identified and recorded species individuals monthly. Turtles were followed using radio telemetry, and were active on the surface from April – November, with movement rates peaking in summer. We made 517 predator sightings, with most images of raccoons, followed by coyotes, opossums, grey foxes, feral dogs, bobcats, feral cats, black bears, and red foxes. There were no apparent temporal trends in overall predator numbers.

43 - **The Ongoing Battle of Silenced Voices**

Lizzy Acosta, *English Theatre & Foreign Languages*

Madelyn Benton, *English Theatre & Foreign Languages*

Teresa Fernandez, *English Theatre & Foreign Languages*

Odalís Gomez, *English Theatre & Foreign Languages*

Cristina Melchor- Ortiz, *English, Theatre & World Languages*

Alexander Aguilar Ramirez, *English, Theatre & World Languages*

Ismael Soto, *English Theatre & Foreign Languages*

Fernando Carranza Toledo, *English Theatre & Foreign Languages*

Mentor: **Ana Cecilia Lara**,

Abstract:

The UNCP Acto Latino Spanish Theater group is a student organization that consists of students who have found an appreciation for theater work and the expansion it brings to the table. Acto Latino works in various plays, from humor and innocence to death and misery portraying pieces of stories that are part of the Hispanic social-political culture. In their latest works, Acto Latino decided to continue to work while understanding the context and reality behind the three plays “La maestra” and “La autopsia” both by Enrique Buenaventura and “Si oyen, lo escuchan” by Ana Cecilia Lara. After intensive research of the characters and general background of the plays, it allowed us to understand and comprehend the complex reality we were trying to portray. Upon this investigation we realized the commitment we had to continue with the work that we are doing here at UNC Pembroke. With the opportunity to travel, students in Acto Latino participated in workshops directed by Carlos Bernal in Spain. He has over 50 years of experience in theater, is a renowned director from Colombia who has worked worldwide with young actors and actresses.

44 - Sexualization of Women in Slasher Films

Kei'Ana Mims, *Psychology*

Mentor: **Brooke Kelly**

Abstract:

The “Final girl” archetype is a well known horror movie trope. It refers to the female survivor in slasher films. It’s a well know idea. Against all odds, the young girl faces off with a killer and makes it out alive. But what about all of the other girls in horror films? What role do they play? That’s the question I was hoping to answer when I decided to research slasher films. In watching these movies I found a few consistent patterns throughout. When looking at the main characters across 10** different films, the main characters were female between 42 and 57%** of the time. They were victims between 27.8 and 30.6%** of the time. The percentages are a range because of how I defined a main character when I watched a movie. When analyzing the killer, I found that the killer was a female 50%** of the time. However, the motives of male killers and the motives of female killers followed different patterns. Women’s motives were revenge based and depending on emotion, which is a very common stereotype of women. They usually targeted people that did something to them personally. Male motives were usually tied to something that was nobody’s fault or something the victims had nothing to do with. If it was revenge based, it was usually an unreasonable response to whatever upset them in the first place. They targeted people who were more indirectly involved (if involved at all) while females targeted people directly involved in hurting them. A majority of the movies also followed the final girl type, and I found a pattern there as well. Final girls were usually “different” than the other victims. They were “innocent and sweet,” or they were remorseful about whatever led to the killer snapping in the first place. I found that the idea of purity and morality is deeply woven into the trope of the “final girl.”

45 - Potential promises and limitations of conservation volunteering in Southeast North Carolina

Tessa Newson, *Sociology & Criminal Justice*

Mentor: **Matthew Schneider**

Abstract:

What motivates people to become and stay involved in environmental volunteering and activism? How do they understand (or misunderstand) the environmental problems to which they are responding? There are many potential avenues through which environmental activism/volunteering could become appealing and through which their commitment might be sustained. Additionally, because any given local environmental issue requires understanding of not only ecology or environmental science, but also the social, cultural, and economic systems that shape our use of and impact on “nature,” assessing volunteer knowledge and interest could paint a complicated picture of environmental activists’ and volunteers’ logics, (mis)understandings, and values.

46 - Gender and Advertising of Men and Women

Daniel Owusu, *Sociology & Criminal Justice*

Mentor: **Brooke Kelly**

Abstract:

While the advertisement promotes goods and services to people, it is one of the socialization agents that reinforce gender, which is a social construct connected to the societal depiction of expected attitudes, behaviors, and personality. Much of advertising defines what a man or woman is and defines men’s and woman’s consumption behavior. This research investigated how advertising depicts the stereotypical gender role in our society, especially concerning their consumption behavior (e.g., the products men buy most). I used content analysis by observing television/magazine advertisements to investigate my purpose. In the study, some

commercials did depict men and women in a certain way and defined their consumption behavior. For gender depiction, there were some commercials of women as homemakers. Some commercials showed women breaking career gender stereotypes. Men's consumption patterns include buying big trucks, fast cars, bodybuilding and fitness equipment, sports apparel, and sex-enhancing drugs. Women's television networks

showed women's consumption of beauty products, designer clothing, and shoes. My findings indicate that advertisements still reinforce gender stereotypes.

47 - Navigating Through *D. kakkawai* 's Genome with a Fresh Undergraduate Perspective

Rosa Parker, *Biology*

Mentor: **Maria Pereira, Seth O'Conner**

Abstract:

The genome annotation process is based on identifying elements, such as protein coding regions, within a genome to determine overall gene structure. Here, we begin the annotation of Contig 4 of the fourth chromosome (F element) of *Drosophila kakkawai*. The F element is unique in that its size would suggest a low gene number and activity, yet it is an active region. This chromosome has not yet been thoroughly explored by scientists, so the gene content of the region is unknown. *Drosophila melanogaster*, a closely related species to *D. kakkawai*, is a model organism used in the UCSC genome browser that is well known for its easy accessibility to genetic material and previously conducted research. The browser contains helpful tools such as RNA sequence read coverage, (transcribed regions), cDNAs and TSS annotations (used to identify transcription initiation). By utilizing the information learned in the Genome Education Partnership introductory modules, annotation of Contig 4 of *Drosophila kakkawai* is expected to be completed by the end of 2023. The annotations made will provide the groundwork to understanding unique F elements in non-model fly species.

48 - Claude Cahun, A Triple Exposure

Bethani Paul, *Art*

Mentor: **Beata Niedzialkowska**

Abstract:

Claude Cahun, born Lucy Schwob, is a largely unknown artist utilizing many media: such as photography, writing, and acting. Mostly obscured by scholarship, modern writers and scholars have singularly focused on her photography under the topics of feminism and gender. Cahun's writing and acting work maintain the same level of artistic skill and creative distinction as her photography, yet few give emphasis to her work outside of photography. Similarly, Cahun's artwork unifies infinite themes and interpretations, yet the focus of gender and feminism remains most popular. Claude Cahun's work exudes a fascinating essence and heart that modern audiences will enjoy, so more display and presentation of the full plethora of her work will encourage more diverse discussion around artists and their art.

49 - What Happened to Eliza: Exploring Enslaved Women's Experiences in Southeastern North Carolina

Santevia Reaves, *History*

Mentor: **Jaime Martinez**

Abstract:

The purpose of this project was to examine enslaved women experiences in North Carolina with a focus on the Southeastern region and how they cultivated family, created networks, while simultaneously living with the

burdens of racism and sexism. But more importantly, focusing how they sought to define womanhood in the midst of all of this.

50 - How do invasive ants interact and impact ant communities within the longleaf pine savannas of North Carolina?

Erika Rivera, *Biology*

Mentor: **Kaitlin Campbell, Lisa Kelly**

Abstract:

The fire-managed longleaf pine savanna ecosystems of North Carolina are highly biodiverse and provide optimal habitats for many species. Colonization by invasive species of ant, like the red imported fire ant (RIFA), may have a great impact on biodiversity. The goal of the study was to survey fire ant nests and ant biodiversity to identify changes in nest density, richness, and abundance over time. Fire ant nest density surveys were conducted along belt transects in 2014, 2017, and 2022 in three longleaf pine savannas. Pitfall traps were used to measure the abundance and richness of ants along the transects in 2017 and 2022. In 2017, Our findings indicated a positive relationship between fire ants and species richness and abundance of native ants. This was the opposite of our initial predictions, as RIFA is known to outcompete native species and cause harm to ecosystems. This suggests that the ant fauna may be responding similarly to environmental cues. The results of 2022 show decreased nest density from 2017 levels and increased ant abundance across all three sites. It is paramount to understand the impact of invasive ants in order to mitigate any negative environmental effects.

51 - A New Method for Rapidly Measuring Caffeine Content in Beverages

Trey Rogitz, *Chemistry & Physics*

Mentor: **Paul Flowers**

Abstract:

Caffeine is present in many consumer products including beverages and certain nonprescription pain relievers. Considering its prevalence and its action as a central nervous system stimulant, lab tests that can reliably and easily detect and quantify caffeine in consumer products are necessary for the safe regulation of this substance. Our laboratory has been developing a rapid method for quantifying caffeine that uses of an Atmospheric Solids Analysis Probe (ASAP) in conjunction with atmospheric pressure chemical ionization (APCI) mass spectrometry (MS). This ASAP-ACPI-MS technique has been widely used for identifying sample components, but its use for measuring the amounts of sample components has been limited due to inherent imprecisions in the measurement process. To compensate for this imprecision, we are adding acetaminophen to each sample analyzed and using its signal to normalize the caffeine signal (a measurement strategy known as internal standard calibration). In this poster, results for both normal and internal standard calibration and the analysis of several common beverages will be presented, and plans for future work aimed at validating our method will be described.

52 - In silico analysis of the Hexokinase III (HK3) gene in pulmonary fibrosis

Nevaeh Roverato, *Biology*

Mentor: **Silvia Smith**

Abstract:

Lung fibrosis is a condition where the lungs develop irreversible scarring, which, if left untreated, can lead to death within a few years. The pathophysiology of lung fibrosis involves intricate molecular pathways and is

likely genetically determined. Our research involved analyzing the whole exome sequences of 750 lung fibrosis patients and unaffected controls to identify several genes containing potentially pathogenic variants, some of which were novel. In this study, we focused on the role of Hexokinase III (HK3), a novel gene, in pulmonary fibrosis. HK3 gene is broadly expressed in the body, and it has an established role in cellular glucose metabolism. We used Ingenuity Pathway Analysis (IPA)® to conduct an in-silico analysis of the role of this gene in the pathway of lung fibrosis. We found that HK3 has a role in glucose metabolism, which is aberrant in alveolar epithelial cells in IPF, and it can promote fibrosis by inducing myofibroblast differentiation via the TGF- β pathway. Moreover, HK3 may be implicated in the molecular relationships that are part of the IPF that also lead to lung cancer, which is known to occur more commonly in people who have IPF.

53 - **In silico analysis of the Hexokinase III (HK3) gene in pulmonary fibrosis.**

Nevaeh Roverato, *Biology*

Mentor: **Silvia Smith**

Abstract:

Between April 12th and 16th, 2023, I traveled to Eau-Clarie, Wisconsin to participate in the National Conference of Undergraduate Research (NCUR) and present my project titled "In silico analysis of the Hexokinase III (HK3) gene in pulmonary fibrosis", which was the second phase of my Research Initiative for Scientific Enhancement (RISE) project initiated in the spring of 2022. Attending the event allowed me to witness a diverse range of undergraduate research and creative projects, which broadened my research horizons and improved my presentation skills. As one of the largest undergraduate conferences in the United States, NCUR allowed me to engage with experts in my field and explore the research being conducted at other institutions.

54 - **The Combined Use of Fine Needle Aspiration and Wilm's tumor 1 as a Specific Cell Marker to determine the size of the Sertoli cell population in Prepubertal Beef Bulls**

Kennedy Rucker, *Biology*

Mentor: **Nicolas-Negrin Pereira**

Abstract:

Daily sperm production in the bull is determined by the size of the Sertoli cell (SC) population established in the testis. At puberty, SC stop replicating fixing the ceiling of sperm production. Fine needle aspiration (FNA) is a low invasive technique used for diagnostic purposes. We hypothesized that the combined use of FNA and a specific SC cell marker with immunofluorescence will allow us to determine the size of the SC population in the prepubertal testis. We compared three techniques: FNA, Reciprocating Procedure Device, and conventional tissue sections stained with Wilm's tumor 1 (WT1). Testicular tissue was collected from ten Angus bulls and data analyzed using Pearson's correlations in SAS. We found no significant correlations ($r = .48$; $p > 0.19$) between techniques for SC density. The potential use of low invasive techniques as selection tools in replacement bulls warrants further experiments.

55 - **Hickory Log: The Anomaly of the Cherokee Nation**

De'Maurion Shelley, *History*

Mentor: **Jamie Mize**

Abstract:

In 1824, the Cherokee Nation decided to conduct a national census, the results of which were published in 1828. In reviewing the data, one district stands out among the rest: Hickory Log. Hickory Log seems to turn

against all of the typical trends. Despite its proximity to the Federal Road and the high numbers of white spouses, Hickory lagged behind the Nation's other districts. This project aims to explain why this was and what changed by the mid-1830s.

56 - From Concrete to Creeks: The Effect of Urbanization on Peak Streamflow

Rajwardhan Shinde, *Mathematics & Computer Science*

Devin Hedgecock, *Geology & Geography*

Mentor: **Madan Maharjan**

Abstract:

In recent decades, urbanization has been the main driver of land-use change, significantly impacting the hydrological cycle and increasing the risk of flooding in various regions. This study examined the effects of urbanization on peak streamflow in North Carolina, using data from USGS gaging stations, the National Land Cover Database, and weather stations. Through our research, a strong correlation was found between urbanization levels and peak streamflow values, with higher peak streamflow observed in areas featuring more impervious surfaces. This highlights the potential flood risks in urban areas due to alterations in the hydrological cycle caused by urbanization. These findings are important for policymakers, urban planners, and water resource managers, as they work to manage and protect North Carolina's water resources in the face of rapid urban growth. Overall, this study offers valuable insights into the complex relationship between urbanization and hydrological processes in North Carolina, and its implications for water resource management in urban settings.

57 - Identifying Perceived Body Image and Self Esteem Trends in College Gym-Goers

Tiffany Smaw, *Sociology & Criminal Justice*

Mentor: **Abigail Reiter**

Abstract:

This study analyzes students at the University of North Carolina at Pembroke who go to the gym and identify within gym culture and their relationship to body image, self-esteem, and the usage of social media. To conduct this study, focus-group interviews were given in the fall semester of 2022 and Spring semester of 2023 at UNCP. Each participant utilized pseudonyms to keep their identity private, consent forms to make sure each individual was comfortable, and in agreement of maintaining confidentiality. A demographics sheet was also given out prior to interviews to collect race, gender, age, classification, social class, and sexual orientation. Diversity of demographics will help identify trends among gym-goers in their respective identities. The interviews were audio-recorded and are in the process of being transcribed for data collection before April 2023. The scientific goals of this research are to find a connectedness of the gym and an individual's perception of themselves. After completion of data collection, a research report will be released to compare my data with other relevant studies done in recent years.

58 - CRISPR-cas9 cis-editing in *Arabidopsis thaliana*

Alexis Strickland, *Biology*

Mentor: **Timothy Anderson**

Abstract:

Plants that senesce earlier can be taken out of the field faster and minimize vulnerability to disease and extreme weather. Clustered Regulatory Interspaced Short Palindromic Repeats (CRISPR) Cas systems are used to introduce precise genome modifications in model organisms. In this study, the model flowering plant

Arabidopsis thaliana is used to study the SENESCENCE ASSOCIATED UBIQUITIN E3 LIGASE1 (SaulI) gene. SaulI is responsible for plant senescence and has only been studied using gene knockout experiments. The problem with gene knockouts is that when used, knockouts cause the plant to germinate but will die prematurely due to early senescence. To avoid the negative consequences of a SaulI gene knockout, cis-editing of the promoter region targeting transcription factor binding sites allows for the investigation of differing transcription levels of the SaulI gene and the impact on early senescence. Alteration of upstream regulatory regions of SaulI is hypothesized to cause early senescence to *A. thaliana*. Three transcription factor binding sites have been identified for disruption and gRNA's have been designed and cloned into a CRISPR Cas9 gene editing vector.

59 - Investigating The Effects of Elderflower on Parkinson's Disease in *C. elegans*

Jacqueline Swann, *Biology*

Mentor: **Courtney Alexander**

Abstract:

Parkinson's disease is a neurodegenerative disease that causes a multitude of side effects. Some of which are tremors, partial paralysis, cognitive disabilities and more. In an effort to find ways to aid in the reduction of side effects, *C. elegans* are being used for research in this field. For this research study, the worms used to display Parkinson's were DDP1 and JVR-406. They both display different side effects, one being paralysis, and the other tremors. To prevent the side effects, or improve life span, the worms were placed on plates mixed with elderflower and checked daily for signs of improvement. To measure the improvement the worm's neurons were imaged to see if the elderflower affected the growth of alpha-synuclein aggregates on the neurons and the aggregates quantified. Finally, to understand the molecular mechanism, we are performing RNA-sequencing on worms with or without elderflower treatment. Together, our work shows that this plant may provide a remedy for patients suffering from Parkinson's disease.

60 - How Job Status Affects Moral Development and Ethical Leadership

Sean Thomas, *Business*

Mentor: **Si Ahn Mehng**

Abstract:

This research project explores the relationship between ethical leadership and employees' job behaviors. Job status (i.e., leader vs. follower) is the modifier of this relationship. Ethical leadership is crucial for creating an effective organizational culture. A positive organizational culture based on ethical leadership positively affects employees' job behaviors, such as low turnover intention, high job satisfaction, low stress, high engagement, and ethical behaviors. It is beneficial to find out how job status strengthens or weakens this relationship. Individuals with different job statuses may have different perspectives on implementing ethical principles. The result of this research study could lead to more effective leadership and productivity from employees.

61 - Rabbit Tobacco Improves Short-Term Memory in *C. elegans*

Limari Vasquez, *Biology*

Mentor: **Courtney Alexander**

Abstract:

This year I was able to conduct a behavioral study involving *C. elegans* in which I measure these organisms' short-term memory and chemosensation abilities. My research question was "How will rabbit tobacco affect short-term memory?". Rabbit tobacco is a traditional medicinal plant of the Lumbee Indian tribe of North

Carolina. It has a long and varied history, and we wanted to see if it could improve short-term memory in our model system, nematodes. In nematodes, chemosensation is often used to test memory. Nematodes have several neurons devoted to chemosensing and can be conditioned easily with food. We used a standard short-term memory protocol. I was able to test memory by conditioning the *C. elegans* to associate the smell of Butanone with food when performing a chemotaxis assay. After a series of trials, and once the *C. elegans* are able to associate the smell of Butanone with food, I am then able to move onto the next step of my experimental study, in which would now involve introducing rabbit tobacco. Half of my *C. elegans* would be preconditioned with the smell of Butanone, the other half preconditioned with rabbit tobacco.

62 - Caveman or Captain; The Prevailing Winds and the Paths of the Taino

Tashiana Ventura, *Geology & Geography*

Mentor: **Dennis Edgell**

Abstract:

New geographical and archeological research provides evidence that ancient peoples were much better seafarers than for which they had previously been given credit. There is evidence that “primitive” peoples around the world have crossed vast oceans, leaving a mark on cultural landscapes. This project is intended to portray a relationship between the movement of iron age people inhabiting the Caribbean islands in pre-Columbian America and the prevailing winds and currents. Over 2500 years ago the Taino, an Arawakan people, migrated from South America using the North Equatorial, Antilles, and Caribbean Currents. The strong and persistent trade winds create the eastern flowing currents of the Atlantic Ocean and Caribbean Sea. Predetermined paths in global currents are generated by the prevailing winds. The Atlantic wind and current may have assisted ancient contact between the Taino and areas of the Old World. A comparison of the Mediterranean and Caribbean Seas artifacts are showcased to highlight the relevance of the ancient nautical capabilities. The various nautical vessels are described, as well as the Taino cultural adaptations to the Caribbean winds and currents is presented.

63 - The Impact of Discrimination on Climate Change

Tashiana Ventura, *Geology & Geography*

Mentor: **Serina Cinnamon**

Abstract:

Continuous carbon recording began in 1958, however evidence of rising levels have been occurring since before the industrial revolution. The research presented depicts human activity closely related with discrimination and race constructs as a catalyst of the current climate crisis. Through comparison of nearly six hundred years of evolving discrimination in congruence with resource depletion of ecosystem services there is an undeniable connection. In the past, emphasis was placed on nationality or religion as the discriminatory factor before race constructs. The Reconquista ended the Moors rule in the Iberian Peninsula and began the start of contemporary discrimination and resource degradation. In the same year Grenada was recaptured by Spain, Christopher Columbus set sail to the Americas decimating native populations and ecosystems. Colonization continued to spread, and climate change would begin gripping the world. Rising carbon dioxide levels would continue to be worsened by the industrial revolution and sustained with the introduction of single use material. In the global effort to combat climate change, contemporary environmentalism still suffers from discrimination.

64 - What's in the Classrooms?: Perspectives of Critical Race Theory in Social Studies Education

Brennan Walker, *History*

Mentor: **Joseph Sweet**

Abstract:

Given the controversy surrounding Critical Race Theory (CRT) in current political discourse, the ways that CRT is being used as a tool for polarization in educational settings, and the common misconceptions regarding its origins and definition, this presentation explores the current climate of CRT in secondary Social Studies classrooms and presents ways that teachers and students are conquering the conflict regarding CRT. Scholarly literature in the field of CRT provides six overarching tenets: racism as normal, interest convergence, social construction, differential racialization, intersectionality, and unique voices of color. However, this study focuses on "Interest Convergence" and "Racism as Normal" as the guiding definition for CRT in secondary Social Studies education. Regarding Interest Convergence, Cabrera (2018) argues, "People of Color will only be advanced to the extent that they also advance White interest." Further, he posits, "Racism is a structured part of everyday life in the U.S." The increasing diversity of school-aged children in the U.S. coupled with a large majority White teaching force speaks to the urgency of this study.

65 - Retesting Histo-Clear Use on Sticky Traps Prior to DNA Amplification

Sierra Wright, *Biology*

Mentor: **Lisa Kelly, Kaitlin Campbell**

Abstract:

To investigate the plant diets of honeydew insects, we are analyzing their consumed DNA. When collecting insects with sticky traps, the surfaces of specimens can be covered in adhesive and DNA from surrounding plants. Solvents used to free trapped insects, plus any residual glue, may possibly interfere with downstream DNA work. Decontamination and safe insect removal are required to avoid these problems. The goal of this study is to standardize our practice as there are several ways to decontaminate and remove trapped insects. We tested two batches of honeydew insects collected by hand from the same plants. Some insects were placed on a sticky trap, while control insects were stored in ethanol. Sections of sticky traps containing insects were soaked in Histo-Clear to remove the glue. We used 4% bleach to decontaminate insect surfaces. DNA was extracted and amplified with ITS2 primers, and gel electrophoresis was used to visualize DNA. Amplicons were sent to a commercial lab in 2022 for Sanger sequencing. The gel and Sanger results were inconclusive so we are repeating DNA work. This study is important for its application as a part of standardizing sample preparation methods.

66 - Potentiometric changes in Robeson County through 2021

Grayson Cecil, *Geology & Geography*

Mentor: **Madan Maharjan**

Abstract:

Throughout the calendar year, the groundwater elevation or potentiometric levels in any given area varies depending on environmental and human conditions such as precipitation, groundwater usage, geomorphology, and recharge rates. I present the changes in potentiometric levels within Robeson County from January 2021 – December 2021. I collected water level data for this project from the RCGM (Robeson County Groundwater Monitoring) project wells and the state and national groundwater network wells. Understanding and identifying trends in groundwater levels is especially important for Robeson County since groundwater remains the primary source of drinking water for the county. The trends displayed in my groundwater animation could allow local administrators to facilitate local groundwater usage policy to better preserve aquifers and prevent water shortages from the overuse of groundwater.

Exhibits

- **Printmaking: Skully Cat**

Brittany Edwards, Art

Mentor: **Brandon Sanderson**

Abstract:

Skully cat is a Relief Printmaking technique done on a wood block. My inspiration was the artist Jose Guadalupe Posada. Relief printmaking is the oldest of printmaking techniques. In this presentation I will demonstrate the basics of the woodblock cutting and printing techniques and discuss the results of my own investigation into the process.

- **Floriography to Human Relations Portrayed in Etchings**

Aly Horn, Art

Mentor: **Brandon Sanderson**

Abstract:

Understanding the meanings or uses of flowers and other plants has been a long-standing practice. Flowers had many social usages in Victorian times; whatever was sent to someone would change the meaning of the gift. Then in many tribal or indigenous cultures, there is a greater purpose to use herbs and other plants for medicinal purposes. Along with that, many human traits are related to flowers and anthropomorphizing them to have a stronger sense of the various meanings. Working with copper to create prints was also done long ago; this is more commonly known as engravings. The engravings would be cut and carved into the plate to create the grooves in the piece that would print, though, in the more modern world, there is a more straightforward way, etching. Since there is such a short time for this project, etching was the most convenient way to make all the pieces and still evoke the linework in engravings. The project was to gain more floriography knowledge and combine that information with a small series of copper etchings.

- **Presentation of Research at SNCURS 2023**

Aly Horn, Art

Mentor: **Brandon Sanderson**

Abstract:

In December of 2022, I attended the State of North Carolina Undergraduate Research Symposium (SNCURS) where I presented my Summer Undergraduate Research Fellowship entitled "Floriography to Human Relations Portrayed in Etchings." In doing so, I was able to share and discuss work with peoples from many fields and backgrounds. Finally, I engaged with undergraduate researchers in a wide range of disciplines.

- Research Presentation at NCUR 2023

Aly Horn, Art

Mentor: **Brandon Sanderson**

Abstract:

During April 12th to the 16th I was able to travel to Eau-Clarie in Wisconsin to participate in the National Conference of Undergraduate Research (NCUR). There the exposure to a larger scale of research and creative based undergraduate work is heavily present and gave me more experience in presenting my work. This presentation and attendance to the conference also brings positive effects back to the University of North Carolina at Pembroke and more importantly myself.

- Blender Modeling

Nairobi Lewis, Art

Mentor: **Robert Epps**

Abstract:

This exhibit will be displaying the process of using the 3D Modeling software Blender. Using a turnaround of the character, a model will be displayed translating a 2D version of a character design and how it translates into 3D and discussing the learned skills from diving into the programs interface and the changes and limitations with making a 2D design into a 3D design.

- What About my Dreams

Donique McLaurin, Art

Mentor: **Carla Rokes**

Abstract:

This diptych is dedicated to those who were never able to see their dreams come true, such as Trayvon Martin (17), Michael Brown (18), Breonna Taylor (26), Emmett Till (14), George Floyd (42), Tamir Rice (12), Fanta Bility (8 and countless others. In the infamous words of Dr. Martin Luther King Jr: 'I have a dream that my four little children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character'. As a society, 'we the people' must continue to live and fight for young black lives whose dreams were cut short. Their dreams may have ended but we must carry them forward, we must continue to fight the good fight in their names and in their honor.

- Exploring Artistic Style in Linocut

Taylor Oldham, Art

Mentor: **Brandon Sanderson**

Abstract:

This exhibit explores artistic style through the process of Linocut. In this I will be showing a Linocut I created; it depicts a skeletal hand holding a Lily of the Valley. I drew out the design on a block on linoleum. I then carved out the linoleum block and printed it out on paper.

- Painting in Puzzles

Bethani Paul, Art

Mentor: **Joseph Begnaud**

Abstract:

This piece is part of an interactive series of abstract paintings illustrating poetry in morse code. Artwork is traditionally understood as an object to observe and aesthetically appreciate in silence. However, art can easily exist to engage an audience in a task, fostering creativity and discussion. This series expresses the sharing of emotions or ideas too difficult or painful to verbalize, presenting themselves in puzzle form, and requiring the observers' effort to decipher its message.

- Visual Representations of Mushrooms Anatomically : Use and Depiction in Culture and Practice

Alana Peterson, Art

Mentor: **Brandon Sanderson**

Abstract:

Mushrooms are seen to be beneficial and harmful in many different ways. Mushrooms are seen to help many cultures in medical practices, as well as spiritual practices, especially in indigenous culture. My goal is to show how the anatomy, functions, and spores of mushrooms can display meaningful representations to indigenous culture and the environment in general. Different functions, purposes and effects of mushrooms will be shown through an artistic series of prints in my presentation. I aim to show the effects of mushrooms through symbolic representation which will be shown through artistic elements such as color, texture, and more. The use of science in art will create an impactful message that will help teach individuals about the society and culture around us. The use of various printmaking techniques will help illustrate the symbolic representations of mushrooms by providing different textural effects. A combination of these techniques as well as water color painting techniques will help emphasize the emotional and spiritual affects of mushrooms on culture rather than just focusing on physical effects. Visual representations will allow the audience to connect with the prints.

- The Process of Ceramics

Ireland Rhoads, Art

Mentor: **Jessica Dupuis**

Abstract:

Clay goes through a range of stages to reach a finished piece. My project describes the process of construction and drying. The right clay body is the first step, this will determine how many additives are in the clay and its consistency. Handbuilding is modeling the clay with your hand and using various techniques such as pinch, coil, and slab to attach clay pieces. Pottery wheel throwing is using a ball of clay and creating a form on a spinning wheel. Before, you must 'wedge' the clay which is removing air bubbles from the clay. Once constructed it is greenware, unfired clay, and it can start drying. There are four basic stages of dryness. The first is slip when the clay is in its liquid form, the second is wet when the clay is easiest to shape. The third is leather hard; the clay is mostly dry but able to be carved. Last is bone dry, which is completely dry and in its most fragile and brittle state. Reaching the bone dry state it is ready to be fired, a two step process. The first is a bisque fire, leaving the clay hard and porous and ready for glazing and the second is a glaze fire, reaching a higher temperature which turns glaze into glass. This is the basics of clay forms.

- Intrusive Inklings: An Artist's Proposition for Invasive Species

Margaret Trimpe, Art

Mentor: **Brandon Sanderson**

Abstract:

This project is a mix of creativity and research which seeks to not only raise awareness of locally invasive species, but also to propose a use for such over the options of mere eradication or leaving them to continue growing. North Carolina is well known for its biodiversity and plethora

of species. However, not many realize how often they encounter invasive species due to their normalization in our lives. While a great many of these species were brought over for beautifying gardens, they often run rampant and threaten the local plant life by depriving them of the resources they need. Contrary to typical management efforts of invasive species, this project seeks to eliminate wasteful or negligent behaviors. Just because they are invasive and were brought for aesthetic purposes doesn't mean they can't be utilized in a functional manner. Additionally, the inks made from the plants are presented in a form of intaglio printmaking and watercolor which tie back into historical botanical illustration methods, acknowledging the underrated ties between the arts and sciences.

- Introductory Exploration of 3D Printing through Resin Prints Applied to Large Scale Sculptural Work

Tina Wilson, Art

Mentor: **Brandon Sanderson**

Abstract:

Currently, 3D printing exploration has been limited to use only through the engineering department at the University of North Carolina at Pembroke. This drastically limits the capabilities of applying 3D printing and other newer and innovative technology tools to more creative research endeavors including those that could be explored in the UNCP art department. The goal of this technological exploration is to show that 3D printing can be utilized in creative and artistic endeavors by exploring the artistic applications of resin printing by creating a large scale sculpture. Through studying the CAD software used to create STL files I was able to alter and apply what is traditionally used for small scale prints to a large scale sculpture. I hope that this is just the first step towards inspiring students as well as UNCP to expand access to 3D printers and other new technologies to artistic research and creativity.

- Experimentation of Large Scale Screenprints through the Exploration of Traditional South Korean Materials, Mythology & Iconography

Tina Wilson, Art

Mentor: **Brandon Sanderson**

Abstract:

Through the research and presentation of traditional South Korean textiles and artistic interpretations of its mythology and iconography that often overlaps with other Asian American cultures, conversation and awareness about Korean American can help increase cultural diversity in an environment where that viewpoint has not, as of yet, been prevalent. This exploration of cultural symbols is inspired by the iconography of the South Korean flag, the mythology of the Bulgae, and motifs and gold leaf designs found in traditional Korean Hanbok dress textiles. These ideas can be shared through the exploration and experimentation of large-scale screen printing onto traditional hanbok dress textiles. While designs were traditionally hand-painted onto textiles, fabric designs can now be screenprinted. It is common place for screenprinting to occur on a smaller scale as is often seen in the clothing industry, however, large-scale experiments can allow potential for greater visual impact to share cultural ideas as well as hopefully allowing screenprint techniques to be applied onto and with traditionally unused materials such as the gold gilding often found in Korean hanbok textile design.

Oral

- **How to safely remove honeydew insects using HistoClear prior to DNA amplification**

Kinsley Adams, *Biology*

Mentor: **Lisa Kelly**

Abstract:

To investigate the plant diets of honeydew insects, we are analyzing their internal DNA. When collecting insects with sticky traps, a common method for collecting insects, the surfaces can be covered in adhesive and DNA from surrounding plants. Solvents used to free trapped insects, plus any residual trap glue, may possibly interfere with downstream DNA work. Decontamination and safe insect removal are required to avoid these problems. The goal of this study is to standardize our practice as there are several ways to decontaminate and free trapped insects. We tested two batches of honeydew insects collected by hand from the same plants. Some of the insects were deliberately placed on traps while the controls were stored in ethanol. Sections of sticky trap containing insects were cut. Some were left with the glue while others were removed using Histo-Clear. A bleach concentration of 4% was used for decontamination. A Nanodrop was used to measure DNA concentrations from all samples. The extracts were amplified with plant primers and sent to a commercial lab for Sanger Sequencing. This study is important for standardizing sample preparation methods for researching insect diets.

- **Surviving Battleship Row: An Autoethnographic Heritage Study**

Logan Bossert, *Sociology & Criminal Justice*

Mentor: **Robert Spivey**

Abstract:

This project presents the life story of my great grandfather, John William Bossert, a carpenter's apprentice in the US Navy, stationed on the battleship, USS Maryland on December 7th, 1941. A survivor of the infamous battleship row, the primary target of the Imperial Japanese naval air surprise attack on Pearl Harbor.

Performance

- Mapping Americas Native Food Trail

Rene' Locklear White, *American Indian Studies*

Mentor: **Jane Haladay**

Abstract:

My research presentation is a 17-min. short film to reawaken everyone to Indigenous culinary traditions by bringing together America's Native foods, Native chefs, Native food authors, Native food films, and Native sacred seed-keepers onto a new digital asset called America's NativeFoodTrail.org. My film opens with the idea that a veil covers our path to access Indigenous foods. I begin by asking "what if" questions and what happens if we pull back the veil. I suggest that the Columbian Exchange, Indian reservations and wars changed our Indigenous foodways by bringing domesticated animals and influencing fry bread and collard green sandwich into our diets. The film dissolves into contemporary health issues facing American Indians include higher rates of alcoholism, obesity, and diabetes. The film's ending is hopeful and shows that I peeked behind the veil. The film ends with the possibility that we can travel back to the foundation of nature's food pantry. I believe telling our food stories is an opportunity to sing our tribal anthems.

- **That Look in Your Eyes**

Jackson Mills, *Music*

Mentor: **Aaron Vandermeer**

Abstract:

The title of this composition is inspired by the feeling you get when you share memories with the people you love. It does not necessarily refer to romantic relationships but can apply to anyone you consider special. This song's harmonic and melodic underpinning is derived from the first movement of "Piano Concerto No. 2" by Sergei Rachmaninoff.

- **Sendejas**

Wyatt Radford, *Music*

Mentor: **Aaron Vandermeer**

Abstract:

Sendejas is inspired by Hard Bop and Post-bop jazz of the 1960's. Many ideas were derived from compositions by Wayne Shorter and Freddie Hubbard and music by Miles Davis's Second Great Quintet. Written in the key of E Phrygian as an up-tempo swing in 3/4 time, I wanted to play with a subtle modal approach using mode-mixture and areas of chromatic harmony. A trumpet melody floats through vamped chords until abrasive hits take over, creating a push and pull throughout the tune.

- **Chaotic Evil**

Silas Seigler, *Music*

Mentor: **Aaron Vandermeer**

Abstract:

The inspiration for "Chaotic Evil" came from Kurt Rosenwinkel's recording of "Zhivago" from his "Our Secret World" album. I wanted to write something percussive with an Afro-Cuban flavor. I chose a 3/4 meter, which reminds me of the 1992 Tito Puente album "Top Percussion". The album is based on the bembé clave and other Afro-Cuban Rhythms. The title, "Chaotic Evil," is derived from a character alignment option in the fantasy role-playing game Dungeons and Dragons. Eventually, I would like to arrange it for big band.

Dr. Timothy M. Ritter and Marie A. Amero **Endowed Research Scholarship**



Dr. Timothy Ritter served as a physics professor at UNC Pembroke for 21 years. He held numerous leadership roles in support of the sciences at UNCP, include Director of the Pembroke Undergraduate Research and Creativity (PURC) Center and Director of the NC Region IV Science & Engineering Fair. Dr. Ritter has established this endowed research scholarship in support of undergraduate research at UNC Pembroke.

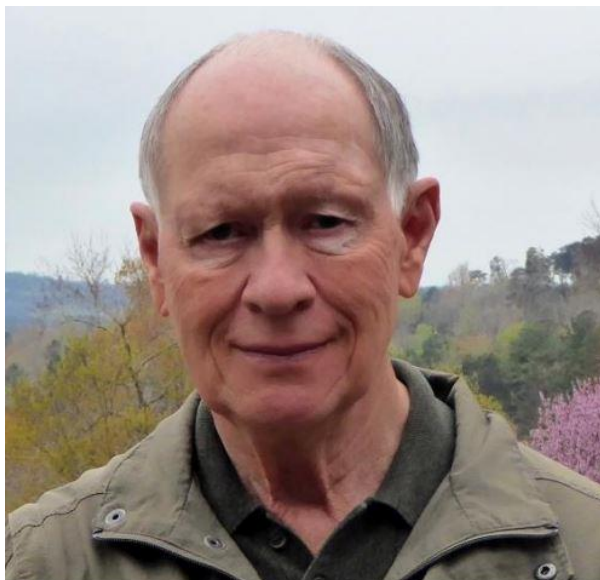
This generous gift will support an undergraduate research scholar each academic year. UNCP is grateful for this support to undergraduate research endeavor.

Dr. Ritter began his career at UNC Pembroke in 1996 after graduating from the State University of New York at Buffalo (SUNY Buffalo) with a Ph.D. in condensed matter physics. From 2002 – 2014 he led a multidisciplinary, multi-University microgravity research team known as the “Weightless Lumbees.” This undergraduate research group had eight teams of students fly themselves and their experiments on NASA’s microgravity research aircraft. Dr. Ritter was also the director of the Region 4 North Carolina Science and Engineering Fair for over 15 years. Dr. Ritter’s dedication to undergraduate research led to him being selected as the second director of the Pembroke Undergraduate Research and Creativity Center (PURC). His tenure as the PURC director was interrupted when he was recalled to active duty with the United States Navy in order to serve as an assistant professor at the United States Naval Academy. Professor Ritter’s academic and military careers were cut short in 2015 when he was diagnosed with amyotrophic lateral sclerosis (ALS). Dr. Ritter and his wife Marie currently live in North Myrtle Beach South Carolina.

Each year, an award (maximum \$3,000) shall be provided to one undergraduate student performing research in Chemistry, Physics, or Science Education Grades 9-12 (Biology, Chemistry, Earth Science, and Physics) through the Pembroke Undergraduate Research and Creativity (PURC) Center. The student shall have a minimum QPA of 2.5. The student shall be selected by the PURC Council.

The student shall have a faculty advisor, who will approve the research project and expenses. Approved expenses are costs directly associated with research, including supplies, equipment, and travel (no student stipend allowed). A maximum of one-half of the total annual award may be used for conference expenses if the student is presenting at the conference. A maximum of one-sixth of the total annual award can be used if the student is attending the conference (without presenting).

Dr. Charles Humphrey Undergraduate Conference Travel Award



Dr. 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.

In 2016, Dr. Humphrey generously created the "Dr. Charles Humphrey Undergraduate Conference Travel Award" to encourage both undergraduate research and faculty mentorship. With this award, PURC has awarded a discrete number of conference travel awards to undergraduates to attend regional, professional conferences with a faculty mentor. This award opens the door for students who have never conducted research to experience an academic conference.

This year the Dr. Charles Humphrey Undergraduate Conference Travel Award has helped two students attend three conferences. Hunter Ivey and Limari Vasquez received the award under the mentorship of Dr. Lisa Kelly, Dr. Kaitlin Campbell and Dr. Courtney Alexander.

Of his travel award experience, Hunter Ivey writes, "I'm very thankful to the Humphrey family for offering support so that students can pursue and share our research with the wider academic community. This award allowed me to attend the Entomological Society of America's Annual Conference in Vancouver, British Columbia, and the Association of Southeastern Biologists meeting in Winston-Salem, NC. At these conferences, I presented my poster *Understanding Connections Between Diets of Honeydew Insects and Fire Ants in Longleaf Pine Savannas of North Carolina*. These were my first experiences presenting work in an academic setting."

Of her travel experience, Limari Vasquez writes, "Being offered support to further pursue my interest in the field of biology research helped me gain experience networking with other students and faculty, and gain knowledge on a wide range of biology research. The Dr. Charles Humphrey Undergraduate Conference Travel Award allowed me to attend the Association of Southeastern Biologists meeting in Winston-Salem, NC. During my time at the conference, I presented my poster *Rabbit Tobacco Improves Short-term Memory in C. elegans*. I was able inform others on my work, and I had the opportunity to hear suggestions regarding my future research that I will incorporate this summer."

PURC Council is proud to announce Undergraduate Research Mentor Awardee – Dr. Kaitlin Campbell



Dr. Kaitlin Campbell is an Associate Professor of Invertebrate Zoology and Assistant Chair of the Biology Department. She completed her B.S. and M.S. degrees at The Ohio State University, and earned her Ph.D in Ecology, Evolution and Environmental Biology at Miami University, Ohio. She joined UNCP in 2016 where she teaches Environmental Science, Entomology, Pest Management, Invertebrate Zoology, Parasitology, Beekeeping, and Biology Seminar. Many of her courses are Service-Learning courses partnering with the Lumbee Tribe to aid in conservation initiatives or with local Elementary schools to communicate sustainability practices through hands-on student-led programming. She was Co-PI on the Burroughs-Wellcome Kids in the Garden grant from 2016-2022, and is currently Co-PI on a 5 year, \$6.8 Million dollar USDA grant with Utah State University that focuses on using Smart Foodscapes for sustainable cattle grazing systems.

Dr. Campbell's research focuses on insect biodiversity and community ecology. Undergraduate students are at the heart of her research, working in teams and independently at all levels of research from question formulation and sample collection in the field and lab, to data processing, analysis, and presentation. At UNCP, she has mentored or co-mentored 41 students in directed research projects focused on: pollinator communities, invasive ant ecology, ant and mite biodiversity, and pest and disease management in agricultural systems. In total, her students have presented over 70 presentations at local, regional, and national conferences, and five of her students have won presentation awards- three of which were at national conferences. She is proud to say that almost half of her students have gone on to graduate programs or are currently working jobs in science fields. Her favorite moment as a research mentor is when she sees her students presenting their work and communicating their findings to peers and the wider scientific community. She is thankful for the Pembroke Undergraduate Research Creativity Center for providing support and opportunities for students to do so.

PURC Council is proud to announce Undergraduate Research Mentor Awardee – Dr. Michele Fazio



Dr. Michele Fazio is a Professor in the English, Theatre, and World Languages Department. The 2020 winner of the UNC Board of Governors Award for Excellence in Teaching, Dr. Fazio teaches courses on 20th-century American literature, contemporary U.S. ethnic literature, and working-class studies using service-learning. She also serves as the co-coordinator of the Gender Studies Minor and is the incoming program director for the Pembroke Mellon REACH Program. Mentoring has played a significant role in her academic career. She was recognized by the Graduate School as an Outstanding Graduate Mentor in 2018, and she was a member of the PURCC Council from 2012-2020. Through PURCC, she has mentored dozens of students exploring topics ranging from migrant farmworker justice and apocalyptic literature and film to folk music and community-based oral history. Two interdisciplinary projects resulted in campus-wide initiatives that highlight her approach to highly-engaged student learning and leadership: the promotion of National Farmworker

Awareness Week and the making of the film, *Voices of the Lumbee*. “Dr. Fazio takes mentorship seriously, and her impact on the students she guides is profound and life-fulfilling. It’s an extension of her commitment as a scholar-teacher, that she cultivates so many opportunities for students to begin exploring a larger project, and then supports them with the skills and perspectives they need to persist in their work, and finally connects them to dynamic networks and communities that help them thrive in their postgraduate and professional futures beyond UNCP,” according to Dr. Scott Hicks. Please join us in congratulating Dr. Fazio as we recognize her commitment to engaging and motivating her students.

The Undergraduate Research Mentor award recognizes individuals who make significant contributions to forwarding undergraduate research, creative scholarship, and entrepreneurial scholarship. This award recognizes demonstrated excellence in supporting undergraduate researchers, encouraging mentoring relationships with undergraduate students, and conveying the campus' high regard for contributions made by the academic and research community at UNC Pembroke, particularly if a mentor supports and influences students' educational and career paths. Exemplary mentors can demonstrate continued success in helping students produce tangible results that may include peer-reviewed publications, student presentations, awards, or scholarships. Excellent undergraduate mentors support students through their availability, attentiveness, encouragement, and understanding. In many disciplines, this mentoring is done by faculty, staff, postdoctoral researchers, and graduate students. The award recipient is recognized annually at the PURC Symposium and the Faculty Awards Dinner.

2023 Pembroke Undergraduate Research and Creativity Council

Council Membership 2022-2023

Prof. Brandon Sanderson, Professor of Art, Director of PURC
Dr. Alice K. Locklear, Professor of Social Work
Dr. Maria Santisteban, Professor of Biology
Dr. Xinyan Shi, Professor of Economics/Decision Sciences
Dr. Renee Lamphere, Associate Professor of Criminal Justice
Dr. Matthew Hassett, Assistant Professor of Sociology and Criminal Justice
Dr. Zachary Laminack, Assistant Professor of English
Prof. Sailaja Vallabha, Senior Lecturer of Chemistry/Physics, Rise Co-Director



Dr. Kaitlin Campbell (far left), Erika Rivera, Hunter Ivey, and Kinsley Adams pictured at Juniper Creek Game Land field site (Photo by Dr. Lisa Kelly)



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