COLLEGE OF CHARLESTON
expo

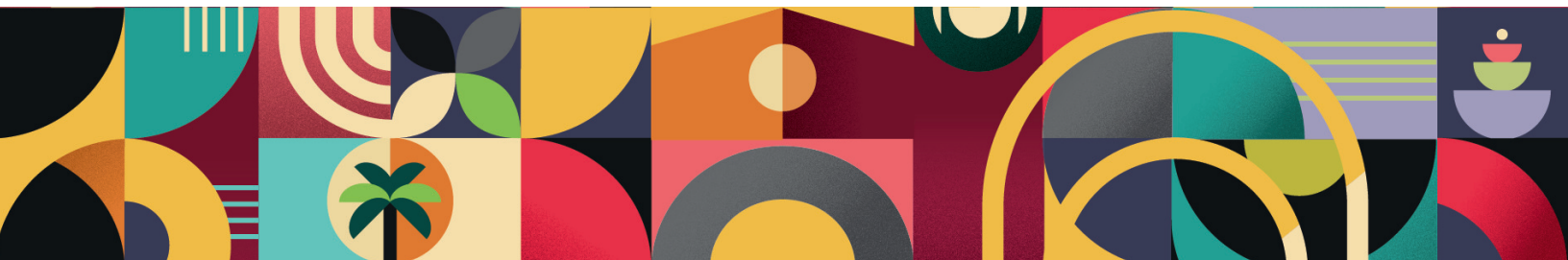RESEARCH • CREATIVE INQUIRY • SCHOLARSHIP • COMMUNITY SERVICE

COLLEGE OF CHARLESTON
expo
RESEARCH • CREATIVE INQUIRY | SCHOLARSHIP • COMMUNITY SERVICE

Schedule of Events
Thursday, April 18, 2024

Poster Presentations
9:00 a.m. – Noon
TD Arena

Welcome
9:15 a.m.
McAlister Hospitality Suite

Oral Presentations
9:30 a.m. – 10:45 a.m.
McAlister Hospitality Suite

Oral presentation abstracts begin on page 3.

9:30 a.m.	**The Intersectional Effects of Race and Gender on Public Opinion Towards Militarism** Madeline Landa, Department of Political Science, School of Humanities and Social Science Faculty mentor: Dr. Jordan Ragusa
9:40 a.m.	**Racial Minorities Usage of South Carolina Beaches, and the Barriers to Such Usage** Nick Matthews, Department of Hospitality and Tourism Management, School of Business Faculty mentors: Dr. Daniel Guttentag and Dr. Steven Litvin
9:50 a.m.	**Contraceptive Knowledge, Attitudes, and Practices among College Students** Katie Morand, Department of Health and Human Performance, School of Health Science Faculty mentor: Dr. Christy Kollath-Cattano
10:00 a.m.	**Resistance in Writing: Examining the Legacy and History of Rachel Auerbach** Natalie Peyton, Department of Jewish Studies, School of Languages, Cultures, and World Affairs Faculty mentor: Dr. Chad Gibbs
10:10 a.m.	**Parking Lot Vehicle Recognition and Counting** Daisy Clavijo Ramirez, Department of Computer Science, School of Science, Mathematics, and Engineering Faculty mentor: Dr. Mia Wang
10:20 a.m.	**An Examination of the Impact of Actors' Equity on the American Theatrical Landscape** Delaney Faile, Program in Arts Management, School of the Arts Faculty mentor: Chris Burgess
10:30 a.m.	**Mosaic Learning in the Secondary Humanities Classroom** Patrick Martin, Masters in Teaching, School of Education Faculty mentor: Dr. Kevin Eakes

School of the Arts Showcase
11 a.m. – Noon
McAlister Hospitality Suite

Individual performances will run for approximately 5-10 minutes.

Indian Dance: Bollywood Medley
Dancers: Sky Carroll, Dylan Horwitz, Emmie Kiser, Or Levy, Gianna Trimboli, and Chloe Whitley
Faculty advisor: Beena Austin

Musical Theatre
"Suddenly Seymour" from Little Shop of Horrors
Performers: Audrey Black and Drake Carney
Faculty advisor: Laura Turner

Jazz Combo
"Madame Toulouse" -- Michael Brecker, transcribed and adapted by James Tomberg
James Tomberg, saxophone; Aidan Johnson, piano; Axel Rangel, guitar; Brice Tiffany, bass; Bryce Waldran-Noren, drums
Faculty coach: Robert Lewis

Dramatic Recitations
"Sonnet 17" by William Shakespeare, recited by Chris Warzynski
"Sonnet 147" by William Shakespeare, recited by L.G. Wiley
Faculty advisor: Todd McNerney

Lecture-demonstration of Swordplay Techniques
Featuring students from the Department of Theatre and Dance
Faculty advisor: Evan Parry

Vocal Soloists
Brett Hunter, baritone: "Go, Lovely Rose," Roger Quilter; "Mandoline," Gabriel Fauré
Lauren Funkhouser, soprano: "Crickets," Tom Cipullo; "Ne Poy Krasavitsa Pri Mne," Sergei Rachmaninoff
Faculty accompanist: Wojciech Milewski
Faculty advisor: Saundra DeAthos-Meers

Keynote Presentation
Every Move Counts: Improving Health through Physical Activity Friendly Communities
Morgan Hughey, Ph.D., M.P.H.
School of Health Sciences
Noon – 1 p.m.
McAlister Hospitality Suite

Awards Ceremony
1 p.m.
McAlister Hospitality Suite

EXPO 2024 Keynote Speaker
Dr. Morgan Hughey

Dr. Morgan Hughey, Associate Professor of Public Health, School of Health Sciences and
Riley Center for Livable Communities Faculty Fellow, is the 2023 Recipient of the
William V. Moore Distinguished Teacher-Scholar Award. In this lecture, Dr. Hughey will discuss
"Every Move Counts: Improving Health through Physical Activity Friendly Communities." A lifelong learner, former student athlete, and outdoor enthusiast, Dr. Hughey will describe her research journey in physical activity and public health and how undergraduate student research enhances projects and community engagement.
Learn more: https://charleston.edu/health-human-performance/faculty/hughey_morgan.php.

Oral Presentation Abstracts

The Intersectional Effects of Race and Gender on Public Opinion Towards Militarism
Madeline Landa, Department of Political Science, School of Humanities and Social Science
Faculty Mentor: Dr. Jordan Ragusa

It is frequently claimed that women are less aggressive than men in both regular discourse and academic research. Across multiple disciplines, research has shown that women support state intervention—the often-violent involvement of a nation's military in the affairs of another country—less than men. Scholars refer to this as the "gender gap." However, women are not a monolith. Research shows that there are certain contexts which alter women's support or opposition to violent state intervention. Although these studies attempt to theorize why this variation exists, one factor has been largely ignored: race. Our study seeks to fill this gap in the literature by discerning which factors motivate women of differing racial groups, specifically Black and White women, to support violent state intervention. We hope to shed light on which of the existing theories perform best when race and gender are considered simultaneously. We will do so by analyzing a survey which asks a large representative sample of Americans in which contexts they support intervention in the affairs of another county. We hypothesize that intersectional feminist theories—which emphasize the unique victimhood and political alienation of women—will perform best. This research is particularly necessary due to the fact that scholars have continually ignored the voices of the marginalized groups that most often bear the brunt of war, women and people of color in the US. By bringing this to the forefront of Political Science, we hope to inform future foreign policy so that it better reflects the interests of American citizens.

Racial Minorities Usage of South Carolina Beaches, and the Barriers to Such Usage
Nick Matthews, Department of Hospitality and Tourism Management, School of Business
Faculty Mentors: Dr. Daniel Guttentag and Dr. Steven Litvin

The purpose of this study is to reveal perceived barriers to beach usage among racial minorities in South Carolina. This study is also providing insight into whether different racial groups use the beach in different ways, including whether racial minorities are underrepresented on South Carolina's beaches. The study involved two methods, firstly having employed the System for Observing Play and Recreation in Communities (SOPARC). Developed by the RAND Corporation, SOPARC has primarily been used in parks to assess information about users in recreational spaces. The method involved visually recording not only the number of individuals at popular beaches throughout the state, including Hilton Head Island, Folly Beach, Island of Palms, Myrtle Beach, and North Myrtle Beach, but also key characteristics such as demographics, visible minority status, and activities engaged in (such as sunbathing, swimming, etc.) during various times of day.
The second phase of this study involved distributing electronic surveys through a research panel provided by Qualtrics, which targeted racial minorities to ensure an adequate representation of such groups. Approximately 500 surveys were collected, employing stratified sampling to ensure a substantial number of responses from African American and Latin American Individuals. The objective of the surveys was to explore the barriers to beach visitation that are perceived by South Carolina residents, such as unease of access, cost, attitudes, fears, swimming ability, or the feeling of unwelcomeness. Data analysis for this phase of the study is currently underway, with the preliminary findings expected to be shared at the upcoming Expo.

Contraceptive Knowledge, Attitudes, and Practices among College Students
Katie Morand, Department of Health and Human Performance, School of Health Science
Faculty Mentor: Dr. Christy Kollath-Cattano

The United States ranks highest among the developed nations in rates of unintended pregnancy and sexually transmitted infections (STIs) and college-aged individuals, in particular, have the highest rates of unintended pregnancy and STIs nationally. Unintended pregnancy and STIs have both been linked to the failure to use an appropriate form of contraception consistently and correctly. Many studies among US-based college students have reported an association between contraceptive knowledge and contraceptive behaviors, however, the majority of these studies have been based on survey data. This project employs qualitative methods to provide a more comprehensive understanding of contraception among college students. Despite overwhelming evidence that males exhibit less contraceptive knowledge than females, there are no current studies with an all-male sample. Therefore, the purpose of this study is to investigate contraceptive knowledge, attitudes and practices among male undergraduate and graduate students at a mid-sized liberal arts institution. In-depth, qualitative interviews have been conducted with 10 male college students, aged 18-25. Interviews were transcribed verbatim, and transcripts will be coded qualitatively. Based on preliminary results, male students perceive themselves to be more knowledgeable than the general student population on campus. While the participants reported consistently using a method of contraception during sexual activity, they do not believe other males on campus use contraception. All male participants interviewed have exhibited positive attitudes toward the use of contraception. The results of this of this research can be used to inform campus-based initiatives related to contraception use.

Resistance in Writing: Examining the Legacy and History of Rachel Auerbach
Natalie Peyton, Department of Jewish Studies, School of Languages, Cultures, and World Affairs
Faculty Mentor: Dr. Chad Gibbs

In 1941, Emanuel Ringelblum recruited Rachel Auerbach to a secret project within the Warsaw Ghetto. As a member of Ringelblum's Oneg Shabbat underground archive, Auerbach and dozens of other volunteers documented and collected testimony about the experiences of Jews in the ghetto. With her background in journalism, Auerbach's skills were uniquely suited to help preserve the facts of life for Jews in Warsaw under Nazi control. Auerbach's influence on the Oneg Shabbat was through her dedication to testimony collection. She meticulously archived documents, testimonies, and artifacts to ensure that no one's story was lost. Her efforts to document the Holocaust served not only as a way to record the horrible facts of Jewish life during the Holocaust, but also as an act of resistance against the Nazis, who aimed to eradicate Jews and their memory. Following her work with Oneg Shabbat, Auerbach continued to be an important recorder of Holocaust history and memory. She dedicated her life to the pursuit of justice against perpetrators and remembrance of victims as an archivist at the Israeli Holocaust memorial, Yad Vashem. Her efforts included reshaping the future of trials in Israel, collecting valuable testimonies, and creating a repository for survivors and victims of Nazi genocide. As the era of the witness comes to an end, we must extend efforts to document and recognize the means by which we learned to do so.

Parking Lot Vehicle Recognition and Counting
Daisy Clavijo Ramirez, Department of Computer Science, School of Science, Mathematics, and Engineering
Faculty Mentor: Dr. Mia Wang

In response to the evolving needs of commercial environments, this research project aims to transform inventory monitoring through real-time drone surveillance, offering a novel approach to address inventory management challenges. The primary objective is to utilize real-time video feeds from drones to provide accurate and up-to-date information on vehicle inventory in various commercial settings, including parking lots and manufacturing plants. Leveraging advanced techniques such as computer vision and deep learning, a new YOLOv5 model incorporating oriented bounding boxes will be employed to enhance accuracy and efficiency in vehicle detection. The project focuses on developing a model capable of accurately identifying and counting vehicles, enabling precise inventory monitoring. Progress has been made in developing a vehicle detection model, with efforts focused on refining the model's accuracy and efficiency. Groundwork has been laid to understand deep learning principles to tackle upcoming challenges, ensuring the robustness of the system. Spring 2024 has been dedicated to the collection of data through drone surveillance and the refinement of the vehicle counting program. Future steps include developing a program capable of selectively counting vehicles in designated lots for enhanced efficiency. The integration of real-time drone surveillance in inventory monitoring has the potential to revolutionize commercial operations, offering businesses a more reliable and efficient inventory management solution to ultimately lead to greater productivity and profitability. The incorporation of a new YOLOv5 model utilizing oriented bounding boxes distinguishes this project and sets it apart from existing approaches, further enhancing its potential impact on the field.

An Examination of the Impact of Actors' Equity on the American Theatrical Landscape
Delaney Faile, Program in Arts Management, School of the Arts
Faculty Mentor: Chris Burgess

This essay aims to investigate how the entertainment union Actors' Equity has shaped the landscape of the US theater industry and provide insights for working actors seeking to navigate and understand their role within the union. The paper's first section provides a general explanation of Actors' Equity and its current presence in the United States. The second section of the paper discusses the history of Actors' Equity from its formation to the present day, emphasizing strikes, the rise of regional theatres and the establishment of LORT, Equity's response to social and political issues, and notable union policy changes. The paper's third section discusses the various routes to gaining Equity membership and what being an Equity member entails. This chapter also addresses the controversies surrounding the "Equity Shop" and the recent implementation of the Open Access program, which fundamentally changed the process of gaining union membership. The paper's final section addresses potential areas of future research including the unionization of erotic dancers under Equity and the potential impact Open Access may have on the union as a whole.

Mosaic Learning in the Secondary Humanities Classroom
Patrick Martin, Masters in Teaching, School of Education
Faculty Mentor: Dr. Kevin Eakes

"Mosaic Learning in the High School Humanities Classroom" is an innovative educational approach aimed at transforming the traditional learning environment into a dynamic, student-centered space. This project outlines the strategic integration of choice within the curriculum, empowering students to deepen their engagement with humanities subjects through personalized research. The Mosaic Learning model is structured around quarterly segments, each driven by thought-provoking questions designed to foster interdisciplinary and critical thinking. These guiding inquiries challenge students to synthesize original research, drawing on a rich tapestry of sources including lived experiences, periodicals, and academic journals. This pedagogical approach encourages learners to select a specific area of interest within the humanities and explore it through a multifaceted lens. This exploration is not confined to mere content mastery; instead, it encompasses a broader understanding of the contextual nuances surrounding the topic. By engaging in this process, students not only become experts in their chosen focus area but also develop a comprehensive understanding of its wider implications and connections. Through this model, educators can facilitate an engaging and meaningful exploration of humanities, enabling students to connect their academic pursuits with their personal experiences and interests. Mosaic Learning thus represents a transformative shift towards a more inclusive, exploratory, and student-driven educational paradigm in the high school humanities classroom. This project showcases the curricular and theoretical framework of Mosaic learning, practical strategies for implementation, and program evaluation outcomes that address student learning, student feedback, and teacher experiences with this approach.

♻ **Sustainability-related project**
* **Graduate student**

Poster Presentations

9:00 a.m. – noon
TD Arena

School of the Arts

Department of Art and Architectural History

1. Factors of Success: Identifying Key Influences in Cases of Repatriation of Cultural Heritage Objects
Student Presenter: Elizabeth Hartman
Faculty Mentor(s): Tara Prakash

In the half-a-decade following the 1970 UNESCO Convention, which concerned trafficking of illicit cultural heritage items, the debate regarding repatriating cultural artifacts to their countries of origin has grown exponentially. Akin in scale to the trade of drugs or weapons, this global issue has engendered a multitude of disagreements. Opinions are divided between those who favor unambiguous return of objects or a belief in complete abstention from repatriation. Using the electronic archive database of the John Marshall Archive Project as a resource to collect primary accounts of object collecting and dealing practices in the early 20th century, this poster analyzes existing cases of cultural objects to identify what factors generally result in a repatriation attempt and, with further analysis, whether that request is successful. By comparing the acquisition of the "Boston Throne" sculpture in the Museum of Fine Arts, Boston, which has not been requested for repatriation, with the high-profile case of the caryatid from the Erechtheion in the British Museum, and analyzing keys elements in those cases against popular arguments for and against repatriation, specific and relevant factors are found. These include country of origin, trafficking history and provenance, method and date of removal, as well as the importance of the object to national culture. These factors influence the viability and outcome of a repatriation attempt. Understanding the key components influencing repatriation claims is integral for collectors, museums, and countries to reconcile the history of cultural heritage items and their past purposes with modern-day requests for their return.

2. Preservation of African American Gravestones at 88 Smith Street ♻
Student Presenter: Aidan Morley
Faculty Mentor(s): Dr. Richard Gilmore III

The gravestones recovered from 88 Smith Street were analyzed to uncover the history of the Ephrath and Trinity African American burial grounds and to evaluate preservation techniques on the recovered stones. Trinity and Ephrath burial grounds were operated throughout the nineteenth century and held the remains of over 3,600 African American Charlestonians. The site was sold and turned into a residential property during the early twentieth century. During the property's early use as a residence, the stones, many used around the property for utility purposes, were removed and destroyed. A 2021 archaeological investigation recovered dozens of stones and stone fragments from the location in varying conditions. However, countless others disappeared and were presumed destroyed throughout the investigation. The desecration of the site led to the City of Charleston passing the Gravesite Protection Act in September of 2021. Research was conducted to discern the property's history as both a cemetery and residential property. The stones from the site were cleaned and documented for the purpose of their physical and informational preservation. The goal of protecting and documenting the site and its stones is to provide the basis for State and Federal legislation concerning the documentation, preservation, and protection of forgotten African American cemeteries in the low country and beyond.

Department of Arts Management

3. Dancing into Leadership: How Professional Dance Skills Translate into Nonprofit Arts Management
Student Presenter: Lucy Dantz
Faculty Mentor(s): Rebecca Ferrell

In the field of professional dance, many dancers shift into leadership positions, both administrative and artistic, at professional companies or schools following their performance careers. However, the majority of professional dancers have not received "traditional" leadership training. This project investigates the skill sets that professional dancers learn throughout their careers and how those aptitudes translate into leadership skills that can be utilized to manage arts organizations. Essential skills for nonprofit leadership are compared to leadership skills that professional dancers may display while they are still dancing. These skills include communication, adaptability, and perseverance. This research also examines different leadership types, including transactional versus transformational, as well as different leadership styles. In recent years, many professional dance organizations have moved away from the traditional structure of leadership, where the Artistic Director would be the primary individual in charge, to styles such as dual or collective leadership. Additionally, the project examines current dance leaders and issues such as gender diversity in leadership and wage discrepancies.

4. An Examination of the Impact of Actors' Equity on the American Theatrical Environment
Student Presenter: Delaney Faile
Faculty Mentor(s): Chris Burgess

This essay aims to investigate how the entertainment union Actors' Equity has shaped the landscape of the US theater industry and provide insights for working actors seeking to navigate and understand their role within the union. The paper's first section provides a general explanation of Actors' Equity and its current presence in the United States. The second section of the paper discusses the history of Actors' Equity from its formation to the present day, emphasizing strikes, the rise of regional theatres and the establishment of LORT, Equity's response to social and political issues, and notable union policy changes. The paper's third section discusses the various routes to gaining Equity membership and what being an Equity member entails. This chapter also addresses the controversies surrounding the "Equity Shop" and the recent implementation of the Open Access program, which fundamentally changed the process of gaining union membership. The paper's final section addresses potential areas of future research including the unionization of erotic dancers under Equity and the potential impact Open Access may have on the union as a whole.

5. The Role of Museum Education as a Third Space for Learning ♻
Student Presenter: Kate MacPherson
Faculty Mentor(s): Hsin-Ching Wu

This study aims to look into the educational offerings at a prominent art museum in South Carolina: The Gibbes Museum of Art in Charleston, SC. The purpose is to gain more information about the way in which this institution serves as a unique place of learning for K-12 students in the Charleston communities. The information was gathered through a qualitative interview conducted with the director of education at the museum. Literature suggests that the 21st-century museum is working to be viewer-centered, socially and culturally responsible, and interdisciplinary with learning outcomes aiming to improve critical thinking, literacy, and engagement. The study findings identify the Gibbes Museum adapting the Visual Thinking Strategies model to facilitate an open dialogue with the students, working towards encouraging them to feel represented by the museum's collections. The museum focuses its education program on the schools most in need (i.e., Title I schools). This may be how the Gibbes Museum reflects its social role, fulfilling its nonprofit mission. The findings affirm that the Gibbes Museum serves as a unique place of learning for K-12 students in the Charleston area. In this way, the Gibbes Museum creates effective learning experiences in a space that differs from home and school where the students can not only learn about the arts but also find their sense of self.

Department of Theatre and Dance

6. Lighting the Fire of Sustainability Within Theatrical Spaces ♻️
Student Presenter: Bristol Barnes
Faculty Mentor(s): Peter Spearman

Art is a changemaker. Theatre as an art form is in the unique position to be able to speak directly to an audience in a way that most other art forms do not. Because of this, when given the chance to emphasize important, topical issues in theatrical productions, the student chooses to do so as much as possible. When presented with the opportunity to be the scenic designer on Firebringer, a musical comedy about cavepeople discovering fire and the havoc they wreak because of it, the student knew that they wanted to explore their passion for sustainability within this design. By utilizing second-hand materials and reducing new waste created from the design, they created a design that both supported the script as well as spread a meaningful message that would influence the audience to think differently about the waste we create every day. After the closing of the show, the student began to study more specifically how sustainability has begun to play a part in theatre in recent decades as well as the theory of green theatre. Through this, the student asserts that art can be beautiful, fun, and also acknowledge the daily destruction of our planet and work to counteract it.

7. Southern Queerness and Storytelling - A Look at Southern Lesbian Representation in Theatre
Student Presenter: Bea Lemaster
Faculty Mentor(s): Susan Kattwinkel

I intend to present my research and analysis on southern queerness and how it is presented in plays and the theatre. During my research, I read plays and articles about queerness in the South. I was thrilled by the intersectionality of class, race, and sexuality in these stories, but noticed a lack of media about the experience of lesbians in southern communities, since the plays were largely male. With this project, I want to continue to research the southern queer community that I am a part of and study the plays and performances that I have found, such as Audrey Cefaly's 'The Gulf', which details the intersection between living in southern communities and being an openly queer femme person in them.

8. Falling down the Mountain: Examining teamwork and collaboration in Japanese Expatriate Theatre
Student Presenter: Christopher Warzynski
Faculty Mentor(s): Lauren Duffie

Falling down the Mountain: Examining teamwork and collaboration in Japanese Expatriate Theatre, is a research project made up of on the field experiences in Yokohama, Japan over the summer 2023. The presentation is about how Expatriate artists coming to Japan to work in the theatre profession are limited by a sense of auteur theory. This research about collaboration will be juxtaposed to a hiking trail of climbing up Mount Fuji, comparing the two experiences abroad and how they miraculously connect.

9. Mysteries in Marble: Unraveling the Enigmatic Jonah Marbles
Student Presenter: Bree Weaver
Faculty Mentor(s): Jessica Streit

My senior thesis delves into the enigmatic Jonah Marbles, a collection of sculptures purchased by the Cleveland Museum of Art in 1965, dating back to 280-290 AD. The sculptures depict scenes from the biblical story of Jonah, incorporating both Christian and Hellenistic motifs. The research explores the provenance of the marbles, suggesting they may have originated from Antioch and were possibly buried to protect them during times of Roman persecution of Christians. It discusses the sculptures' potential function as fountain ornaments in semi-circular Nymphaeums, drawing parallels with similar artworks and architectural features from the period. I also explore the unique artistic choices in the Jonah Marbles, such as Jonah's shaggy beard, challenging traditional depictions. I argue that the Jonah Marbles represent a rare and exceptional blend of craftsmanship, symbolism, and historical context, deserving recognition as a significant artistic achievement in Early Christian art history.

♻️ **Sustainability-related project**
***Graduate student**

School of Business

Department of Accounting

10. Using the Beneish Model to Detect Financial Statement Misstatements
Student Presenter: Jenna Stern
Faculty Mentor(s): Jennifer Burbage

Earnings manipulation can occur in any industry. It occurs when a company manipulates aspects of its financial statements, changes accounting methods without justification, or even fictitiously accounts for certain items to meet earnings targets or to inflate financial results. Earnings manipulation deceives the public and gives false information regarding the company's performance. If caught, stock prices can drop and investors will lose confidence in that company. This paper examines how financial statement ratio analysis can help to predict earnings manipulation. Mainly it focuses on the validity of a statistical model created by Messod Beneish. Beneish's model uses eight financial statement ratios that produce an M-Score, which predicts the likelihood of earnings manipulation. This paper focuses on public manufacturing and banking companies in the US because other research with the model looks at companies in niche industries in the US or Eastern Europe. The research takes 12 companies: half of whom were caught by the SEC for committing earnings manipulation, and half of whom were not. Those caught were assigned a 1 and those not were given a 0. We calculated the ratios for each company over a six-year period, found the M-Score, and ran regressions using the ratios as the y-variable and zeros and ones as the x-variable. We will use different combinations of the ratios to find which elements of Beneish's model are more useful in predicting manipulation over others. Finally, we will compare these results to other research done on variations of Beneish's model.

Department of Economics

11. The Economic Impacts of Nuisance Flooding ♻
Student Presenter: Riley Haas
Faculty Mentor(s): Chris Mothorpe

Charleston, South Carolina has experienced 89 flood days in 2020 compared to only 2 flood days a century ago. Projected SLR and global warming are likely to increase the number of flood days in the future and exacerbate the impacts of nuisance flooding, which includes disrupting transportation, damaging infrastructure, and straining local government budgets. As local governments increase public expenditures towards sea walls, pump stations, and elevated bridges, it is important to estimate the effectiveness of such policies and how those costs compare to the estimated benefits in the prices of residents' homes. Exploring this issue, this research paper examines the economic impact of nuisance flooding in Charleston, South Carolina, analyzing its consequences on residents' commuting times and how such road closures impact the housing market. Mapping assessment and sales data from the Charleston County Assessor's Office and reported road closures by the City of Charleston with SLR, tide height, and rainfall data, the analysis establishes an original dataset that illustrates the economic impacts of nuisance flooding on Charleston residents, considering the increase in commuting times and how such flood events are priced into homes in the region.

12. The Value of Quitting ♻
Student Presenter: Serena Pipes
Faculty Mentor(s): Calvin Blackwell

Tobacco use continues to pose a significant public health challenge in the United States, contributing to many adverse health outcomes. This study explores the efficacy of diverse financial incentives, incorporating gains and losses, to promote smoking cessation.
Initially, participants were asked to indicate how much they would be willing to pay to eliminate nicotine cravings and usage, thereby informing the monetary value used in the reward-specific questions. To compare participants' perceptions of different reward structures, we conducted a survey where individuals were randomly assigned to one of three programs with varying reward structures: fixed, escalating, or de-escalating rewards.
The analysis of our 505 survey responses revealed that participants in escalating or de-escalating groups perceived the hypothetical monetary gains and losses as less motivating than participants of the fixed group. However, all three groups indicated a uniform preference for their program when compared to an all-or-nothing reward structure.
Moreover, participants' self-reported willingness to pay at the beginning of the survey was the most significant predictor influencing their perceptions of motivation, efficacy, and overall appeal of the program. This self-reported willingness to pay was found to be heavily influenced by demographic variables, including gender, education level, income, race, and age.
From a behavioral economics standpoint, this research underscores the importance of structural design, demographics, and individual motivation in enhancing the efficacy of financial incentives for smoking cessation, further contributing to the ongoing fight against tobacco addiction.

♻ Sustainability-related project
*Graduate student

Department of Finance

13. Not All Commercial REITS Are Created the Same in Relation to Interest Rate Changes and COVID-19
Student Presenter: Axel Stordahl
Faculty Mentor(s): Weishen Wang

Commercial real estate has received a lot of attention from media and academics alike in recent years due to a high interest rate post COVID-19. This study examines the performance of different sector REITs in the commercial real estate space, specifically how interest rates and COVID-19 relate to Commercial REITs' performance. Using the data from both fund of funds and individual REITs, we find that different sector REITs perform differently from one another in terms of responding to interest rate changes and COVID-19. We also show that REITs' capital structure allows them to weather adverse changes in market conditions like COVID-19 or a rise in the interest rates. We found that office REITs have performed the worst post-COVID. Thus, one general classification of commercial real estate may not be able to capture the risk-return characteristics of different sectors.

Department of Hospitality and Tourism

14. "How the Word is Passed" - a modern depiction of slavery in Charleston
Student Presenter: Olivia Friedland
Faculty Mentor(s): Stephen Litvin
Additional Authors: Nick Matthews

The presentation of urban slavery in the historic city of Charleston makes for a captivating study. In 2005, a College of Charleston student, Joshua David Brewer published an article with a faculty supervisor that had furthered similar research that had looked at plantation presentation of slavery, with Brewer's work focused upon instead of plantations, historic downtown homes. This current study, intended as an extension of the earlier Charleston research, revisits the same five historic homes, post-George Floyd, that had been visited by Brewer two decades prior, seeking to determine how the organizations that manage and present these homes to the public have adapted to the changing times in which we live. As this abstract is submitted, we have completed our home visits and at the EXPO will be able to present our findings.

15. SEWE Transportation Consultation
Student Presenter: Lydia Johnson
Faculty Mentor(s): Jeremy Clement
Additional Authors: Maria Cochran (Hospitality and Tourism Management), Catherine Bedenbaugh (Hospitality and Tourism Management), Harvey Proctor (Hospitality and Tourism Management)

Each year, the SEWE festival kicks off the Charleston event season by bringing approximately 40,000 people to Charleston in mid-February. Our team was tasked with revising the SEWE transportation plan for 2024. The goals presented to us by SEWE were: to increase efficiency, stay within the existing budget, and mainly to increase attendee satisfaction. Our solutions included reducing shuttle sizes to help navigating downtown, partnering with local businesses for shuttle services, utilizing public transportation, creating an easy-to-read map, and applying data collection for future reference. To bring these solutions to fruition, we connected with CARTA DASH, the City of Charleston Traffic and Transportation Department, and local transportation companies. Our team's final proposal included major revisions to existing bus routes, the utilization of new, local service providers, a different mix of vehicles to enhance ease of navigation through downtown, strategic marketing to highlight the public transportation collaboration, data collection in conjunction with CofC event management students, and a proforma financial estimate that stayed within the existing budgetary parameters. We believe our proposed revisions would minimize residential disturbance, reduce transportation times between SEWE venues, and ultimately promote public resources that are already available. Additionally, our solutions were within budgetary guidelines originally outlined by SEWE and provide a methodology for gathering important ridership data for future planning and transportation improvements. Our suggestions were not implemented in 2024 but we are hopeful the SEWE teams will be able to integrate these updates in 2025.

Sustainability-related project
*Graduate student

16. Racial Minorities Usage of South Carolina Beaches, and the Barriers to such Usage
Student Presenter: Nick Matthews
Faculty Mentor(s): Daniel Guttentag
Additional Authors: Dr. Stephen Litvin - Department of Hospitality and Tourism

The purpose of this study is to reveal perceived barriers to beach usage among racial minorities in South Carolina. This study is also providing insight into whether different racial groups use the beach in different ways, including whether racial minorities are underrepresented on South Carolina's beaches.
The study involved two methods, firstly having employed the System for Observing Play and Recreation in Communities (SOPARC). Developed by the RAND Corporation, SOPARC has primarily been used in parks to assess information about users in recreational spaces. The method involved visually recording not only the number of individuals at popular beaches throughout the state, including Hilton Head Island, Folly Beach, Island of Palms, Myrtle Beach, and North Myrtle Beach, but also key characteristics such as demographics, visible minority status, and activities engaged in (such as sunbathing, swimming, etc.) during various times of day.
The second phase of this study involved distributing electronic surveys through a research panel provided by Qualtrics, which targeted racial minorities to ensure an adequate representation of such groups. Approximately 500 surveys were collected, employing stratified sampling to ensure a substantial number of responses from African American and Latin American Individuals. The objective of the surveys was to explore the barriers to beach visitation that are perceived by South Carolina residents, such as unease of access, cost, attitudes, fears, swimming ability, or the feeling of unwelcomeness. Data analysis for this phase of the study is currently underway, with the preliminary findings expected to be shared at the upcoming Expo.

17. Exploring Travel Psychographics: The Differences between those Living in Small Towns vs. Big Cities
Student Presenter: Ann Alyse Messick
Faculty Mentor(s): Stephen Litvin

This research utilized Plog's model of Psychocentricity and Allocentricity to help understand the relationship, if one were to exist, between a person's travel psychographics and the size of the city/ town in which they live. In my study, one's place of residency serves as the independent variable, with Plog's well established four questions used to determine one's psychographics. In addition, other travel behaviors and attitudes were measured as the dependent variable in my study. The purpose of this research is to look at travel marketing in small towns versus big cities, based on the psychographics of the people who live there. Using a data set provided by the Canadian government that includes over 60,000 USA respondents, it was found that the differences between those living in small towns and big cities were consistent, with small towns versus those living in big cities lean towards allocentric. Further, both travel behaviors and attitudes were consistent with those characteristics one would expect based on the Plog model.

18. Understanding Understanding: An Interdisciplinary Literature Review ♻
Student Presenter: Danielle Putbrese
Faculty Mentor(s): Stephen Litvin

While tourism has been celebrated as a catalyst for fostering mutual understanding and cultural exchange, there is growing recognition of its potential to exacerbate existing tensions, perpetuate stereotypes, and deepen inequalities. The review synthesizes perspectives on both the potential positive and negative effects of tourism in facilitating cross-cultural interactions. Ultimately, it underscores the necessity for adopting a balanced understanding of tourism's effects and integrating this understanding into responsible tourism practices. As an international studies and tourism student, it is my hope that unlocking the complete potential of tourism to promote authentic cross-cultural understanding can promote a more inclusive and sustainable tourism industry. I look forward to revealing the findings of my study at the EXPO.

Department of Management and Marketing

19. How Do We Address the Scarcity of On-Campus Housing?
Student Presenter: Wilson Kern
Faculty Mentor(s): Lancie Affonso
Additional Authors: Stephanie Mauro- Cofc Student; Class of 2026

Affordable housing for students is a prevalent issue in Charleston and only worsens as our student population increases each year. Students are having an extremely hard time finding affordable housing, causing unnecessary stress. Despite Charleston being an overpopulated city, we still need measures in place to accommodate all students. This project aims to inform students about future housing plans through the college, as well as dive deeper into the issue of on-campus housing for students. We will evaluate specific data on on-campus living offered by the college and provide visualizations to help viewers fully understand the magnitude of the housing crisis that has been undermined. We will explore data specifically on the College of Charleston 2023 Campus Framework Plan. By exploring these topics, we aim to provide valuable information that will help students navigate the challenges of finding affordable housing in Charleston.

♻ **Sustainability-related project**
***Graduate student**

20. Digital Amnesia: How Screen Time Affects Sleep and Brand Recall
Student Presenter: Tyler Bauereis
Faculty Mentor(s): Kelley Cours-Anderson

The proliferation of smartphones, tablets, and computers has fundamentally altered how consumers engage with information, including advertising content. Research shows excessive screen time harms physical, brain, mental, and emotional health (Manwell et al., 2022). Furthermore, it can impact one's sleep as well as one's ability to concentrate and remember (ibid.). However, little research has studied its effect on brand recall. We employ an ad recall survey utilizing the School of Business Student Research Pool (SSRP) to test how sleep mediates the relationship between digital device usage and brand recall. Modifying the approach from Beard et al. (2022), participants will engage with a video that simulates scrolling through an Instagram feed with advertisements mixed in. After completing other questions, participants were asked to recall the brands featured in the ads, allowing for an analysis of short-term recall capabilities. This work builds upon advertising recall literature (Bagozzi, 1981; Beard et al., 2022; Jin et al., 2022) by recognizing how screen time negatively impacts sleep and ultimately diminishes brand recall. The findings from this study are expected to offer invaluable insights for marketers and advertisers. In an increasingly competitive digital marketplace, understanding the factors that influence memory retention can inform the development of more effective advertising strategies. Additionally, this research holds the potential to contribute to the broader discourse on consumer behavior in the digital age, providing a foundation for future studies and policy-making in the realm of digital marketing.

21. Belonging in the School of Business ♻️
Student Presenter: David Byrd
Faculty Mentor(s): Lancie Affonso

As we are progressing as an institution, we must broaden our purview on operations and stakeholders. This is especially important in business, where there is serious underrepresentation across multiple sectors. This problem is also applicable to institutions of higher education. My poster plans to display factors of Diversity, Equity, Inclusion, and Belonging throughout the School of Business. In addition, I plan on showing how our School of Business's AACSB impacts our students sense of belonging.

22. Be the Changemaker ♻️
Student Presenter: Maylee Clifton
Faculty Mentor(s): Lancie Affonso

In 2011, The College of Charleston's Center for Sustainable Development launched the Cougar Changemaker Challenge, an initiative created to promote student-led transformations on campus. This innovative challenge empowers students to propose and implement impactful changes, fostering an environment of proactive engagement and sustainable development within our campus. This project explores student-led projects that have made an impact on campus, while also serving as a platform to promote the Cougar Changemaker Challenge. By aligning with the campus framework plan currently under development by the university, I will illustrate the areas where the College of Charleston aspires to enact change, while emphasizing the vast potential for students to contribute their ideas and initiatives towards creating a more sustainable and vibrant campus community. Implementing an inviting space for discussion about improving our campus is the main point that my poster aims to achieve.

23. Airbnb Expansion Effects Student Housing Affordability in Charleston ♻️
Student Presenter: Bella Cocimano
Faculty Mentor(s): Lancie Affonso
Additional Authors: Avi Rosan- CofC Student, School of Business

This project examines the negative effects of Airbnb rentals on the Charleston peninsula. As more houses are converted into Airbnb rentals, the availability of long-term, fairly priced, housing for residents and college students is decreasing. Landlords prefer the income generated through short-term Airbnb rentals over long-term student tenants. Additionally, the demand for Airbnb properties is contributing to rising real estate prices. Investors are willing to pay high prices for properties, inflating the market, making homeownership less accessible for local residents. Charleston is known for its charming characteristics. Neighborhoods with a high concentration of short-term renters, however, lose the community feeling which contributes to that charming feel. While Airbnb does boost local tourism and provides income for property owners, it leads to an over-reliance on tourism, making the local economy vulnerable to fluctuations in travel trends.

24. Let's Talk About TikTok
Student Presenter: Catherine Cozad
Faculty Mentor(s): Lancie Affonso

TikTok has become an extremely popular social media platform in recent years. Students all over campus have been using TikTok to watch short videos from their favorite creators, and even become creators on the platform itself. However, as social media is constantly changing, some may wonder what will happen to TikTok in the future. Could legal troubles with TikTok in the past resurface and possibly take down the site? Will people turn to other social media sites to keep their data safe? TikTok has been the subject of discussion for years with its changes on the site, drama, and controversy. The goal of our project is to engage with students about their knowledge of data privacy with TikTok.

25. Intrapreneurship and Interdisciplinarity in FinTech and Quant Finance
Student Presenter: Ben Gonzalez
Faculty Mentor(s): Lancie Affonso

The interdisciplinary nature of FinTech, a rapidly expanding industry projected to reach $1.5 trillion by 2030, necessitates a nuanced approach to education and skill acquisition. This project delves into the evolving landscape of FinTech careers, highlighting the fusion of Financial Services and Technology. Unlike traditional finance roles, FinTech demands proficiency in emerging technologies like blockchain, cybersecurity, data science, and AI. Through an interdisciplinary lens and embracing Intrapreneurship, this study aims to enhance understanding and readiness for FinTech and Quantitative Finance careers. Leveraging platforms such as Datacamp and LinkedIn Learning, a comprehensive learning path is crafted, encompassing essential skills in SQL, Python, finance, accounting, and cutting-edge technologies like generative AI and machine learning.

26. Workwear Heritage Brands: The Fight to Remain Relevant with the Modern Consumer
Student Presenter: Kate Milano
Faculty Mentor(s): Scott Greene

In the ever-evolving landscape of apparel, trends shift daily, introducing new micro-fads, must-have items, and emerging styles. The dynamic nature of this field presents a formidable challenge for brands striving to maintain their relevance. Many brands struggle to anticipate and adapt to this challenge, thus risking the label of being outdated and obsolete. This concern is particularly pertinent to heritage brands, which often adhere steadfastly to their original brand identity and target market. However, certain heritage brands have managed to transcend their initial purposes, seamlessly transitioning into other styles of clothing. This paper will focus on heritage brands within the workwear sphere, exploring their efforts to reestablish their former relevance with modern consumers. The central inquiry aims to investigate the sustainability and efficacy of these efforts and whether they represent a viable-long term solution, or simply offer a temporary remedy to the plight of fading brands.

27. Social Media Marketing Manager Burnout
Student Presenter: Kiley Pettit
Faculty Mentor(s): Kelley Cours Anderson
Additional Authors: Dr. Ryan Milner, Department of Communication

The rise of social media usage has led to increased burnout among social media marketers, prompting a growing interest in digital and social media wellness ideas. Defined as "the optimum state of well-being a consumer pursues while intentionally managing social media consumption accessible on mobile devices and other digital technology through the awareness of how such consumption affects one's mental health and priorities," social media wellness is an up-and-coming concept emerging as a response to these challenges (Mertz et al., 2022). The phenomenon leans into ways of managing social media consumption and its effects on one's lifestyle, especially those of social media managers. However, the 24/7 persistent connection for social media managers specifically reduces success and hinders their ability to practice methods such as digital disconnection in fear of compensating for productivity. Recognition of social media burnout and proper disconnection strategies for social media managers is scarce in communication and marketing industry research. Therefore, in this study‚Äîthrough qualitative interviews, secondary literature research, and analysis via the holistic phronetic iterative approach‚Äî I define social media manager burnout, explore burnout, and evaluate methods managers can implement to effectively conquer burnout without compromising their job performance. Ultimately, this research will provide an imperative open door for increased discussion as social media managers are at risk of burnout. Therefore, this study will explore the practices social media marketing managers employ to reduce their social media burnout and find balance, or social media wellness.

Master of Business Administration

28. Sustainability at the Heart: The College of Charleston's Green Office Program ♻️
Student Presenter: Daniel Sanguino Franco*
Faculty Mentor(s): Nicole Killen

Explore the transformative journey of the Green Office Program, an innovative initiative launched by the Center for Sustainable Development at the College of Charleston. Since its inception in 2020, this program has spearheaded a movement towards sustainability within our campus offices, fostering a culture of environmental responsibility and inclusivity.

Focused on enhancing the environmental performance of our workspaces while promoting accessibility and diversity, the Green Office Program has witnessed remarkable success. With 16 offices already certified, our commitment to sustainability shines brightly.

Last year, we undertook a comprehensive process to revamp and align the program with the Sustainability Action Plan of the Center for Sustainable Development. This involved enhancing our digital tools to streamline the certification process for offices and providing enhanced resources to help offices excel in their sustainability performance.

Through a holistic evaluation process, offices are assessed in key areas such as Circular Economy, Climate Resilience, Accessibility & Inclusion, Active Sustainability Culture, and Sustaining YOU. This approach not only recognizes achievements but equips offices with tools for continuous improvement.

Our goals extend beyond mere certification; we aim to integrate sustainability into the fabric of campus culture, engaging students, faculty, and staff. By promoting a circular economy, conserving resources, and fostering social inclusion, we create vibrant, sustainable workspaces benefiting both our community and planet.

Discover how the Green Office Program is shaping a more sustainable future at the College of Charleston and join our transformative movement.

♻️ **Sustainability-related project**
***Graduate student**

School of Education

Department of Teacher Education

29. The Best Education Your Money Can Buy ♻
Student Presenter: Lauren Benson
Faculty Mentor(s): Ashleigh Werth

In South Carolina there is a large educational disparity among differing socioeconomic classes, creating a paramount issue affecting the generations vital to the future. By hindering the youth's potential to prosper, society is doing a great disservice to themselves. The students in low-income schools will receive an inferior education compared to wealthier areas, leaving them with an unfair disadvantage. With additional research into this problem, solutions will be able to create a system where students can share the same opportunities. According to "Statista," thirteen point three percent of students within the poverty line graduated from high school: compared to affluent schools where eighty-eight percent graduated. This is because students in lower-income areas have fewer resources inside and outside of school. As well schools within the poverty lines often include little support, unqualified teachers, and fewer opportunities for students. My objective is to work with psychologists, economists, and education specialists in order to create and implement a system where students of all backgrounds are given an adequate education.

30. Pathways to Wellbeing in High-Risk School Settings: A Comparative Analysis of Traditional and Alternative Spaces
Student Presenter: Alexa Bolton
Faculty Mentor(s): Adam Jordan

In this study, seven qualitative interviews (n = 7) with alternative high school teachers were analyzed using qualitative descriptive methods and compared and contrasted with 20 interviews (n = 20) conducted with traditional teachers in schools experiencing high levels of secondary informed trauma. The data were analyzed to determine possible themes related to barriers and facilitators of wellbeing in each space. Findings included a shared facilitator of student-teacher relationships and a shared barrier of societal inequities.
However, the alternative and traditional school settings differed in many ways. Traditional teachers experienced a facilitator related to being connected to a larger schooling community. Alternative educators, in contrast, expressed a disjunction from the larger school community. Additionally, alternative educators highlighted a unique experience of frequent disruption in upper-level leadership. These findings contribute to the ongoing professional conversations related to equity of supports across a diversity of school types.

31. How does Nutrition affect Educational Growth and Cognitive Development
Student Presenter: Colin Cook
Faculty Mentor(s): Laura Brock

This research revolves around the concept of how nutrition can affect your educational growth within your day-to-day life, the objective of this is to discover the true impact that good or bad nutrition can have on your academic performance and cognitive development. Drawing on a plethora of empirical information from a variety of research, including those investigating the effects of individual nutrients on brain function and learning outcomes, this study seeks to highlight the critical role nutrition plays in molding academic performance. By examining the processes by which diet affects cognitive capacities, attention span, and general brain health, this study makes convincing justifications for emphasizing comprehensive nutrition treatments in educational settings. This study aims to promote awareness among educators, policymakers, and parents on the need to encourage healthy eating habits to effectively support optimal learning settings. Finally, the desired result of this study is to argue for holistic methods of education that incorporate nutrition as a core component, hence supporting the academic achievement and well-being of learners.

♻ Sustainability-related project
*Graduate student

32. Students Who Write Success ♻

Student Presenter: Taylor Crosby
Faculty Mentor(s): Ashleigh Werth

Around 30% of children world-wide face challenges in handwriting. Handwriting involves complex motor and cognitive skills, with developmental milestones reached at different ages. Lacking such skills impacts a student's reading, spelling, and math abilities. Early identification and intervention are crucial to avoid negative effects on academic success and self-esteem in students who lack such necessary, handwriting skills. Statistics are showing a decline in dedicated instructional time for handwriting in schools over the past three decades. My study will investigate the impact of handwriting proficiency on academic abilities. Particularly emphasizing its crucial role in student success. Through review of existing studies, I look to establish and surface the correlation between proficient handwriting and enhanced cognitive development, literacy skills, and academic performance. With a decline in handwriting instruction time in schools, there is a dire need to prioritize handwriting as a foundational skill in primary education. This research proposes a policy recommendation advocating for mandatory handwriting instruction and proficiency assessments before grade-level advancement. By using statistical evidence and educational insights, my study aims to influence policy decisions and educational practices, ensuring that handwriting mastery becomes a prerequisite for academic progression. I aim to raise awareness about the significance of handwriting proficiency and push for systemic changes in primary education curricula. By advocating for mandatory handwriting instruction, the research strives to bridge a critical gap in educational practices, promoting comprehensive, student development and fostering improved academic outcomes.

33. Advocacy Project

Student Presenter: Rylan Cusick
Faculty Mentor(s): Ashleigh Werth

Students with special needs must get the proper care and support to help them succeed. There is a lack of acceptance when it comes to special needs. Taking the negative stigma away from special needs will allow for more children to get diagnosed. Creating a plan to educate parents, teachers, and other students on special needs will allow for more acceptance and less of a stigma. When a parent is in denial about their child having special needs and disabilities it will set the child behind intellectually and emotionally. Research shows that when a special needs child has access to the proper support they need, they will show long-term success in and out of the classroom. I am aiming to work with special education specialists, educators, and psychologists to create a plan on how to get rid of a negative stigma on special needs so children can get the proper support they need to help them succeed.

34. Chronically-Online Generation Has Decreased Academic Performance

Student Presenter: Rachel DiCarali
Faculty Mentor(s): Ashleigh Werth

With ever-emerging technology and a chronically-online generation, encouraging children to participate in exercise is difficult, especially when school systems are taking away recess. There has been a rise in disruptive behavior and other disciplinary issues due to the excessive use of technology in this generation. The removal of recess and other extracurricular activities either as punishment or to reallocate time for learning is counterintuitive, since movement has proven to be crucial for childhood development. Movement improves motor skills, mental and physical health, and classroom performance; the lack of it can lead to developmental delays and other behavioral issues in students because there are less opportunities to stimulate cognitive functioning. Disruption in cognitive functioning can lead to disruptions in social-emotional well-being, which is inconsistent with teachers and parents' intention when teaching children. Movement benefits all different kinds of students, however, children are less active today than ever before. The purpose of this study is to share the benefits of exercise and link them to the development of children, and how we can implement more movement in schools to improve academic performance. By bringing awareness to the importance of exercise in young children, healthy habits can be built to help children increase movement and improve classroom performance. Informing parents, teachers and students about how exercise can contribute to the well-being of children will bring better results in the classroom and set students up for a healthier future.

35. CRT in K-12: Misconceptions and Applications

Student Presenter: Kyle Fersner
Faculty Mentor(s): Tiffany Harris
Additional Authors: Thomas Mayes

There is an unfortunate abundance of controversy surrounding the machinations of modern public education in the United States, and all carry significant weight in the potential implications for the state of education and our K-12 students. However, very few of these discussions carry the potential for misunderstanding and subsequent animosity as that of Critical Race Theory. In our research, we look to identify, understand, and dissolve these remarkably common misconceptions for the collective understanding and improvement of general education. We analyze the social, historical, and civic factors that may breed these misconceptions, as well as the implications of such factors. This is a bipartisan approach that intends to highlight and educate audiences as opposed to bolstering an argument on either side of the partisan spectrum.

♻ Sustainability-related project
*Graduate student

36. Educational Realities in Gaza Pre and Post War ♻️
Student Presenter: Grayson Foley
Faculty Mentor(s): William McCorkle

The available public data from the Palestinian Central Bureau of Statistics shows the overcrowding and teacher shortage in Gaza over the last several decades with a growing population under the age of 18. These educational issues were exacerbated by the 2020 COVID pandemic. This research is based on the analysis of this publicly available data, but will also seek to forecast the possible future realities of education in Gaza after the destruction of educational facilities and schools during the war with Israel in 2023 and 2024. Currently, 79% of schools in Gaza have either been destroyed or suffered sustained damage because of the war. Using an economics framework we consider the long term social and monetary effects that these educational difficulties will have on the Palestinian population.

37. How best to implement nature in the classroom curriculum considering the multifaceted benefits of green spaces in other aspects of the community. ♻️
Student Presenter: Zinnia Futhey
Faculty Mentor(s): Ashleigh Werth

The environment significantly influences brain development, with nature playing a pivotal role in this process. Integrating nature into the classroom curriculum and structure presents educators with an opportunity to cultivate a nurturing environment that supports mental health, executive function development, and mitigates the impact of toxic stress and other adverse influences. By examining the positive impact of nature in diverse community contexts, we can glean valuable insights for its effective implementation in educational settings. Nature schools represent an extreme yet enlightening example of this approach in action, offering innovative strategies for incorporating nature into the curriculum. These schools not only serve as a rich resource for understanding the educational benefits of nature but also inspire imaginative and unconventional methods for integrating it into learning experiences. Similarly, community green spaces serve as successful models for leveraging nature to enhance the well-being of the general population. A growing body of research underscores the therapeutic effects of green spaces on mental health outcomes, including stress reduction, anxiety alleviation, and improved mood regulation. Furthermore, the integration of greenery and outdoor learning spaces within educational environments has been linked to enhanced attention, creativity, and emotional resilience among students. By synthesizing this research, educators can develop and implement effective teaching strategies tailored to harness the benefits of nature in educational curriculum design. This holistic approach not only enriches learning experiences but also fosters a deeper connection between students and their natural surroundings, promoting overall well-being and academic success.

38. Classroom Language
Student Presenter: Hannah Godek
Faculty Mentor(s): Laura Brock

In the world of education today, there are numerous ways that you can better the classroom experience for the students. Things like brain breaks, games, or making the lessons more engaging. One thing that is rarely talked about is the language used in the classroom. Especially with early education, there is a huge question in the back of my mind; what language works best for young children, on the topic of behavioral issues or productivity in the classroom. With my research I will use this to not only better understand students in the classroom and how to help them, but I will also be able to pass it on to other teachers around me. I think figuring out what language works best in the classroom has always been something that is extremely intriguing to me. I never know whether to be stern, or calming, nice, or giving them choices. I think this is something I could carry into my classroom in the future, and pass it on to other teachers, making the classroom a more productive and welcoming place.

39. The Treatment of Young Girls in the Classroom
Student Presenter: Angela Hales
Faculty Mentor(s): Ashleigh Werth

My topic is about how girls are unfairly treated in classrooms. I'm very interested in which the ways girls are treated in the classroom affect their academic performance, behavior in the class, and self confidence later on in life. Young girls are often expected to be standards of good behavior for their male counterparts in their class, even being seated next to boys who exhibit problematic behavior in order to get that boy to behave by having the girl watch over him. This puts the girl in a very vulnerable position, having her be responsible for not only her own behavior, but also the behavior of her male classmates. I also want to explore how educators treat girls in the classroom, whether they are more or less likely to call on girls versus boys and how this affects their academic performance. I hope to also find research on how girls and boys interact with each other in the classroom. I will also provide ways to ensure gender equality in classes.

40. The impacts of outside activity on behaviors and productivity in the classroom.
Student Presenter: Meghan Haug
Faculty Mentor(s): Ashleigh Werth

The requirement for physical activity in South Carolina is only 90 minutes of Physical Education and 60 minutes of planned physical activity per week. Integrating physical activity and movement into classroom routines has an impact on student academic performance, behavior, and overall well-being. The sedentary nature of traditional classroom settings has potential negative effects on student engagement, attention span, and academic achievement. Research suggests that incorporating physical activity into learning environments can enhance cognitive function, improve classroom behavior, and positively influence academic outcomes. Through a systematic review of empirical studies, theoretical frameworks, and educational practices, this study will examine the effects of integrating physical activity and movement into classroom settings. By analyzing the findings from many sources, including experimental studies, observational research, and qualitative inquiries, the research aims to identify key mechanisms underlying the relationship between physical activity and student behavior and productivity outcomes. The intended outcome of this research is twofold: firstly, to raise awareness among educators, policymakers, and stakeholders about the importance of incorporating physical activity into the classroom to support student well-being and academic success. Secondly, to provide practical guidance and evidence-based recommendations for implementing physical activity initiatives in educational settings, thereby promoting healthy learning environments and maximizing student potential.

41. The Role of Culture in Parental Involvement in Primary Education
Student Presenter: Na'ama Hoffman
Faculty Mentor(s): Ashleigh Werth

Parental involvement in their childrens' education is imperative for student success, but there are limiting factors that might cause parents to not be able to be as involved as they want and should be. Culture and socioeconomic status are interconnected factors when it comes to parental involvement in education. Parental involvement is much higher in schools located in high income areas versus low income areas. Factors such as one parent households, working class parents, and language barriers are things we must take into account when planning school activities that require parental involvement. Parent-teacher communication is important for understanding children's needs as well as highlighting their strengths and successes. This is why prioritizing inclusivity measures and multicultural approaches to education and schooling is necessary. By implementing these measures, we can work to understand the role of cultural differences and socioeconomic status in parental involvement as well as work on fostering positive cross cultural relationships between parents, students, and teachers.

42. The Impact of Education on Economic Growth
Student Presenter: Coral Holmes
Faculty Mentor(s): Ashleigh Werth

Several studies have reported the impact of education on economic growth in different communities. Many businesses have begun investing in school systems around the world in order to help the next generation and contribute to economic growth. This type of investment helps to prepare students for entering the workforce by widening their knowledge on research and entrepreneurship, while also getting them excited about topics in business. The quality of a child's education does not only benefit the child themself, but is also very beneficial to society in the long run. These studies show the correlation between well-funded education and economic growth in different areas. It has been proven that communities who invest more into their education systems will ultimately end up with a greater economic advantage than those who do not.

43. Just How Important is Psychology in the Classroom?
Student Presenter: Chloe Holt
Faculty Mentor(s): Ashleigh Werth

The question that I aim to find an answer to is how classroom management and facilitation affect the psychological well-being and academic success of students. My initial interest in this and why I would like to study it comes from my original interest in psychology. As a psychology turned elementary education major I am interested in what aspects of the classroom create the most stimulating environment for students to feel comfortable and safe in. I have experienced firsthand the effect that this has on students. It was very clear that growing up, the classrooms and teachers that provided the best atmosphere and structure for learning were always the classes that I performed better in, and felt more excited to attend. By facilitating research and looking at past studies, I hope to find a connection between the two. I want to discover which tactics are successful and which are harmful. By doing this project and research, I am hoping to be able to educate teachers on the impact that they have on the overall psychological well-being of their students. Teachers need to understand that they are molding minds at such an influential age of brain development and that how they set up classrooms, facilitate behavior management, and teach lessons can have serious effects that can alter psychological well-being for the better or the worse. This is also important because this can facilitate better academic understanding and learning skills, which, in the long run, helps set students up for success academically.

44. How Can We Improve Classroom Management Skills In First-Year Teachers?
Student Presenter: Adrianna Jackson
Faculty Mentor(s): Ashleigh Werth

Through educational studies, it has become common knowledge that classroom management skills are a struggle for first year teachers. From creating a safe space in their classroom to responding appropriately to behavioral issues, it can be incredibly overwhelming for a new teacher. This overwhelming feeling can result in teacher burnout or depression in first-year teachers. Ineffective classroom management skills can also be harmful to their students. When students lack a feeling of safety and structure in the classroom, it can result in poor academic performance and a poor attitude towards school in general. Though it is mainly first-year teachers that struggle with classroom management, we can not just label them as "bad teachers". There needs to be better preparation for incoming teachers to combat this issue. This project will explore research on how better training for building classroom management skills can be provided for preservice teachers. First-year teachers need to be equipped with more skills than just being able to teach a curriculum. This change will improve the overall well-being and education process for students and teachers.

45. Social Effects of Movement For Children
Student Presenter: Caroline Knapp
Faculty Mentor(s): Ashleigh Werth

Incorporating physical activity into classrooms for elementary school students will improve education as a whole. Movement increases the social and emotional health of children. Mental health and the social ability of developing children is not addressed as it should be. Research indicates that activity improves self confidence and boosts self esteem. Physical activity releases specific chemicals in our brain, known as endorphins, which improve the mood and well being of the students. Utilizing activity to increase social and communication skills results in improvement in both academic, and extracurricular settings. After COVID 19, the social skills of young children decreased drastically. Children were quarantined from the world during prime developing years. By integrating activity into pre-existing curricula, students can gain back the lost skills and become more social. Making connections among these practices could lead to a drastic improvement among children and adolescents' cognitive and social-emotional health. Movement allows students to remain focused and engaged in the classroom. I will provide numerous ways to incorporate physical activity and brain breaks into the classroom that will result in multiple benefits on the social and overall well being of developing children.

46. How Dance Improves Cognitive and Behavioral Performance in a Classroom Setting
Student Presenter: Fiona Lambrix
Faculty Mentor(s): Ashleigh Werth

Mental health has been a continuous topic of conversation within our society that needs addressing. While the conversation often revolves around adults, we fail to observe the massive population of elementary aged children who struggle with mental discrepancies. As a child who struggled with anxiety in elementary school it was hard to be taken seriously or understood by my teachers. Until I found the outlet of dance and physical activity. Through previous research we understand there is a correlation between the release of endorphins and the positive effects it can have on our mental state. Through research I plan to better understand the correlation between physical activity and the positive behavioral and cognitive outcomes that can come from implementing physical activity within a classroom setting. There is a stigma around young children battling mental health. We see this in classroom settings and regret to recognize that there could be a potential correlation between a child's behavioral patterns caused because of an underlying mental health issue. By drawing connections between knowledge of pedagogical practices and the effects of movement, specifically dance, on cognitive function, this research aims to better understand the correlation between physical movement and the improvement of performance in the classroom.

Sustainability-related project
*Graduate student

47. Advocacy Project
Student Presenter: Emily Lipe
Faculty Mentor(s): Ashleigh Werth

How does Early Childhood trauma affect the brain? How does it affect a classroom setting and how can a teacher be more accommodating? There are lots of kids with trauma experiences, I want to understand from the neurological perspective of what being exposed to trauma actually does to developing brains. What effects does it have long term? I also want to understand how this shows in the classroom and what way a teacher can show support.
Information:
How many children are affected by childhood trauma?
- Did You Know Childhood Trauma Affects Nearly Half of American Children?
I searched "Early Childhood Trauma" in the library database and found:
- The neurobiological effects of childhood maltreatment: an often overlooked narrative related to the long-term effects of early childhood trauma?
- The Long-Term Consequences of Early Childhood Trauma: A Case Study and Discussion
I searched "Early Childhood Trauma in the Classroom" in the library database and found:
- Trauma-informed Teaching in the Early Childhood Classroom: Teachers' Perspectives on Supporting Students Exposed to Trauma
- Addressing Trauma in Early Childhood Classrooms: Strategies and Practices for Success
Knowing trauma does have an impact on the brain and so many children are affected by it, it's important for teachers to have an understanding of how they can help the child in their classroom. The first step in understanding how they can help is understanding how it affects the person long term. I want my project to bring awareness to the affects trauma can have.

48. Active Shooter Drills in Schools
Student Presenter: Grayson Liston
Faculty Mentor(s): Tiffany Harris

School shootings have become a tragic recurring issue within the United States of America, and questions on how to best prepare students in the event of a school shooting have arisen as a direct result. One such response to this issue is the implementation of active shooter drills in schools. Some aspects of active shooter drills include simulated gunfire, fake guns, and actors playing the role of students that have been shot. The question being posed in my research is whether or not these drills impact students' perception of safety within their schools. In order to analyze this, I will look at peer reviewed journals, news articles, and firsthand accounts from students. Through observation of data, I will gain an understanding of both the effectiveness of active shooter drills as well as the impact that they leave on students.

49. Accessible Nutrition as a Key Component in School Age Students Performance
Student Presenter: Brenna Monteiro
Faculty Mentor(s): Ashleigh Werth

Nutrition is a vital component for humans and wellbeing. In schools specifically, students rely on nutrition to aid in school performance and cognitive function. In elementary, middle, and highschools some students of low or middle class income status rely on school provided meals as a primary source of food and nutrition. However, school provided lunches tend to contain high levels of sugars, fats, and heavily processed and packaged foods. The malnutrition of foods directly correlates to poor cognitive function and trouble focusing. Although there are meal plans in place at most public schools and a specific set of nutrient standards that school districts, these plans set in place are often struck down with loopholes. The heavily processed, packaged, and frozen food offerings that are provided to students are not nutritionally dense enough and therefore contribute to a decline in academic performance. Providing nutritious meals to students, especially those who might not have access to this at home, is beneficial to not only student health but also academic performance and overall stability. This can be achieved by implementing guidelines, increasing student knowledge of daily nutritional needs, and as the CDC suggests, implementing the Student Breakfast Program at schools.

50. Phonics vs Whole Language learning in the classroom
Student Presenter: Malaysia Otero
Faculty Mentor(s): Ashleigh Werth

The integration of phonics in a public school system's curriculum has been a topic of debate for a while in the realm of public schooling. Phonics was recently defined as a system of teaching meant to teach symbol and sound association to teach reading. Phonics has been replaced with Whole Language Learning, which teaches memorisation of words. I find this to be very relevant because teaching a new way of reading and comprehension, and thus the entirety of literacy for the rest of a child's life can have devastating effects on a student's ability and reading skills in the future. Understanding which form of teaching is more beneficial from the account of teachers is the best way to support teachers in providing a quality education for their students. Few research exists containing teacher accounts of how they feel phonics has affected reading rates in their classrooms but even fewer about whether or not whole language learning is really impactful on children's learning. Getting teachers' opinion on the new enforced curriculum is especially important considering many schools in America are rejecting the new curriculum in favor of embracing the old phonics curriculum. I aim to survey primary school teachers to get a first hand account of how phonics and whole language learning affects learning rates and how the drastic curriculum changes are affecting their students' learning.

51. The Importance of Clothing, Expression of Individuality
Student Presenter: Mike Patterson
Faculty Mentor(s): Ashleigh Werth

There are a plethora of ways that students of all levels can choose to express themselves in their respective schools; these can include: music, art, writing, and hair styles. Sadly, there is one form of expression that can be infringed upon depending on the school, which is clothing. Schools that require a uniform completely strip that expressive outlet away from their students. The reason for that being is to relieve students of peer pressure and to help students concentrate more within the classroom. But what if I were to tell you that school uniforms are doing more harm than good for our youth? How do we expect students to find out who they are or who they want to be if they cannot fully express themselves to their desired extent? There is no sense of individuality in a school where everyone looks the exact same, it's like looking at a school of fish. So bland and no character to be shown or expressed. How does one grow in that environment? I aim to prove the importance and benefits of giving the students the freedom to express themselves through clothing instead of boxing them in.

52. Drawing the Line: District zonings impact on Charleston students education ♻
Student Presenter: Savannah Prescott
Faculty Mentor(s): Ashleigh Werth

Throughout the Charleston County school district minority and low socioeconomic students have been battling for access to quality education over generations. The discussion regarding school district zoning and how that impacts segregation within the county school system has never ceased. This issue relates to the lack of quality education for low socioeconomic status students, which throughout Charleston tends to be minority groups. Surveys conducted reflect the notion that availability to quality education within the Charleston county school district is not equal.
This problem has directly targeted the tri-county school district of the area, that includes Charleston, Berkeley, Dorchester county. It is beneficial to understand what roles play into this issue being resolved, due to the issue being publicized to gain traction for change, virtually all of the Charleston community is factored into this discussion of district zoning.
Moreover, the Charleston Forum, a community project led to review topics concerning race within Charleston, has played a crucial role on this subject. The project has contributed to promoting the communities opinions through conducting surveys and reaching out to district members. Nevertheless the argument of district zoning being redrawn and making changes to aid in fixing this matter is ultimately in the hands of political officials and school board members. I aim to work alongside community members and local officials to redraw zoning regulations or better implement quality educators into all districts in hopes to make Charleston a more equitable environment for learners within the low country.

♻ **Sustainability-related project**
*****Graduate student**

53. Children Deserve to Feel the Bad Emotions
Student Presenter: Caitlin Quinn
Faculty Mentor(s): Ashleigh Werth

Hardship does not discriminate. Grief, familial hardship, moving to a different school, divorced parents or any of the countless reasons why a student could be acting differently need to be adequately addressed in schools. Children spend 8 hours every day, for 5 days a week, in school. It is where they spend the majority of their time, and it is a disservice to allow students to struggle while they are in attendance. Children have very big emotions, and dealing with everything that comes along with school in addition to their own demons can send students into a bad place mentally. School Guidance Counselors need to be better equipped in grief counseling, and need to flag students that meet the requirement for at-home hardships. Accommodations need to be easily accessible and the school needs to have open lines of communication with parents. Teachers need to emphasize the importance of mental health in the classroom, and encourage students to be honest with them in times of need. My proposal is to make school staff more aware of the issues, teach faculty how to handle mental health issues in their students, and seek out the children who could potentially need more help than others. Raise awareness, be better prepared in the event that the students are struggling, and handle it as effectively/compassionately as possible.

54. Student's Interest Matter
Student Presenter: Alana Reynolds
Faculty Mentor(s): Ashleigh Werth

Students are getting more disinterested in school which is causing an academic and social problem in classrooms. Teachers are not able to keep students' attention on the subject at hand, I believe that in order to combat this we should be including student's interest in the classroom. With more information and support, we can get students more interested in staying in school and paying attention in classrooms. Incorporating individual interests in class teachings and structures of lectures and readings have been proven to increase the student's interest in school as well as their motivation and learning experiences. Furthermore, students will be able to think more creatively and with more of an open mind to the world around them, making them better members of society. The education system needs to be more lenient on what teachers teach in their classrooms, so that they may be able to keep students interested in learning. I plan to work with psychologists, counselors, school board members, educators, and parents to create a structure of learning that incorporates the student's interests.

55. How the Pandemic Has Worsened the Reading Crisis
Student Presenter: Emmie Rhoden
Faculty Mentor(s): Ashleigh Werth

In recent years, South Carolina's education system has faced a strong decline in reading levels and reading proficiency, especially after the Covid 19 pandemic. This is an issue that will have very negative effects on elementary school students if it remains unaddressed. Many students are behind reading level and current elementary students are not learning how to read due to the elimination of phonics combined with the effects of the pandemic. After experiencing first hand the negative impacts of students who either do not care for reading or literally can't read, it is evident that this problem needs to be addressed by promoting reading in classrooms again and implementing phonics back into the curriculum.

56. Reading Much More
Student Presenter: Michael Rohling
Faculty Mentor(s): Ashleigh Werth

The difference in reading from high school to college is quite large. High schools need to prepare their students more by giving more reading assignments throughout high school to better prepare students for college. A possible consequence could be the high dropout rate among first-year students. Students can fall behind so easily when it comes to reading and that may be a cause of trouble in high school and college. A curriculum that can prepare students for college, means a decrease in college dropout rates and a more literate society. The current reading curriculum could explain the current literacy problem in some areas of the country. Reading is an essential skill for all students and it is not being taught enough. Students need to be able to read books throughout their school year and gain knowledge from the book and subject to better ready themselves for college and real life. Some students coming from low-performing high schools do not recognize the vernacular that is so abundant in the college reading scene. A restructuring of the current reading curriculum and requirements in high school would benefit everyone in society because it would improve the dropout rate in colleges and educate our society beyond what it is now. How would the country restructure its current reading curriculum to benefit society?

57. Educating Educators
Student Presenter: Stephanie Sams
Faculty Mentor(s): Ashleigh Werth

Throughout the time that a future educator is in school, they undergo many classes to prepare them for a class of their own. Some of the courses they take include educational psychology, technology integration, pedagogy, subject matter, field experience, and more. What teachers are not taught is that when becoming a teacher you are not dealing only with the student that sits in your classroom every day, but with the student who doesn't have a support system at home, or the student with no food, or the student with limited resources. Educators learn the crucial needs of children's brains and the impact that their surroundings have on them from a young age, yet they are not taught how to be there for their students. The people that they see everyday and grow to care for and love. There are boundaries in which teachers need to stay inside, while still lending a hand to those in need. By providing a course or certified training to educators on how to take on another role, while still remaining in the teacher-student boundary, I believe that there could be a wide variety of benefits. I think that fewer teachers would leave the field, as teachers tend to take on the problems of their students. More students will feel comfortable enough to seek the help they need, such as counseling, without the feeling of being an outcast. Making a change in training will then start the change of the future generations.

58. Integrating Movement in the Elementary Classroom
Student Presenter: Faith Slimmer
Faculty Mentor(s): Ashleigh Werth

Incorporating movement into the elementary classroom is a critical step toward improving student focus. It is common to find elementary students required to sit still at their desks for multiple hours at a time, counting down the minutes until they are able to move their bodies during recess or physical education class. Yet, children simply crave movement which can lead to less focus in the classroom. It is important to recognize that most students only attend physical education class once a week for about forty-five minutes. With this in mind, classroom teachers have an obligation to provide movement opportunities for their students throughout their school day to improve overall focus in the classroom. Through personal experience, observation, and academic research it is evident that students have limited opportunity for meaningful movement in the classroom. Although educators are focused on completing their curriculum and staying on schedule, movement will not take time away from educating, but will actually enhance learning through encouraging improved focus through purposeful movement opportunities. I aim to bring awareness to this issue regarding limited opportunity for movement in elementary classrooms and further provide educators with practicable ways to incorporate movement into their classroom without straying from curriculum.

59. Advocacy to better inform future educators on assessing and accessing receptive language
Student Presenter: Adaline Smith
Faculty Mentor(s): Ashleigh Werth

There is a disconnect in teacher education regarding assessing receptive language in children and how to access it. A child may understand a high percentage of what is being said to them but lack the motor skills to express their knowledge. Teachers are not being properly trained on how to test receptive language levels independently of expressive language. It is important not only that future educators know how to test for this but afterward how can they access it. This is especially true in low-income areas where typical education teachers don't have access to quality special education resources. This research aims to inform educators on how they can test receptive language levels and what their next steps should be if they don't have the financial resources to provide high-quality communication devices. By compiling an abundance of recent research this study provides clear and concise information for future educators to make them better teachers overall.

60. Art Therapy Within The General Education Classroom
Student Presenter: Sarah Anne Sponseller
Faculty Mentor(s): Ashleigh Werth

Art should be incorporated into the general education curriculum to aid mental health. Mental health is very prevalent in children, specifically ages five through fifteen. This can be anything from emotional to social to behavioral problems, including anxiety, depression, ADD, ADHD, and many more. It is not only important to be able to identify these symptoms within the classroom, but to provide a way to help. Traditional psychotherapy or counseling can be a great option for some, but is not always the best option for every individual. This is why art therapies should be integrated into every classroom. To start the schools should have clinicals for the teachers to educate them on common adolescence defenses and how to properly execute the art therapies. Examples of some art therapies are: dance movement psychotherapy, drama therapy, music therapy, and many more. There are many forms of art therapy to allow creativity and freedom to the students and there is something specific to every student, to cater to their needs. If we incorporate these art therapies in the classroom, it will hopefully result in a more comfortable place to express ourselves without having to talk.

♻ **Sustainability-related project**
*****Graduate student**

61. How Movement Creates Positive Learning
Student Presenter: Kendall Suggs
Faculty Mentor(s): Ashleigh Werth

Incorporating movement into everyday activities in the classroom setting can help boost cognitive brain development. Movement is a great way to keep students engaged during lesson time. Whether this be through a group activity, games, or small exercise movements, it can help the students stay interested in the topic at hand. Specifically students with exceptionalities need this time of movement implemented to keep their brains functioning. Studies have shown that a specific amount of play time/ exercise in the classroom can improve multiple factors. Such as building cognitive and judgment skills, improving self confidence, and helping with sleep patterns. Inserting a certain amount of time for movement into your daily classroom routine will overall have a positive effect on the cognitive development of these students. Overall, implementing movement into the classroom will not only help students stay active, but will also help them continue to grow in their education. I aim to educate others how this topic can have a large positive impact on all students. I want other educators to be aware of the possibilities and opportunities they have to help their students improve in more than just the standard way of lecturing in the classroom setting.

62. Standing Desks and the Benefits for Both Students and Educators ♻️
Student Presenter: Ja'Leah Summers
Faculty Mentor(s): Ashleigh Werth

As we all know, movement is essential for everyone, but it is vital for children because of its effect on their growth and development. Studies have shown that since the impact of COVID-19, students have experienced a decrease in learning, engagement, and attention span. Students have undergone many educational changes yet still suffer from the system. However, educators, districts, and people in power can change this. Standing desks inside the classroom have been found to alleviate these issues and show increased physical activity and behavior. It has been discovered that incorporating standing desks into the classrooms can reduce student anxiety and stress. Certain schools have been able to get standing desks. However, many schools still lack the resources and opportunities to get them. I would like to put a few standing desks in all elementary schools within the Charleston County School District. While some schools can do this themselves, some simply can't afford to. That is why I aspire to work with the district and each of the individual schools to determine how we could implement standing desks in every classroom so that students can choose whether they prefer the traditional form of sitting down at a desk or using a standing desk.

63. comparing and contrasting schools in the north-east and south-east
Student Presenter: Grace Swanciger
Faculty Mentor(s): Ashleigh Werth

The educational landscapes in the Northeast and Southeast regions show variations shaped by historical, cultural, and socioeconomic factors. While both regions share a commitment to academic achievement, Northeast institutions continue to pass Southeast institutions in categories such as graduation rate, attendance rate, and test scores. Examining the differences in Southeast vs. Northeast educational curriculum, practices, class sizing, and standards gives a much clearer picture on why this disparity exists. I plan to examine specifics for each region and lay out a broader image of what each region offers students and how this impacts future successes for these students. Through my research I encourage viewers to think critically and carefully and come to their own conclusions on what these differences mean for the future of education.

64. How can technology affect the development of children? ♻️
Student Presenter: Brooke Tarr
Faculty Mentor(s): Laura Brock

Technology is advancing day by day and is becoming more popular within adults and children. Technology can have a crucial effect on the development of young children. A lot of the technology use of children reflects on the parents' screen-time, if a child is observing their parent always on a device they are more likely going to learn from that and become avid technology users as well. This technology can cause emotional issues like low self-esteem, depression, stress and anxiety. Some studies also suggest a possible link between excessive screen time and delays in language development, attention span, and emotional regulation. A balance between digital and outdoor or indoor activities is important for development. Although there are many negative effects there are also positive effects of technology with young children. Children that are non-verbal or have issues with speech can use devices such as i-Pads to communicate with caregivers or teachers. Along with communication, things like educational videos and games can be accessed which are known to strengthen the brain. Certain technological tools can promote the development of cognitive skills, problem-solving abilities, and creativity in children. Exposure to technology at an early age can also help children with digital literacy skills, which prepares them for a future where technological skills are needed in various aspects of life.

65. Impact of Interactive Teaching in Classrooms
Student Presenter: Taylor Thoelen
Faculty Mentor(s): Ashleigh Werth

For this Classroom Advocacy Project, the topic I have decided to focus on researching is exploring the impact of interactive and visual teaching on young children in schools, as opposed to traditional teaching methods. I have decided to choose this topic for many reasons. This is a method of teaching/learning that I have had experience with in my own elementary schools and would like to further learn about its impact. My third grade teacher left a major impact on me because of her interactive teaching style that helped me succeed. I want to research if implementing this learning style in all classrooms is beneficial for all young children in schools. I know some information thus far from personal experiences and observation, so therefore I believe it will be very effective for children, especially in the present day. As a result of social media, the news, and even being around children myself, I am aware of the lack of focus, interest, and attention span most children have today. Therefore, I want to further research how interacting teaching and learning could potentially increase children's ability to grow and thrive in school. Overall, I want my project to accomplish change and give the opportunity of greater success to all children in elementary schools.

66. Technology in the Classroom
Student Presenter: Sebastian Travis
Faculty Mentor(s): Ashleigh Werth

In the current day and age, we all find ourselves living in it can be a challenge to not find technology everywhere you go. This begs the question that technology should be combined with a setting such as the classroom to teach growing minds more effectively. With how the current state of technology, and social media is portrayed where everyone has a supercomputer available at in time in their front pocket, it is hard to say if that is entirely a good thing. In this current time studies have shown that social media can actually be damaging to a young and growing mind, or on the other hand implementing technology into a classroom could also advance the learning experience into a more interpretive way of teaching. Potentially there will be a day where virtual reality might be the new way of learning so children can be at home and still experience a classroom experience. I aim to show the importance of understanding both the benefits, and disadvantages of a age where technology is constantly changing and evolving.

67. Parent-Child relationship impacts on learning disabilities
Student Presenter: Michelle Vanaria
Faculty Mentor(s): Ashleigh Werth

Throughout all school systems all over the world there are populations of children who struggle with learning disabilities, many of which go undetected. The amount of parental involvement in the child's education and schooling can have extreme impacts on the child's development. Research suggests that parents may have different levels of involvement based on multiple factors such as socio-economic status and levels of education. Knowledge of developmental psychology within pedagogical practices has also shown that early intervention is the most beneficial to the students. When learning disabilities are detected early in a child's life and in early education, there are many more opportunities for the child to make progress. The intended outcome of this project is to highlight the importance of the level of parental involvement and its impacts on improving development for children who struggle with a learning disability. To improve parental involvement, researchers suggest implementing programs available for parents to learn more about their child's disability and how they can guide their children successfully throughout their educational life. There are many ways in which parents can be practicing behaviors at home with children to improve their experiences in the classroom as well as their transitions between grades or schools.

68. Art Integration Within the Classroom
Student Presenter: Destiny Weil
Faculty Mentor(s): Ashleigh Werth

Many students struggle with learning in lecture-only classroom environments. Hands on and social learning through art can be incorporated within every subject of the classroom. Art integration in curricula helps students engage in active learning and deepen understanding of content as they interact with the material provided by teachers. Art integration allows for students to explore and become leaders in their own learning with the guidance of the educator. Additionally, creating exciting and artistic assignments as a part of curricula allows students to express what they have learned to their teachers that may have been more difficult to convey in traditional quizzing or testing. Through investigation of educational and developmental research, a greater understanding of how using art curriculum as a teaching method has impacted both students and teachers alike has been developed This project focuses on the positive aspects that incorporating art has had on the traditional classroom and the ways we can continue to utilize this information for student learning improvement.

69. Grounding Through Bioregional Literacy in K-12 Schools ♻️
Student Presenter: Molly Westfall
Faculty Mentor(s): Ashleigh Werth

Many students in the United States struggle to deal with the burden of childhood trauma. Some students may have even endured trauma at an earlier stage due to exposure to teratogens while in utero. Development during childhood is crucial, and when a child experiences trauma, it can have adverse effects on their entire lives by affecting their neural pathways. Experiencing trauma at a young age can lead to a plethora of mental health and behavioral issues in students. This can negatively affect students' learning and social abilities. Teachers are a constant in the lives of students and have the power to support students who have experienced trauma through trauma-informed teaching and classroom protocols. There is a direct correlation between time spent outdoors and the overall health of someone including their mental and physical health. By implementing bioregional literacy curriculum to help ground students and increasing the overall time students spend outdoors, teachers and their administration can make a long-lasting impact on the lives of students.

70. A Healthy Education ♻️
Student Presenter: Savannah Wurst
Faculty Mentor(s): Ashleigh Werth

The majority of students spend the entirety of their school day confined to their desks until they go to lunch and eat an imbalanced lunch lacking essential nutrition. It is imperative that we start to integrate healthier options in cafeterias and get children to be more active during the school day to stimulate brain activity and engagement. This issue is particularly pressing for students who possess lower socioeconomic status and do not have the funding for extracurricular sports, foods with nutritional value, and awareness on why these things are so important. There is an overall lack of education in food science and exercise for children and the tiny amount of information that is taught to students is typically not introduced until high school. By establishing a healthier environment and educational framework, we have the opportunity to significantly improve long-term memory and academic performance. Drawing upon extensive research, experiments, and analysis, I conclude that incorporating these tools into schools at an early age promotes more engaged learning and an overall healthier development for children in school systems.

Master of Arts in Teacher Education

71. Improving Teacher Retention Through School Engagement Ambassadors
Student Presenter: Adam "AJ" Barnes*
Faculty Mentor(s): Kevin Eakes

In a time where many schools are experiencing high turnover rates, it is essential that we expand on the work being done to provide a support network for new teachers. Charleston County School District (CCSD) has a successful induction and mentoring program that provides support to first year teachers. However, this support is not available to all teachers who may be new to a building, CCSD, or South Carolina. While many building leaders create inviting and supportive cultures in their buildings, there is no system that creates a consistent set of expectations for providing support to teachers across the district.

The School Engagement Ambassador program offers the opportunity to deliver the differentiated supports our new teachers need, creates a structured system focused on retention that is consistent across the district, and provides leadership growth opportunities for classroom teachers. This program can become a cornerstone to retaining veteran teachers by providing authentic leadership pathways. The Ambassador program allows a classroom teacher to remain in front of their students while being elevated to a leadership role to positively impact their school culture. Ambassadors will serve as the support mechanism for new teachers, expand on their experience as trained mentors, maintain dialogue with their principal about retention efforts, and engage in leadership development with other ambassadors across CCSD.

This proposal incorporates related literature research, a needs assessment, rationale, examples of successful models, framework for implementation, and program evaluation measures.

72. How to Learn, Teach, Manage and Survive a Secondary Social Studies Curriculum
Student Presenter: Lindsay Skillman*
Faculty Mentor(s): Kevin Eakes

There is a need for a teacher education course like How to Learn, Teach, Manage and Survive a Secondary Social Studies Curriculum. The prerequisite for this course would be EDFS 456: Teaching Strategies in the Content Areas - Social Studies. Pre-service teachers need to have an additional course that addresses how to teach the actual secondary social studies standards for South Carolina.
The EDFS 456 course is a great launching point for learning about the state and national standards, ways of lesson planning, types of assessments, and inquiry-based activities. However, pre-service teachers need more direct instruction and help with how to plan, teach, manage, and survive with today's South Carolina's secondary social studies curriculum and classroom. Completing this course would lead to the pre-service teacher's clinical practice in social studies.
The justification for this course is to acquire more field hours prior to student teaching and content knowledge related to authentic secondary social studies courses, to develop and implement various methodologies of this content knowledge, and to gain additional classroom experience through a semester or year-long mentorship program with a current secondary school teacher.
The goal of this curriculum course proposal is to benefit both pre-service and first year teachers. This course could alleviate some of the stress related to content preparation based on the assignments given in this course. Also, critiquing classroom scenarios and collaborating on classroom management strategies for today's high school classroom is imperative.

Master of Arts in Teaching

73. Special Education Training for Teachers of Extracurriculars
Student Presenter: Lauren Stubenhofer*
Faculty Mentor(s): Ashleigh Werth

Special Education students are encouraged to enroll and participate in extracurricular activities and classes like Physical Education, Art, Theatre, and Dance, however; teachers of these extracurricular activities are often not trained in Special Education. Inadequate training in the special needs of students is stressful for both the teachers and the students. This can disrupt the learning for all students, and hinder the teachers ability to do their job well. Proper training in special education would decrease distractions and increase effective teaching in the classroom. Special education students would feel more supported and included in the class and receive a more well rounded education. I want to bring attention to the need for more education of the needs of special education students in regards to their extracurricular activities. I want to be able to support special education students in every classroom, not just their core classes. Providing teachers with more training would in turn provide the students with a better chance for success both academically and professionally.

Master of Education in Teaching, Learning and Advocacy

74. Experiences of Palestinian and Arab-Americans in South Carolina During the War in Gaza ♻
Student Presenter: Haneen Dames*
Faculty Mentor(s): Will McCorkle

This paper is based on interviews with Palestinian and Arab Americans in South Carolina after the start of the war on Gaza. The study will both look at their broader thoughts regarding the conflict, the way they have been accepted or received due to the war, and how this relates to their broader experiences as immigrants in the American Southeast. The interviews will focus on those who have been involved with the activism in the Free Palestine/ceasefire event as well as those who have not been involved or hold more nuanced opinions. Central to this study is understanding the experience of Palestinian Americans (as well as Arab and Muslim immigrants) more broadly particularly in times of crisis and violence such as the current moment. The presentation will both give a broad overview of the perceptions of the Palestinian and Arab American population as well as time for discussion about the larger issue about how the geopolitical situations in the nation of origin can have an effect on the cultural and immigration experiences in the United States.

75. Daughters in Distress: A Qualitative Study on Adolescent Girl Mental Health in Charleston County ♻
Student Presenter: Alie Jones Terry*
Faculty Mentor(s): Kevin Eakes

In the last decade, there has been a severe rise in the number of adolescent girls experiencing serious mental health problems in the United States. Rates of anxiety, depression, and suicidality have been steadily increasing, reaching an all-time high in 2021. Across almost all measures of substance use, experiences of violence, and mental health, female students are doing more poorly than male students. This is a national public health crisis that needs to be prioritized and urgently addressed with a broad spectrum of evidence-based, preventative and intervening measures. This qualitative descriptive study seeks to understand the current state of the nationwide mental health crisis among adolescent girls in Charleston County. The proposed method is to use snowball sampling and social media groups to recruit school counselors and community-based mental health professionals to participate in semi-structured interviews. The interview protocol seeks to understand participant perceptions of the mental health crisis among adolescent girls in Charleston County, their understanding of available resources, and their proposed additional solutions for addressing the mental health crisis. The collected interviews will be thoroughly analyzed and coded for important themes to answer the research questions. The extant literature emphasizes the critical and powerful role of schools and communities in improving the mental health outcomes of adolescent girls, and it is the intent of this paper to elevate the perspectives of local school and community-based mental health professionals, with the hope of improving school and community responses to the wellbeing of adolescent girls in Charleston County.

76. Imagining Foundations of Education Anew: A Curriculum (Re)Design for Interdisciplinary Interpretations
Student Presenter: Ashleigh Werth*
Faculty Mentor(s): Tiffany Harris
Additional Authors: Dr. Tiffany Harris, Assistant Professor of Educational and Social Foundations, TEDU program; Holly Reagan, MSCL Program

How can an interdisciplinary approach and course materials support potential teacher education candidates in better understanding how societal inequities play out in schools? This study will examine critical teaching and learning aspects connected to an introductory level education course which fulfills several campus requirements. Utilizing knowledge of culturally responsive pedagogical practices, participants have worked to intentionally align course design between College of Charleston REI student learning outcomes (SLOs), and multiple core course requirements, including general education, and humanities, necessary for any education major or minor. Participatory action research methods have provided unique insight from students' perspectives surrounding curriculum redesign based on relevant topics and trends within the field of education. The qualitative inquiry-baed process chosen has identified existing gaps within syllabi inherited by first year faculty, which can in turn be used to improve curriculum and pedagogical approaches, resulting in valuable insight to the College of Charleston and the Department of Teacher Education alike. This study will primarily support the development of a more student-centered curriculum for an introduction level course fulfilling several campus course requirements. Furthermore, this project specifically concentrates on the REI SLOs as well as our "new normal"(the first full academic year mostly back in-person and without mask mandates or social distancing) since the beginning of the pandemic.

77. If 'Teaching is Our Superpower,' Why Can't We Stop the Increasing Teacher Shortage?
Student Presenter: Ashleigh Werth*
Faculty Mentor(s): Keonya Booker
Additional Authors: Dr. Laura Brock, Department of Teacher Education

Recently, the factors most commonly blamed for contributing to the increasing teacher shortage and burnout rate are typically listed as following: a barely live-able salary, the chaos experienced during and after the Covid-19 pandemic, conflicting priorities between educators and the general public, and intolerable working conditions in schools. Despite these topics seemingly arising within every conversation surrounding the education profession, it appears that any action taken to correct them, if any action is taken at all, has been futile. While significant attention has been directed towards specifically addressing the experiences of students and teachers, the question arises: are we focusing on the right groups of people? It seems as though the public, including those in the field of education, have forgotten that the burnout rate was climbing long before a virus initiated a global lock-down. By attributing the teacher shortage to the characteristics portraying the profession as less-than attractive, most have seemingly ignored the fact that, in actuality, the teacher attrition rate is high, and it is the rapidly declining retention rate that is to blame for our lack of educators. What if our obsessive focus on rapidly producing educators by expediting their preparation process and lessening the requirements to become certified, is also accelerating the burnout rate? This qualitative research highlights the significance that pre-service teacher preparation has on the education profession, while drawing parallels between common misconceptions increasing the growing invalidation of the profession in the eyes of the public, and identified factors actually contributing to teacher burnout.

♻ **Sustainability-related project**
***Graduate student**

School of Health Sciences

Department of Health and Human Performance

78. Process evaluation of the WarriorWOD program to reduce PTSD in military veterans through physical activity and nutrition education ♻
Student Presenter: KyLee Bales
Faculty Mentor(s): Kathleen Trejo Tello, PhD
Additional Authors: Maddie Skalski

Background: Promising new research indicates that behavioral interventions promoting physical activity may be an effective approach to reducing PTSD symptoms in veterans. Drawing on this research, WarriorWOD, a non-profit community-based organization, established their mission of helping military veterans manage and reduce PTSD symptoms through fitness. WarriorWOD is a free program for veteran participants that includes physical activity, nutrition education and peer-to-peer mentorship.
Methods: This study is a process and efficacy evaluation. A cohort of 30 participants were enrolled in the fall of 2023 in the Phase I process evaluation study. Participants completed online pre-intervention evaluations assessing their PTSD symptoms, motivations for, barriers to and perceptions of physical activity and health related questions. PTSD symptoms and program attendance are assessed and monitored monthly. Participants will be assessed following program completion for acceptability and feasibility. WarriorWOD organizers, nutrition counselors and peer-to-peer mentors will be interviewed for their experience in implementation.
Results: A total of 30 veterans completed the pre-intervention assessment, the majority (73%) were male. Factors affecting intervention implementation ease or difficulty, participant experience and acceptability of intervention components will be reported following conclusion of the six-month program in March of 2024. Full results will be available April 2024.
Conclusions: Findings from this study will help to evaluate the acceptability and feasibility of intervention components and inform any necessary modifications prior to evaluating the program's efficacy for reducing PTSD symptoms in veterans through physical activity and nutrition.

79. Plasma Biomarkers of Inflammation and Extracellular Matrix Turnover are Increased in HFrEF and Differ Between Certain Patient Demographics ♻
Student Presenter: Devki Bhatt
Faculty Mentor(s): Christy Kollath-Cattano
Additional Authors: Medical University of South Carolina, Department of Medicine, Division of Cardiology, Bradshaw Lab

Heart failure (HF) is one of the highest prevalent diseases in the U.S., where the heart is unable to pump blood properly around the body depriving the tissues of rich-oxygenated blood. There are two main types: HFrEF and HFpEF. Heart failure with preserved ejection fraction (HFpEF) is where the ejection fraction is greater than or equal to 50% whereas heart failure with reduced ejection fraction is where the ejection fraction is less than or equal to 40%. During HFrEF, muscles are able to contract normally and may seem to pump a normal proportion of blood, but muscle thickening causes ventricles to hold an abnormally small amount of blood. The blood also holds biomarkers in which levels vary amongst individuals. This experiment grouped control and HFrEF categories of cohorts: males v females, black v white, younger v older. Aliquots of 10 uL plasma samples from 13 control and 26 HF patients were sent for biomarker analysis. Results of biomarkers were compared and statistical significance was calculated, revealing not a lot of significance amongst the subgroups. In the overall groups, there was statistical significance in biomarkers IL-6, IL-8, TNFŒ±, MMP-1, MMP-7, MMP-8, MMP-9, MMP-10, and MMP-13 . This study does not prove a direct correlation between race, age or sex and presence of HFrEF even though it is known. Low sample numbers, varying biomarker levels and many omitted variables (comorbidities, severity of disease, medications, etc) could be factors that contribute to the unexpected results.

80. Physical activity and play behavior among children in/on playgrounds in Charleston, SC ♻
Student Presenter: Allison Carter
Faculty Mentor(s): Morgan Hughey
Additional Authors: Maria Zweig - Exercise Science

Regular participation in physical activity (PA) is crucial in establishing healthy patterns and reducing obesity risk in children. Playgrounds are significant aspects of the built environment designed to foster opportunities for children to engage in PA. In partnership with the Word Playground Research Institute, this study aims to characterize play episodes among children in Charleston, SC. By utilizing Global Positioning Systems (GPS) and accelerometers to gather, respectively, PA location and intensity data, this study analyzed differences in playground-based PA across youth demographics and park features. A total of 54 participants aged 5-12 years old were included, each equipped with a belt containing the GPS and accelerometer units. Participants were instructed to play normally for at least 15 minutes. Research assistants filmed participants with GoPro cameras to validate objective data measures. The parent/guardian was given a demographic survey to complete, which included information about the child and parent/guardian. Based on survey data, it was found that the sample contained an almost even split of boys and girls, 49.1% and 50.9% respectively, and an average age of seven. Children spent 49.7% of their park visit engaged in moderate to vigorous PA (MVPA). Data management is currently ongoing with more results to follow statistical testing. Analysis of results will increase understanding how to effectively design playspaces for various ages, gender, and background in order to promote increased PA duration and intensity among children visiting local playgrounds.

81. Phthalate exposure in bottlenose dolphins (Tursiops truncatus) sampled in Barataria Bay, Louisiana (2011-2023) ♻
Student Presenter: Tita Curtin
Faculty Mentor(s): Leslie Hart
Additional Authors: Miranda Dziobak - Department of Health and Human Performance, School of Health Sciences, College of Charleston, Charleston, SC, USA; Environmental Health Sciences, Arnold School of Public Health, University of South Carolina, Columbia, SC, USA
Amanda Moor

Phthalates are endocrine disrupting chemicals found in consumer goods including plastics and personal care products. Because of widespread use and their propensity to leach from these products, terrestrial and marine wildlife are ubiquitously susceptible to exposure. In humans, exposure has been associated with impacts on growth, development, metabolism, and reproduction. While wildlife health impacts are not understood, there is growing evidence linking phthalate exposure with health indices observed in human epidemiological studies. Given previous marine mammal studies, we sought to characterize phthalate exposure in bottlenose dolphins (Tursiops truncatus) inhabiting Barataria Bay, LA. Urine was collected during catch-and-release health assessments (2011-2023; n=45) and screened for seven phthalate metabolites via high performance liquid chromatography with tandem mass-spectrometry. One-third of dolphins screened were exposed to phthalates (n=15), evidenced by detectable concentrations of at least one metabolite. The most common metabolite was mono-2-ethylhexyl phthalate (MEHP; 31.11% of individuals exposed; geometric mean = 3.71; 95% CI: 2.31-5.98). There were no significant differences in the proportion of exposed dolphins by demography (male vs. female: 36.36% vs. 30.43%, p=0.76; adult vs. subadult: 32.00% vs. 35.00%, p=1.00); interestingly, across years, approximately half (46.67%) of exposed dolphins were sampled in 2011 alone. These findings agree with previous studies of dolphins inhabiting Sarasota Bay, FL, and highlight an additional stressor for Barataria Bay dolphins, a vulnerable population due to the Deepwater Horizon oil spill. Our findings, in conjunction with hypothesized impacts of phthalates, offer additional justification for concern over the general health of Barataria Bay dolphins and warrants additional study.

82. Normative Workload Data Across an Entire Season in a Collegiate Men's Soccer Team
Student Presenter: Blake Fentress
Faculty Mentor(s): Kate Pfile

Background: The acute:chronic workload ratio (ACWR) is a commonly used method of evaluating work rate in sports. Acute workload is the athlete's state of fatigue, representing the individual's initial response to cumulative exercise performed over a time frame of 1 week. Chronic workload is the athlete's state of fitness, representing the individual's prolonged response to cumulative exercise performed over a time frame of 3-6 weeks. Workload is a measure of external effort that is associated with athletic performance and injury prevention. Normative data is data from a reference population that establishes a baseline distribution for a measurement. This provides expected ranges for measures, comparisons between different groups, and comparisons within groups over time.
Purpose: The purpose of this study is to establish normative data for workload measures for NCAA soccer players throughout an entire season. (pre-, in-, and post-season)
Methods: Workload data was collected from the College of Charleston Men's Soccer team from August 10, 2022 to April 15, 2023. Workload measures investigated included total distance, sprint distance, power plays, work ratio, and player load. The acute and chronic workloads were calculated for each measure separately.
Results: The data are collected and the results are in progress of being finalized.
Conclusion: This study established normative data for multiple workload measures in a population of NCAA soccer players. The results of this study can be used by coaches and other researchers to compare data between different groups of NCAA soccer players.

♻ Sustainability-related project
*Graduate student

83. Comparing the Quality and Amenities of Public Parks in Lisbon, Portugal and Charleston, South Carolina ♻️

Student Presenter: Emma Langan
Faculty Mentor(s): Morgan Hughey
Additional Authors: Kayla Kerr, Department of Health and Human Performance, College of Charleston
Nick Baker, Department of Chemistry & Biochemistry, College of Charleston
Morgan Flaherty, Department of Health and Human Performance, College of Charleston
Maggie Harkins, De

The field of public health is experiencing increasing crises in areas such as physical activity and obesity, mental health, and environmental health and justice. One promising initiative calls for an increase in access to, quality of, and utilization of public parks. However, the field lacks informative data on park quality through the use of park audits, especially at the multi-city and multi-country level, making this project one of the first in its field. The objective of this study is to complete a comprehensive assessment and comparison of the quality of public parks in Lisbon, Portugal and Charleston, South Carolina. In total, 41 public parks in Lisbon and 63 public parks in Charleston were audited using the Quality of Public Open Space Tool (POST). To ensure reliability, a portion of the parks in both Lisbon and Charleston were audited by multiple groups or researchers. Prior to data entry, a codebook was developed in order to accurately represent the data with numerical codes, with data entry occurring after each audit. Descriptive statistics were used to summarize activity areas, amenities, and safety features. To compare the two countries, the statistical analysis plan is to run independent t-tests on the summarized data. Analytical/statistical results comparing park quality indicators between Lisbon, Portugal, and Charleston, South Carolina will be presented at the EXPO (in progress). The conclusions drawn from this research will help better address the state of the field of park access and inform future park updates and improvements in Charleston.

84. Equitable Park Initiatives: Insights from City Leaders in 19 U.S. Cities ♻️

Student Presenter: Canaan Michel
Faculty Mentor(s): Morgan Hughey

Introduction: Access to parks and green spaces, with their associated health and environmental benefits, is not universally equitable. While policy is a key strategy to address these inequities, a comprehensive framework for describing policy solutions and their effectiveness is lacking. This study aims to analyze city leaders' perceptions of supports and challenges of policies employed to enhance public park accessibility.

Methods: Semi-structured interviews lasting 60-90 minutes were conducted with representatives from local government sectors in 19 U.S. cities, including the mayors' offices, parks and recreation, and city planning departments. The interview guide explored local government perceptions, efficacy, motivations, challenges, barriers, and solutions to key policy areas. Interviews were transcribed verbatim and analyzed using NVivo software, with a collaboratively developed codebook rooted in a grounded theory approach.

Results: Results will focus on three key policy areas: Community Engagement, Public Finance, and Land Use. Community Engagement involves gathering information from community members to inform park planning and projects. Key supports include a commitment to engagement, structured processes, and tailored approaches to address specific community needs. Challenges include informal/internal policies, resource constraints, and ensuring adequate representation of community needs. Public Finance policies manage government funds, with supports including park needs assessments, mayor and council support, and effective communication. Challenges encompass competing funding needs, additional tax burdens, and inconsistent city budget processes. Results from Land Use policies will be presented at the EXPO.

Conclusion: This study contributes to advancing park access and equity-promoting policies, offering actionable recommendations based on city leader perceptions.

85. COACH-DIRECTED WORKLOAD MANAGEMENT IMPROVES EXTERNAL WORKLOAD BUT NOT INJURIES IN COLLEGIATE MEN'S SOCCER
Student Presenter: Grace Powell*
Faculty Mentor(s): Kate Pfile
Additional Authors: Mary Catherine Avey - ATC, CofC Men's Soccer team

INTRODUCTION: External workload is physical work performed, measured by the acute chronic workload ratio (ACWR) and categorized as low, sweet spot, overreaching, and high. ACWR values outside the sweet spot reportedly increase injury risk. Workload management (WM) adjusts training based on data to optimize performance and injury risk. The purpose was to determine if the injury occurrences and team average workload is related to a WM strategy decided upon and implemented by the coaching staff in a men's soccer program. METHODS: 46 participants' GPS data and injury records were collected over two consecutive seasons (2021-22). Each player's ACWR was calculated for five variables using two methods, rolling average (RAACWR) and exponentially weighted (EWACWR). In Season 1, no WM was applied; in Season 2, coaches adjusted training based on provided ACWR data. Sweet spot ACWR and injury rates were compared between seasons. RESULTS: There was a relationship between the number of RAACWR sweet spot variables and seasons, $X2(1, 85) = 4.0$, $p=0.046$, with 60% (27/45) in 2021 and 80% (32/40) in 2022, and EWACWR sweet spot variables and seasons, $X2(1, 125) = 12.0$, $p<0.001$, with 29% (19/65) in 2021 and 60% (36/60) in 2022. There was no relationship between the injury occurrences players and seasons. CONCLUSIONS: While workload management led to differences in workload between seasons, it did not significantly affect injury rates. The coaching staff effectively utilized workload data to manage external demands, potentially benefiting participant physical performance over time.

86. Exploring stress, perceived burnout and wellness behaviors amongst university faculty and staff ♻
Student Presenter: Lilliana Taylor
Faculty Mentor(s): Katie Trejo Tello

Background: Higher education has recently been subjected to "The Great Resignation" with unprecedented faculty and staff exodus. Research indicates that wellness behaviors promoting health and managing stress, like physical activity, sleep and nutrition, may also alleviate burnout. There is a lack of research exploring these behaviors within university faculty and staff.
Methods: This mixed methods study contacted faculty and staff at a Southeastern university and invited them to complete an anonymous online survey during Summer 2023. The 42-item survey assessed demographic characteristics, wellness behaviors, and burnout. Participants that indicated interest in a follow up qualitative interview were invited via email to fill out an anonymous 9-item, open-ended questionnaire regarding their perceptions of wellness, burnout, and campus resources to help manage stress. Responses were coded and themes were identified utilizing thematic analysis.
Results: 294 faculty and staff participated in the quantitative study. The majority of respondents identified as female, n= 158 (54%) and in faculty roles, n=150 (54%). Most, n=169 (58%) reported moderate or high levels of burnout and were inactive or minimally active, n=174 (59%). There was a significant correlation between physical activity status and personal burnout rpb(294)=0.153, p=0.013. From the 48 faculty and staff participants in the qualitative study, social support, hobbies, physical activity, and other wellness behaviors emerged as the preferred methods for managing workplace stress.
Discussion: Findings provide evidence for organizations that investing in active living resources to support faculty wellness may be a promising approach to addressing burnout.

87. Relationship Between GPS-Obtained Indices of Training and Self-Reported Perceived Exertion in Collegiate Male Soccer Players
Student Presenter: Emily Waddell
Faculty Mentor(s): Susan Rozzi
Additional Authors: Dr. Kate Pfile (Health and Human Performance, School of Health Sciences), Blake Fentress

Overtraining increases an athlete's risk for injury and illness. Wearable GPS devices are now commonly used by sports teams to quantify training loads and intensities. This training information permits modification of training load and intensity to minimize players' injury and illness risk. However, this technology is expensive, making acquisition difficult for programs with limited funding. In this study, we investigate the relationship between GPS-obtained training indices and session rates of perceived exertion (sRPE) in male collegiate soccer players. Our purpose is to determine if sRPE can be used in lieu of GPS devices.
Twenty-five Division 1 collegiate male soccer players participated in this study. Each participant wore a GPS tracking device (Catapult One), which measured their distance, sprint distance, power plays, player load, and work ratio during every training session and match. After each event, participants elected to respond to an online survey via Qualtrics software. Using a validated modified zero to ten RPE scale, participants rated the exercise session on its overall level of difficulty. Participants provided their initials and jersey numbers to link their responses with their GPS tracking data. Twenty-one participants responded to at least one RPE survey questionnaire for a given practice or match in which there was also accompanying GPS-obtained data. A total of 140 valid responses were received across the season. This study's findings may help identify an affordable alternative for obtaining important training information for minimizing risk of injury and illness.

88. The Difference in Park Quality and Amenities Between Neighborhoods in Charleston, SC ♻
Student Presenter: Kayla Kerr
Faculty Mentor(s): Morgan Hughey
Additional Authors:

Public parks are vital to neighborhoods as they promote physical and mental well-being for individuals and communities. There are disparities within park quality and amenities, specifically in low-socioeconomic status neighborhoods. Research on this topic has largely focused on the accessibility of parks among different socioeconomic groups, so this research aims to add to that discussion by examining the differences and similarities among park quality and amenities across the different neighborhoods in Charleston by socioeconomic status, race/ethnicity, and population density. In 2023-2024, 66 parks were audited using a validated observational tool called the Public Open Space Tool (POST). Census data was gathered and managed to describe the socioeconomic status, race/ethnicity, and population density of neighborhoods. Using Geographic Information Systems (GIS), the number and quality of parks across neighborhoods will be analyzed. Results: About half (47.5%) of the parks in the City of Charleston had a playground present. The average number of activity areas, including fields, courts, trails, and other areas designated for structured physical activity, among the parks was 2.3. The most prevalent were children's playgrounds and walking paths. Additional analytical/statistical results comparing park access and quality indicators between neighborhoods in the City of Charleston will be presented at the EXPO (in progress). These results will aid in park planning efforts and inform city leaders and residents about the factors contributing to poorer health outcomes and lower physical activity in specific neighborhoods.

School of Humanities and Social Sciences

Department of Communication

89. The effects of ADHD on communication with roommates
Student Presenter: Cassidy Bell, Eddie Slocum, Abby Rauch
Faculty Mentor(s): Debra McGee

Roommate relationships often pose serious issues throughout the duration of time spent living together. Not only can navigating roommate relationships be difficult for those who are neurotypical, but can be especially difficult for those who are neurodivergent as well. Many researchers have documented the impacts of ADHD on peer-to-peer communication.
Attention-Deficit/Hyperactivity Disorder, commonly known as ADHD, affects close to 6.1 million people in the United States, with boys being three times more likely to be diagnosed than girls (National Prevalence of ADHD and Treatment). ADHD affects parts of the brain related to memory, speech, and emotion (Gehricke et al., 2017). In this study, we explore the dynamics between roommates who are both neurotypical and neurodivergent, as well as communication strategies that help these roommate relationships thrive and which might hinder the relationships. For this study, we surveyed College of Charleston students who were in mixed (neurodiverse and neurotypical) roommate situations.The survey contained true/false and likert-type questions. Data analysis is ongoing. From this research we hope to identify behaviors that encourage a positive roommate experience when neurotypical and neurodiverse persons share living space, along with better understanding of the challenges that come with the pairing.

90. Abortion and Healthcare Providers in the U.S. South ♻
Student Presenter: Bailey Brewer
Faculty Mentor(s): Beth Sundstrom
Additional Authors: Dr. Cara Delay, Department of History

This bachelor dissertation, conducted in collaboration with the Women's Health Research Team (WHRT), explores the historical and contemporary landscape of abortion access in the U.S. South. By utilizing a reproductive justice framework, the research delves into the role of healthcare providers in shaping abortion accessibility, particularly after the 2022 overturning of Roe v. Wade. The study employs historiography to unveil the challenges faced by abortion providers from colonial America to the present, highlighting the orchestrated efforts to restrict abortion access. The impact of state laws, such as waiting periods and TRAP laws, is analyzed statistically on medical professionals, considering social, religious, and political barriers. Careful examination of the disparities in health access within the American South emphasizes the need for informational resources to challenge government policies. The forced birth movement's influence on legislation and its consequences, including increased violence towards abortion providers, are scrutinized. The research also delves into the shifting landscape of abortion narratives, emphasizing the rise of medication abortions, the legal challenges faced by organizations like Aid Access, and the attempts to redefine mifepristone as a contraceptive method. Ultimately, this dissertation contributes to a comprehensive understanding of abortion issues, advocating for reproductive justice and universal sexual and reproductive healthcare.

91. Neurodiversity and Conflict Management in the Classroom
Student Presenter: Mary Margaret Carter
Faculty Mentor(s): Deborah McGee
Additional Authors: Emily Thompson (Communication), Geno Mariano (Communication), Devin DeHollander (Communication)

According to Mader and Butrymowicz (2017), only about a third of the students with disabilities who enroll in a 4-year college or university graduate within 8 years," (Ortiz 2020). This includes a wide range of persons with neurodivergent diagnoses like autism and attention deficit hyperactivity disorder. We know from previous research that individuals who have any form of neurodivergence are greatly impacted by the notion of conflict. This study aims to discover more about individuals with neurodivergence and their conflict management styles. Our research will look at several aspects of neurodivergence and conflict management in classroom settings. Research suggests that there are five conflict management styles: Avoiding, Accommodating, Compromising, Collaborating, and Competing. We have collected survey data from CofC students (18+ years old). Among other questions, the survey includes Dr. Reginald Adkins Conflict Management Inventory Assessment. Data analysis is underway to identify differences in classroom conflict management styles between students who are neurodivergent and those who are not. We are also comparing self-reports of participants' conflict management style with their results on the conflict inventory.

92. The Effects of Social Media on Mental Health
Student Presenter: Margaret Cubitt*
Faculty Mentor(s): Namjin Lee

My research project examines the relationship between time spent on social media and mental health conditions, specifically depression and anxiety. I chose this research topic because of the growing popularity of the internet and social media use, and the potential effects this usage has on the mental health of humans. Due to the increased use of social media (aka screen time), necessary life skills such as face-to-face communication, relationship building, personal hygiene, and so forth have become significantly more challenging to develop. Recent trends include individuals spending several hours daily scrolling on multiple social media platforms and adolescents joining social media platforms at a much younger age. My research focuses on the relationship between time spent on social media, age, gender, and mental health conditions. I hypothesize that the amount of time spent daily on social media platforms correlates with the development of depression and anxiety. I utilized an experimental survey for my method and Likert-scale questions, and I requested basic demographic questions, including age, gender, and level of education completed. I administered the survey to 30 subjects. The independent variable questions focused on how much time per day was spent on social media, while the dependent variable questions focused on individuals' feelings when using social media. The results from the survey indicate that my hypothesis was correct, as the time spent on social media and depression increased, so did anxiety. Therefore, it is essential to emphasize the dangers of spending too much time on social media.

93. More Than Viral Grape Memes: The da Vinci Surgical System
Student Presenter: Julia Lewis
Faculty Mentor(s): Kathleen DeHaan

There is no questioning whether artificial intelligence and robotic technology are polarizing topics. What if there were a robotic device that gave lives back into the hands of those suffering medical issues? Would the public be supportive?
This is not a fantasy; it is real life. The da Vinci Surgical System, created by Intuitive, has performed over twelve million procedures worldwide. I spent a semester in Communicating Science (COMM 410) researching this robotic device and translating technical language into approachable terminology. In my piece, I describe how da Vinci works, who is eligible for surgery, compare it to traditional surgical techniques, discuss controversies, and new/future advancements. I interviewed three people: a patient, an Intuitive Clinical Sales Manager, and a surgeon who has performed over 600 cases with the device. My piece titled, "More Than Viral Grape Memes: The da Vinci Surgical System" dives deep into the technicalities of robotic-assisted surgery in an approachable and relatable way that references the viral "they did surgery on a grape" meme.

94. The Blurring of Privacy Boundaries within Romantic Relationships among Generation Z
Student Presenter: Avery Pedraza, Juliana Signora, Ethan Alassi, Amanda Biehler, and Bridget Rosso
Faculty Mentor(s): Deb McGee

In today's digital age, addiction extends beyond traditional substances like alcohol and drugs to include behaviors such as excessive social media use. The research aims to clarify the complications surrounding privacy and communication limits with a focus on Gen Z, specifically their romantic interactions via social media. Gen Z are digital natives who find it difficult to discern between public and private environments, which causes sharing and privacy to be balanced too closely. The study hypothesizes that increased reliance and use on social media platforms among Gen Z correlates with a lack of awareness of privacy boundaries and challenges in effectively communicating and setting boundaries within romantic relationships. Divided into three themes to examine the management of boundaries, privacy concerns, and adaptive communication. Commonly found gaps from previous studies highlighted the importance of qualitative data, comprehending long-term effects, and taking cultural differences in privacy standards into account. All participants will be College of Charleston students, over 18 years old, actively on social media daily, and in a romantic relationship. Participants will complete a short survey as well as participate in a group interview. The group interviews provide us with more insight and better gauge the connections of data. Survey data will be collected through Qualtrics and interview groups will be recorded on a password-protected device. The findings seek to contribute to a deeper understanding of the complex relationship between social media, privacy, and interpersonal communication in the digital era.

95. Lecture and attention spans in Gen Z college students
Student Presenter: Cameron Seel
Faculty Mentor(s): Deb McGee
Additional Authors: Sam Franz, Communication, Alexa Gordon, Communication

This study, led by students at the College of Charleston, employs a variety of mixed-methods research to examine the effect of social media use on Generation Z college students' attention and retention spans during lectures. The study identifies factors contributing to difficulty retaining information and staying focused. The team will distribute a survey via social media and email to collect quantitative data, focusing on social media engagement patterns and self-reported attention spans during lectures. They will seek the participation of 75 to 100 College of Charleston students. Descriptive statistics and tests will be used to analyze the data and explore relationships between social media use and attention spans. The team will conduct in-depth interviews with 10 to 20 College of Charleston students selected based on their social media engagement and attention span experiences from the survey to gather qualitative data. The interviews will explore personal experiences, social media use, and strategies for mitigating attention challenges. One researcher will observe the interviews while another takes notes. The data collected will shed light on how social media affects attention spans and provide insights into factors influencing attention diversion and retention challenges. Ethical considerations will be paramount, such as informed consent, confidentiality, and secure data storage. Ultimately, this study seeks to offer valuable insights into the complex interplay between social media engagement and lecture attention spans among Generation Z college students, informing educational practices and support initiatives.

96. The Night the Stars Came to Life: A Science Communication Article
Student Presenter: Steven Smyder
Faculty Mentor(s): Kathleen DeHaan

"The Night the Stars Came to Life" encapsulates the culmination of Communication 410, a journey from childhood wonder to pioneering research in exoplanetary science. Dr. Ana Uribe and Dr. Joe Carson, both professors at the College of Charleston, share personal narratives that intertwine with cutting-edge astronomical discoveries, inviting readers into the field of cosmic exploration. By incorporating recent research findings and application of communication principles, this final project explores diverse methods of exoplanet detection, from the Radial Velocity Method to Direct Imaging, illuminating the challenges and triumphs of unraveling the mysteries of distant worlds. Recent breakthroughs, such as the potential detection of biosignatures for life on exoplanet K2-18-b using the James Webb Space Telescope, add timely excitement to the narrative. While cautious optimism permeates their perspectives, Uribe and Carson advocate for a balanced approach in the quest for confirming extraterrestrial life, considering the allocation of scientific resources. Their reflections underscore the necessity of scientific rigor, transparency, and collaboration in advancing our understanding of the universe. "The Night the Stars Came to Life" offers a captivating blend of personal anecdotes, scientific inquiry, and philosophical reflection, showcasing the culmination of Communication 410's focus on making complex ideas understandable and engaging to a broader audience interested in the cosmos and the search for life beyond Earth. This paper is hereby submitted for your consideration to be included in the 2024 College of Charleston Student Exposition, having received positive feedback from my peers and the esteemed recommendation of Dr. Kathleen DeHaan.

97. Building Trust Through Communication: Exploring Teamwide Impact
Student Presenter: Kaitlynn Weeks*
Faculty Mentor(s): Namjin Lee

In the wake of the COVID-19 pandemic, the work landscape has undergone a profound transformation, with a considerable shift from in-person to remote operations for numerous organizations. Given the prevalence of remote teams, this research aims to explore how communication within a team, whether remote or in-person, influences trust dynamics within the team. Drawing on the Leader-Member Exchange Theory (LMX) and Social Exchange Theory (SET), which emphasize the role of effective communication in fostering trust, the study hypothesizes ‚Ää‚Ääthat increased levels of communication within a team increases trust among team members. To test this hypothesis, a Qualtrics survey incorporating Likert Scale and Frequency Scale questions was administered to a sample of 30 respondents. The independent variable, communication levels, was assessed based on the frequency of team meetings, utilization of various communication channels, and engagement in informal communication. The dependent variable, trust among team members, was measured by gauging participants' comfort expressing ideas, offering constructive feedback, admitting personal shortcomings, and sharing personal information within the team. SPSS was employed for data analysis, incorporating a regression analysis with additional independent variables, namely team size and past team experience. Contrary to expectations, the results of the regression analysis did not support the hypothesis. Specifically, communication levels, team size, and past team experience were not identifiable as significant indicators of trust within a team. Despite findings, with only 30 respondents, including undergraduates, this study highlights the necessity for a larger, professional-focused sample to ensure comprehensive exploration of the topic.

Sustainability-related project
*Graduate student

Department of English

98. Web Alchemy: Shaping Portfolios and the Future of Writing
Student Presenter: Isabelle Adler
Faculty Mentor(s): Chris Warnick

This Bachelor's Essay project investigates the evolving landscape of creative expression, particularly in the face of AI-generated content. This project aims to bridge the gap between technology and human storytelling by creating a web publication for the College of Charleston undergraduates. This platform will serve as a space for students to share their experiences, skills, and passions with curious peers and new students, fostering community and self-promotion in preparation for post-graduate pursuits. The project encompasses both research and design phases, culminating in the development of a web publication featuring sections on travel both in and outside South Carolina and the United States, personal experiences on and off campus, creative problem-solving, fiction, and non-fictional stories. Through meticulous planning and design, which includes crafting style guides, submission guidelines, audience profiles, and user testing, this Bachelor's Essay contributes to the ongoing dialogue about maintaining humanity in the arts while actively participating in the dynamic landscape of digital creativity. The website also provides a platform for students to begin building their portfolio in preparation for graduating and joining the competitive workforce of writing and the arts, fostering a network for students to gain confidence in their work and connection to their fellow students. This Bachelor's Essay is not only an opportunity to leverage its creator's existing communication skills but also a platform for her to expand her proficiency in digital editing, writing-style adherence, software usage, and professional engagement, all aligning with her aspirations for a career in technical writing and editing.

99. Mother Emanuel: Charleston's Greatest Activist
Student Presenter: Lexi Redd
Faculty Mentor(s): Valerie Frazier

The African Methodist Episcopal (AME) Church is a historical example of Black American citizens searching for community amongst themselves amidst blatant acts of racial violence and discrimination. Despite the basic Christian principle of love towards thy neighbor, some racist Whites across America met their Black counterparts with hatred and hostility. Seeking religious autonomy from those who oppressed them, several Black leaders broke away from the Methodist Episcopal Church in 1816, forming what we now know as the AME church: a sector of Christianity in which African Americans could authentically practice their religion. One of Charleston's most prominent and historical sites is the Mother Emanuel AME Church. Founded in 1816 as the South's first AME church, Emanuel was a place where Black Charlestonians could strengthen their spiritualities, helping them cope with the negative impacts of extreme racial polarization of the period. Despite several devastating events that should have eradicated the building along with the lives of its constituents, the church was resilient and continued to be characterized by its activism in the face of destruction, violence, and hatred. Throughout the 19th, 20th, and 21st centuries of the church's history, Mother Emanuel repeatedly rises like a phoenix from the ashes and acts as the city's greatest activist. Therefore, understanding Emanuel's history of activism is integral in appreciating its activism and advocacy work today. Emanuel's 21st-century activism is made possible by past, historical experiences in which the community relied on such an activist to improve the livelihoods of its members and future generations.

100. Podcasting the Lived Experiences of Young Women and Nonbinary People with Chronic Illnesses in the SC Lowcountry ♻️
Student Presenter: Molly Dickerson
Faculty Mentor(s): Kathleen Rogers

Patients with chronic illnesses often report feeling misunderstood, dismissed, or cast off as hysterical by peers and in clinical encounter. This podcast aims to gather and record the experiences of women with chronic illnesses, and to understand their perceptions of the world's attitudes towards illness/disability. Women and nonbinary people with chronic illnesses between the ages of 18-40 in the South Carolina Lowcountry were recruited for a series of interviews. Topics of discussion in interviews were chronic illness management, barriers to healthcare, patient-doctor relationship, gendered ableism, intersectionality, social invisibility, disability discrimination, and shifting self-perceptions. Interviews were recorded and produced in podcast format, and then released through Buzzsprout, Spotify, and Apple Music. At the expo, I will showcase the podcast episodes, some of the main themes and narratives, and quotes from the podcasts.

101. Burke High School and its activist history
Student Presenter: William Jenkins
Faculty Mentor(s): Valerie Frazier

Burke High School, founded in 1894 as the Charleston Colored Industrial School, has a rich history of activism and student activism. It was one of the only two black public high schools in Charleston, South Carolina, and was vital to the area's black community. Burke High School was the oldest and largest public high school, serving thousands of black students in Charleston's downtown area. In the 1960s, students, teachers, and staff fought to end segregation in Charleston by assuming the role of local leaders in social activism. Eugene C. Hunt, a teacher, desegregated the College of Charleston faculty in 1973. Burke students were some of the first to sit in and occupy lunch counters in the country on April 1, 1960.
Alumni, such as Minerva (Brown) King, have dedicated their lives to a fair education. Minerva was the original main plaintiff in a court battle to desegregate South Carolina's public school system. Millicent Brown, Minerva's sister, took her position in the case of Millicent Brown v. Charleston County School District 20.
Despite facing challenges, Burke High School continues to advocate for quality education and spark important conversations about the role of public education in Charleston. The school's supporters are committed to providing quality education for its students, as did their predecessors. Burke High School remains a respected institution with a renowned Steppin' Bulldogs marching band led by Leonard McLeod.

102. Bonds Wilson High School Then vs. Now
Student Presenter: Azi Kynard
Faculty Mentor(s): Valerie Frazier

Throughout Charleston's history, Black people have struggled to obtain a quality education on par with that of their White counterparts. After segregation was outlawed in schools as a result of the Brown vs. Board decision, America had to find alternative ways to keep Black and White people separate. While it was illegal to keep students separated on the basis of race, it was not illegal to send students to certain schools based on their location. Many Black and Brown students lived in lower-income areas, and were therefore zoned for schools with equally low funding. This funding gap (among other related factors such as access to resources, higher rates of crime, and low community morale) has carried over into the present day, and has resulted in a sort of modern day segregation. Furthermore, the impact of gentrification on majority Black areas has not only prevented them from receiving a quality education, but has pushed them out of their homes. This phenomenon can be observed by analyzing how Bonds Wilson High School came to be Academic Magnet High School.
Bonds Wilson High was a formerly all Black high school that was later demolished a few decades after its students were moved to schools like North Charleston High and Stall (both now underperforming and predominantly Black/Brown schools). Academic Magnet now sits in its place, holding a 3% Black student enrollment rate as of the 2023-2024 school year. The culprit? The process of gentrification and the trickle effect of systemic racism in America.

103. What the Cargo Carried and Created
Student Presenter: Amber Sanders
Faculty Mentor(s): Valerie Frazier

Art can come from and create pure joy, strife, hopefulness, or emptiness, and a perfect example of artistry capturing the soul of people is the IAAM over Gadsden's Wharf. The museum that was built over the area, Gadsden's Wharf, it was a slave port and holding area along the Cooper River where over 260,000 enslaved people had been brought into this country. As the African American community struggled with oppression and the constant threat of terror they were still able to enjoy these moments of expression, or revolution, at times, even simply spending time together as a community. The International African American Museum captures the resistance of the black community. How we would take the blood, the suffering, the fear, and cruelty from our lives, and instead of letting the pain consume us we would become artisans. The museum's core intent is to show the activism, artistry, and artisanship that the black community brought with them when forced to build this country, and the art, hope, and constant rebellion that they created once they established lives within these stressful conditions. The art and beauty of the International African American Museum represent the artistry that came from the pain and tragedy of its roots. It quite literally sits atop what the museum dictated as the hallowed ground where the enslaved were brought into this country and held captive in inhumane conditions.

104. From Bondage to Banknotes ♻️
Student Presenter: Joshua Smith
Faculty Mentor(s): Valerie Frazier

This paper examines the persistent issue of racial inequality in the American workplace, tracing its historical roots from the Middle Ages to contemporary society. Analyzing the impact of racism on minority communities, particularly African Americans, sheds light on systemic challenges ingrained in societal structures.
The study demonstrates how pre-colonial concepts of race have contributed to the engraining of whiteness in America as the status quo, perpetuating issues like the school-to-prison pipeline and daily microaggressions. The paper argues capitalism plays a pivotal role in upholding white privilege, particularly in employment practices, creating hurdles for minorities in hiring processes.
Post-hire statistics reveal even more scrutiny and lower performance evaluations black employees face, emphasizing the systemic challenges that persist within workplaces. The paper contends that dismantling these structures requires a commitment to diversity and inclusion, exemplified by Best Buy and Cisco initiatives. However, it highlights the need for diversity in managerial positions to ensure the effectiveness of such efforts.
The paper proposes active measures, including public salary benchmarks, to address the racial pay gap to increase transparency and awareness. By targeting the root causes of pay disparities, such as opportunity gaps and occupational segregation, the paper aims to create a more equitable society.

Department of History

105. Reading Powders: Gender, Drugs, and the "Foreign" in Early Modern England
Student Presenter: Francesca Gibson
Faculty Mentor(s): Jacob Steere-Williams

Through this research, I examined how local and global networks of medical substances, such as powders, were mediating objects for early modern English debates over women, legitimacy, the home, and the market. In early modern medicine, the line between poison and cure was blurred,Äîin fact, the ancient Greek word for drug,Äîpharmakon,Äîmeans both remedy and poison depending on the context. With new debates over forms of medicine (Galenic medicine vs. chemistry) and the introduction of new drugs to English society through the global drug trade, physicians became concerned with legitimizing substances. Drugs, in the early modern world, referred vaguely to any substance that could alter the body or the mind, and were divided into simples/compounds and preparations. Simples/compounds referred to naturally occurring ingredients, such as herbs, without alteration, and preparations were alchemically created substances. Powders, including anything from arsenic to metal shavings to ground up herbs, are ambiguous given their form. My research argues that powerful male physicians channeled their anxieties over gendered social debates into these ambiguous powders, but by examining the use of powders by women, a picture of female resilience emerges.

106. The Latin American Green Revolution and Rural Youth Programs ♻️
Student Presenter: Bianca Hernandez-Villanueva
Faculty Mentor(s): Lisa Covert

Humanity collectively bears the responsibility of not only witnessing but also perpetuating the environmental issues that worsen as time and technology advance. Environmental historians examine how other aspects of society such as politics influence the development of agriculture. It has only been until recently that scholars have examined the intersections of politics and environmental sustainability within Latin America. The Green Revolution is a pivotal marker in this history. It occurred during the twentieth century amid the Cold War and during major political turmoil in Latin America. Moreover, within the Green Revolution, rural youth programs such as 4-H Clubs played a role in mobilizing young individuals to involve themselves with agriculture and subconsciously with politics and social progress. I was accepted to engage with research through the Center for Sustainable Development. During this time, I explored themes related to the Green Revolution in Latin America. My main research method for this project was archival research, primarily from the Rockefeller Archive Center. With the assistance of my faculty mentor, Dr. Lisa Covert, I analyzed a range of primary sources such as reports, brochures, newspaper articles, and images. Moreover, we engaged with a variety of scholarly works to incorporate the historiography and research of contemporary environmental historians. This research revealed a notable exclusion of Latin American agency and narratives in relation to the Green Revolution, more so rural youth groups. However, it is imperative that we highlight this history to acknowledge the implications of what past societies have done to impact the environment.

107. The Effectiveness of Post-Dobbs Abortion Center Legislation in Protective States
Student Presenter: Malori Lesesne
Faculty Mentor(s): Cara Delay

This research explores abortion seeking people's experiences in and around abortion clinic spaces since the Dobbs v Jackson (2022) decision. The research explores how effective buffer zone legislation has been at protecting those seeking abortion care in protective states and looks at relevant pre-Dobbs legislation to see how it is being used in a post-Dobbs world. The work combines personal narratives and survey data to tell the story of the harassment and violence that abortion seeking people, healthcare workers, and escorts are facing every day. The work will also look at legislation presented in other countries to address the issue of abortion center harassment and discuss how effective this legislation has been in solving the issue.

108. The Third Sex Before the Third Reich: A Glimpse at Trans Erasure from the Weimar Era Gay Rights Movement ♻
Student Presenter: Charlotte Nicely
Faculty Mentor(s): Cara Delay

In historical studies of the LGBTQ community, the transgender community often gets left out, overshadowed, or forgotten. Few secondary works focus on transgender individuals, instead lumping them in with gay men or lesbians. This research delves into the overlooked history of trans individuals in the Weimar Republic, Germany, and examines their marginalization outside and inside the LGBTQ community during a pivotal era of cultural and social transformation. This study uncovers the pervasive ostracism experienced by trans individuals, revealing a complex dynamic that extended beyond societal prejudices.

Given the scarcity of secondary materials, this research relies predominantly on primary sources, including biographies, newspapers, magazines, and scientific research. Many German-exclusive sources required meticulous hand translation, enriching the study with authentic perspectives from the Weimar Republic.

During the Weimar Republic, trans individuals faced not only external discrimination but also found themselves marginalized from within the LGBTQ community, highlighting the need for a nuanced understanding of historical LGBTQ narratives. This ostracism stemmed from a combination of societal conservatism, internalized prejudices, and a desire to step on other minorities to gain social standing.

Understanding the historical challenges faced by trans individuals in the Weimar Republic holds significant contemporary relevance. As society grapples with ongoing debates surrounding gender identity and expression, lessons from history can inform more inclusive and intersectional approaches within the modern LGBTQ movement. Addressing internal prejudices within the community is paramount for fostering unity and solidarity.

109. Women's Reproductive Health Outcomes Before and After the 2022 Dobbs vs. Jackson Women's Health Organization Decision
Student Presenter: Madeleine Smith
Faculty Mentor(s): Cara Delay

The 2022 Supreme Court decision on the Dobbs vs. Jackson Women's Health Organization case marked a significant moment in the landscape of reproductive rights and justice for women in the United States. This research paper examines the impact of the Dobbs decision on women's reproductive health outcomes. Using a comprehensive analysis of existing literature, statistical data, and qualitative research methods, this study examines the changes in access to reproductive health services, maternal health outcomes, and abortion rates before and after the Dobbs decision. In addition, this research investigates the effects of policy changes following the decision, including state-level restrictions on abortion access and the availability of comprehensive reproductive healthcare services. The findings highlight the interconnected nature of legal rulings, healthcare policies, and women's reproductive health outcomes, elucidating the nuanced implications of the Dobbs decision on women's health and rights. Specifically, the research uncovers how restrictions on abortion access correlate with shifts in maternal health outcomes and access to comprehensive reproductive healthcare services. Understanding these dynamics is essential for informing future advocacy efforts and policy interventions aimed at promoting equitable access to reproductive healthcare services for all women.

Department of Philosophy

110. Aesthetics and Affect: Protected Spaces for Marginalized Voices
Student Presenter: Vero (Verina) Salib
Faculty Mentor(s): Jonathan Neufeld

I am specifically interested in the use of aesthetics and affect as protected spaces for Black Americans to express their political beliefs without imposition upon political structures. There are two facets to facilitating this understanding. The first is the recognition of "public reason" as a weapon of white supremacy utilized in the exclusion of Black Americans from within the political sphere. This exclusion led Black Americans to seek other methods of emotional expression, political protest, and deliberation, thus yielding the creation of black aesthetics. Aesthetics are generally considered to be outside of the realm of "reason," which is traditionally thought to ground legitimate political deliberation. Thus, the weaponization of "reason" is used to undermine the efficacy of aesthetics and affect as legitimate political expression. The second facet is the recognition of the political and expressive value of black aesthetics. Tommie Shelby's "Impure Dissent: Hip Hop and the Political Ethics of Marginalized Black Urban Youth," for example, explores the expressive value of black aesthetics through the genre of Hip Hop. Shelby's work recognizes the significance of hip-hop as a tool for inciting social change within the political sphere. A thorough understanding of the combination of these two facets will provide a fuller picture of black aesthetics as a whole. It will also allow for an exploration of how the oppressor and oppressive system function, as well as how black aesthetics allows the oppressed a voice of their own.

Department of Political Science

111. Gendered Occupational Segregation: A Comprehensive Report and Action Plan ♻
Student Presenter: Hannah Everage
Faculty Mentor(s): Lynne Ford

My comprehensive research report addresses the pervasiveness of gendered occupational segregation in the United States, offering a multifaceted analysis and a strategic action plan. I begin by tracing the historical evolution of women's participation in the workforce and move to unveil the root causes of occupational segregation, including early socialization, educational systems, workplace discrimination, family support, and societal expectations. Recognizing the complexity of the issue, my proposed action plan outlines five main goals, each featuring sub-goals structured akin to the UN Sustainable Development Goals. To go along with this report and for easier engagement with the public, I created an interactive website to highlight the goals and strategies for change.
The first goal focuses on education and skill development, aiming to eliminate educational disparities, challenge stereotypes, and encourage diversity in career choices. The second goal centers on dismantling discriminatory structures in the labor market and workplace. The third goal addresses the critical need for improved family support and work-life balance. Goal four, public awareness, cultural change, and intersectionality, seeks to shift societal norms and recognize intersections of discrimination. The final goal, policy changes and advocacy, calls for collaborative efforts at educational, institutional, and societal levels.
My proposed action plan underscores the necessity for long-term commitment and collaboration across various sectors, including individuals, communities, schools, businesses, policymakers, and governmental bodies. The multifaceted approach advocated recognizes the diverse root causes of occupational segregation, emphasizing progress measured by the dismantling of systemic barriers and the creation of equal opportunities for all.

112. Views on Blacks and Transgender People through a Series of Lenses
Student Presenter: Jordan Familant
Faculty Mentor(s): Gibbs Knotts

It would be an understatement to say that the United States of America has had its issues with race. From slavery to Jim Crow to contemporary racist attitudes, anti-Black racism lives on. A separate emerging issue revolves around Transgender people. Unlike anti-Black racism, views on Transgender individuals is relatively new and less studied. This paper uses data from the 2022 American National Election Survey (ANES) to analyze opinions toward Blacks and Transgender People. Therefore, the dependent variables for this paper are separate feeling thermometers on Blacks and Transgender People. The study examines four independent variables: age, education, party ID, and region. The findings indicate that party ID and education have the most substantial effects on the feelings on Blacks and Transgender individuals. Region and generation have much less pronounced effects.

113. Fractured Republic: Examining Public Perceptions of American Democracy
Student Presenter: Julia Kempton
Faculty Mentor(s): Gibbs Knotts

The American political system has grown more polarized in recent years, as demonstrated by elections that have been tainted by deep animosity between parties and uncertain outcomes. Public opinion polling over the last few years has shown a lack of confidence in the country's electoral system and mounting apprehensions regarding the state of democracy in the United States. This paper utilizes data from the 2022 American National Election Study to examine views on the robustness of the nation's democratic system and the precision of its vote-counting procedures. The analysis aims to unravel some of the key dynamics influencing public perceptions, with a focus on the South/non-South regional divide, political engagement, and ideology as pivotal factors. The findings reveal a nuanced view of American sentiments toward the health of democracy and the accuracy of vote counting. Overall, only 18% of Americans deem the country's democratic system extremely or very healthy, and almost half of them believe votes are counted extremely or very accurately in the US. In addition, respondents who voted for Donald Trump over Joe Biden are more likely to see the country's democracy as weak and its electoral system as inaccurate. Negative opinions about American democracy are also more prevalent among those who live in the Deep South and who do not follow American politics very closely. This investigation of citizens' views on the strength of the nation's democratic system allows us to gain valuable insights into the broader challenges facing the nation.

114. Classical and Early Modern Rights: Political Theory and Practice
Student Presenter: Florence Manlapas
Faculty Mentor(s): Andrew Alwine

Governance is concerned with the organization of power structures within a society. Those who have power within the government (the "rulers" in classical terminology) control these structures and the citizen body (the "ruled") is subject to those decisions. In certain regimes, the governing body and the citizen body are one and the same, but the relationship between these two groups can be complex and multifaceted, making for a diverse array of societies with differing levels of power concentration, social mobility, cultural perspectives, and citizen rights.
Ancient Greece and Rome demonstrate the potential variety across democracies, oligarchies, tyrannies, and mixed regimes. In addition to its actual political diversity, antiquity hosted a variety of excellent political philosophers, all of which made significant contributions to subsequent understandings of governance. These ancient civilizations therefore made an ideal laboratory for studying the various ways in which a regime can be arranged.
The political theory underlying the "representative democracies" of the modern western world (concepts such as social contract theory and liberalism) is quite different from the classical models from which it developed.
This research investigates the rights and privileges afforded to citizens to analyze the continuities and deviations across these political systems and ideologies. Synthesizing ancient and early modern political systems provides a deeper understanding of each respectively, while also offering broader observations about the continuity of various political concepts over more than 2,000 years. In depth discovery of the interconnectedness of these ideas offers new insights into today's political systems and issues.

115. Division in the support of the U.S. giving military aid Ukraine
Student Presenter: Ian McManus
Faculty Mentor(s): Heyward Gibbs Knotts

This study investigates the conflicting viewpoints around the U.S. giving military aid to Ukraine as well as analyzing whether the Rally-Round-the-Flag effect is still relevant in U.S. politics. The dependent variable is support for U.S. military aid in Ukraine. The independent variables are partisan identification, ideology, age, 2020 presidential vote choice, and whether or not an individual lives in the 11-state South. This study analyzes data from the 2020 American National Election Study (ANES using SPSS, a statistical software program. The results indicate that nearly 49% of respondents strongly favor or somewhat favor the U.S. giving weapons to help Ukraine fight Russia. There were substantial differences in opinion based on partisanship, ideology, age, and 2020 presidential vote choice.   Overall this research seeks to better explain how different demographics view the U.S's role in the Russian and Ukraine War.

116. Constitutional Issues in Charleston's Immigrant Latino Community
Student Presenter: Brooklyn Morella
Faculty Mentor(s): Roxane DeLaurell
Additional Authors: Anna Giles White, attorney at Duffy Law Firm.

Through mentored research under attorney Anna Giles White, supervised by Dr. Roxane DeLaurell, I explore how Charleston's immigrant-Latino community is affected by various legal issues. Marginalized communities have fought for equal protection under the Constitution, and the immigrant-Latino community is no exception. This research seeks to expose the problems here in Charleston through a broader discussion of Constitutional issues. Research was conducted through observation at the Duffy Law Firm in North Charleston, where information collected through client meetings, court hearings and conversations revealed significant legal issues faced by both Spanish and non-Spanish speakers. This research captured linkages between the issues presented and language status. Observations of these disparities support the claim that Charleston's immigrant-Latino community is suffering violations of Constitutional rights, specifically the 4th, 6th, 8th and 14th amendments. My work further explores how the Constitution is meant to function and how rights should be protected compared to how the immigrant-Latino community in Charleston is treated. The examples derived from the experience of attorneys at the Duffy Law firm support an inequitable response to problems based on language barriers, lack of resources and cultural differences. My hope is that this research will bring attention to a fundamental issue of fairness and persuade policy makers to take steps to rectify the inadequacies.

117. Dear America, What Are Your Thoughts on Racism?
Student Presenter: Caroline Peters
Faculty Mentor(s): Gibbs Knotts

From the Emanuel Shooting to the murder of George Floyd, racism continues to be a stain on our society; However, not everyone holds this to be true. This research examines various groups of Americans and whether they believe racism to still be a problem today. With my independent variables being Black, White, Ideology, Generation, and South and Non-South, this study explores these different groups by utilizing crosstabs and frequencies in SPSS. From the quantitative data received from the American National Election Studies (ANES), I was able to separate preconceived notions from facts. After my research, I have concluded that South and Non-South are quite similar when it comes to views about racism - there was not much change at all. I found that the younger the generation the more they believe racism to be a problem. Someone who is black is more likely to agree that racism is a serious problem. The biggest difference I found in my research was the contrast in ideology with almost 50% of Liberals believing racism is still an extremely serious issue while 7.6% of Conservatives believe that.

118. What Influences Someone's View on Abortion?
Student Presenter: Courtney Quinn
Faculty Mentor(s): Gibbs Knotts

Abortion continues to be one of the most controversial topics in American politics. This research investigates the factors that are associated with opinions about abortion. To investigate this topic, I focused on four independent variables: gender, political party affiliation, census region , and support for the second amendment. I used SPSS statistical software to analyze the 2022 American National Election Study. Partisanship, region, and support for the second amendment were the strongest predictors of support for abortion rights. These findings are important because the topic of abortion has become so politicized after the reversal of Roe v. Wade. The findings of this study could be used by the government, in collaboration with the healthcare system to create education initiatives and healthcare access for abortion resources.

119. The Future of New Eugenics
Student Presenter: Claire Turner
Faculty Mentor(s): Claire Curtis

This presentation analyzes the moral and legislative implications of eugenics in the past, present, and future and ponders the civil discourse surrounding genetic engineering (including potential costs and practical applications). The social and political taboos surrounding the eugenics of Sir Francis Galton and his attempts to legitimize racism and ableism using a scientific background are warranted. However, the emergence of both modern reproductive and genetic technology, as well as New Eugenics, also known as liberal eugenics, has sparked conversations regarding the role of liberal ideology and government control in genetic intervention. Working within a liberal structure, the role of the government is finite yet present, making the issue of preventing a hostile takeover from rogue scientists, ill-intent governments, or selfish misguidance complex. By exploring a world without limitations on access to genetic engineering technology, what does it mean for the "betterment" of humanity and the future of New Eugenics? While there are no definite answers, theorists such as Nicholas Agar, Michael Sandel, and J√°rgen Habermas explore the social impact and moral divisions surrounding the ethics and application of genetic engineering. Distinguishing between Galton's idea of eugenics and New Eugenics and examining and comparing moral and legal debates helps present possibilities of the future of New Eugenics and what the civil discourse surrounding New Eugenics should include regarding what the "betterment" of society would look like.

Department of Psychology

120. The Relationship Between Negative Word Use in Expressive Writing and Symptoms of Anxiety and Depression in First Year College Students ♻
Student Presenter: Eva Acheson
Faculty Mentor(s): Sarah Robertson
Additional Authors: Ashlyn Wells, Psychology, Sarah Robertson, Psychology

Transitioning to college introduces many new experiences and life changes. Expressive writing has proven effective in reducing distress in college students (Mohamed et al., 2023), especially first-year students who are often met with new or worsening symptoms of poor mental health (Duffy et al., 2020). This study aims to investigate the potential relationship between negative word use in expressive writing and symptoms of anxiety and depression. Participants are assigned to either traditional expressive writing, enhanced expressive writing, or a non-emotional writing condition. After completing baseline surveys assessing both mental and physical health, each condition completes five sessions including three days of writing procedures, a one-week follow-up, and a one-month follow-up. Once the data collection period is completed, a narrative coding program will be used to quantify the percentage of negative emotion words utilized by participants, and differences between negative emotion word use will be evaluated across experimental assignments. Data and analysis of results are forthcoming and will be complete at the time of presentation.

121. Enhancing Neuroanatomy Learning Through Drawing
Student Presenter: Sophie Allman
Faculty Mentor(s): Nicholas Hindy
Additional Authors: Ritu Adusumilli (Biology Department)

This experiment aims to explore the benefits of drawing in learning neuroanatomy. Traditional methods for learning neuroanatomy may not sufficiently engage students in spatial aspects of neuroanatomical structures. Drawing can be a potential solution to encourage visual and cognitive learning and enhance memory and comprehension. In an online within-subjects experiment, participants will learn 24 brain structures through three training conditions: two where participants draw using their cursor and one control condition that does not involve drawing. The experiment begins with a pretest where participants label known brain structures, followed by the three training conditions. Training involves identifying eight structures in each of three views (front, side, and medial) with a letter and a number overlaid on each structure. The names of two brain structures will appear above the brain image for each trial, and a lookup table of brain structures and corresponding letter-number pairs will appear below. In one drawing condition, participants will trace the named brain structure, while in the other, participants will draw lines to connect pairs of brain structures. In the non-drawing condition, participants will type in the numbers corresponding to each brain structure. Following all three training conditions, participants will complete a multiple-choice memory test in which they identify each brain structure. We predict superior test performance for both drawing conditions compared to the non-drawing condition. Directly comparing memory performance based on the two different drawing conditions will suggest how to most effectively use drawing as a tool for learning neuroanatomy.

122. Evaluation of case studies as inclusive teaching tools
Student Presenter: Liam Bagwell
Faculty Mentor(s): Jenn Wilhelm

Case studies can be powerful inclusive pedagogical tools to help students role play various identities and imagine themselves in different situations. The goal of this study was to investigate the ways in which the framing of cases impacts students' perceptions of science self-efficacy and sense of belonging in science. Students were presented with a series of cases that were written either in second or third person. The main character was either 1) a college student or had a job relatable to a college student (e.g., EMT) or 2) a person with an aspirational job (e.g., physician). After completing the cases, students were surveyed about their confidence in the understanding of the content, their feelings about envisioning themselves in the jobs portrayed in the cases, and their feelings about pursuing a future career in the jobs portrayed in the cases. Most students felt more comfortable with cases written in third person or in second person when imagining themselves as characters with similar experiences to their own. Some students rated their confidence in their abilities to successfully complete the case and their abilities to have a career in science field significantly lower when presented with cases asking them to imagine themselves in aspirational roles. However, other students greatly preferred the aspirational cases. Preliminary analyses suggest an interaction with race, ethnicity, and gender in how students responded to the framing of cases. Further research is necessary to understand the consequences of using role playing case studies with students with various identities.

123. Survival versus Community Building: What yields the best memory?
Student Presenter: Mary Bearfield, Mia Diserafino, Jalie Hittner, Jackson Colby, Allison Klein, Lydia Kurtiak
Faculty Mentor(s): Cindi May
Additional Authors: Abby Limor, Sarah Miller, Angel O'Banner, Taleen Pratt, Karli Silver, and Adeline Youngblood. (All presenters are enrolled in PSYC 468).

Scientists have long sought ways to improve human memory. One technique that has received much attention lately is survival processing (Nairne et al. 2007). In the standard survival processing paradigm, participants imagine that they are stranded in the grasslands of a foreign land and must work to find water, food, and shelter. They then see a list of words (e.g., "finger, stone, fabric") and must judge how relevant each item is to their survival. Relative to many other encoding conditions (e.g., rating the pleasantness of words; imagining moving to a foreign land), survival processing produces better memory (Kazanas & Altarriba, 2015). Although the survival processing effect (SPE) is a robust phenomenon, there is ongoing debate regarding why SPE is observed. Some researchers take an evolutionary approach and argue that memory evolved to help humans survive and reproduce, and therefore processing information within the context of a survival-relevant scenario provides significant benefits. However, other researchers have noted that survival processing evokes other proximate mechanisms known to enhance memory, including relational processing, arousal or threat, self-referential encoding, congruency, and three specific goals that force a focus on the function of to-be-remembered items. We explored whether the SPE derives specifically from an emphasis on survival, per se, or from these other proximate processes. We used a community-building encoding condition to test our theory. Our data offer insights into the mechanism(s) responsible for SPE.

124. The Effect of Knocking Down Corticotropin-Releasing Hormone in the Medial Prefrontal Cortex on Alcohol Preference in Mice.
Student Presenter: Katherine Calamusa
Faculty Mentor(s): Jennifer Wilhelm
Additional Authors: Jen Rinker MUSC Neuroscience Department, Katie Carter MUSC Neuroscience Department

Background. Alcohol use disorder (AUD) is a chronic and relapsing neuropsychiatric disorder and currently the fourth leading cause of preventable death in the US (CDC 2020). AUD is a characterized by compulsive, excessive and uncontrolled drinking and thoughts about alcohol, and one of the biggest triggers for relapse in individuals with AUD is stress. Corticotropin-releasing factor (CRF) is a stress neuropeptide that signals through various brain regions, and activation of CRF systems have been shown to promote alcohol seeking and drinking, however it is unknown how CRF in the medial prefrontal cortex (mPFC) functionally contributes to the development and maintenance of AUD.
Methods. Here we knocked-down Crh (the gene encoding CRF) in the mPFC using Crh-flox transgenic mice with an AAV-Cre viral vector injected into the mPFC, resulting in significantly reduced CRF protein. Mice were then allowed to drink in the limited access 2-bottle choice (2BC) model. Once trained, animals were then put through the chronic intermittent ethanol (CIE) vapor exposure and then allowed to drink again in the 2BC model. In some aniamls, post-CIE 2BC drinking was preceded by a forced swim stress (FSS) to model chronic stress.
Results. Crh gene knockdown in the mPFC blocked the escalation of alcohol consumption that is typically seen in the FSS and CIE paradigm.
Conclusions. CRF in the mPFC appears to be critical for the promotion of alcohol drinking in our stress-alcohol dependence model using the CIE-FSS paradigm.

125. Salivary Cortisol, Word Recall and Stress
Student Presenter: Caitlin Cody
Faculty Mentor(s): Michael Ruscio
Additional Authors: Lydia Mahan, Department of Psychology, Dr. John Widholm Professor Department of Psychology

This study aimed to detect changes in salivary cortisol in response to a memory recall task involving emotionally salient images. Emotion plays a well-established, but nuanced role in memory recall. Cortisol is a hormone generally associated with a stress response but its levels can also elevate with increased attention. Data were collected from approximately 100 subjects over four semesters. Subjects were presented with one of two sets of 25 word-image pairs. One group of word-image pairs were intended to evoke a positive emotional valence. A second group of word-image pairs (same words, different images) were intended to evoke a negative emotional valence. Following the presentations, participants were asked to recall as many of the 25 words as possible. Before and after viewing the presentation, participants provided a saliva sample and reported their perceived stress levels to determine changes caused by either set of images. The changes in cortisol concentration were determined by immunoassay (Salimetrics #5004400). Participants in the positive emotional valence group recalled significantly more words than the negative emotional valence group. Participants' perceived change in stress levels correlated with the post-manipulation cortisol levels. A related experiment was conducted to determine whether the type of feedback (positive, negative, or none) received after the Trier Social Stress Test significantly influences word recall. It is hypothesized that positive feedback will be associated with lower cortisol levels and greater word recall. The interactions among emotional, hormones and memory are important to consider in respect to education, professional performance and productivity.

126. Effects of Intermittent Home Cage Ethanol Access on Within-Session Drinking During Unfavorable Reward Shifts in Alcohol Non-Preferring Rats
Student Presenter: Tyler Cooper
Faculty Mentor(s): Chad Galuska
Additional Authors: Anna Saracino - Psychology Department, Meghan Dougherty - Psychology Department

Frustration stress has been identified as a common reason for alcohol use in humans. In animal models, the transition from receiving a large (L) reward to a signaled upcoming small (S) reward produces drinking behavior of a concurrently available ethanol (EtOH) solution in rats. In this study, we report results from four rats who did not drink EtOH during signaled LS transitions. We sought to determine if exposing these rats to cycles of EtOH availability and withdrawal in the home cage would increase their alcohol consumption during sessions. Throughout a 5-week study, rats were provided 24-hr access to 20% (v/v) EtOH solution and tap water in the home cage, followed by 24-hr EtOH withdrawal, during which sessions were conducted. During operant sessions, the rats were given the opportunity to drink EtOH while lever pressing was maintained on a two-component fixed-interval (FI) 90-s schedule differing in reinforcement magnitude. Components alternated irregularly yielding four transitions between past and signaled upcoming reinforcers (SS, SL, LL, LS). The project's preliminary results show that within-session ethanol consumption increased in withdrawal periods following EtOH home cage access.

127. Role of Perineuronal Nets in the Ventral Pallidum on Coping Strategies in female rats, using an animal model of PTSD
Student Presenter: Lillian Duncan
Faculty Mentor(s): Micheal Ruscio
Additional Authors: Dr. Ritchy Hodebourg, MUSC Neuroscience Department

Post-Traumatic Stress Disorder (PTSD) is a mental health disorder that occurs when a subpopulation of people experiences a traumatic event. Recent studies demonstrated that perineuronal nets (PNNs), a highly condensed form of the extracellular matrix, are dysregulated in several brain regions after stressful events. Although the ventral pallidum (VP) is a brain region well characterized for its role in aversive behaviors, the effect of stress on PNNs in this structure is unknown. In male rats, we previously demonstrated that acute stress induced a long-term increase of PNNs in the VP. Moreover, a stress-conditioned stimulus (stress-CS) induced active coping and decreased the number of PNNs in the VP. A negative correlation was also established between PNNs number and the active coping, indicating a role of PNNs in stress responses. The goal of the present study is to assess the effect of acute stress and stress-CS on PNNs in the VP of female rats. Rats were restraint stressed for 2h and simultaneously exposed to an odor that became the stress-CS. Control rats were exposed to the same odor in the home cage. Three weeks after the stress, we evaluated the effect of the stress-CS or a novel stimulus (stress-NS) on coping strategies in a defensive burying task. The burying (active coping), immobility, grooming, and escape behaviors (avoidant coping) were analyzed. There was a difference in escape, immobility, and grooming. We will then use confocal microscopy to quantify PNNs in the VP. This study will help to identify new targets to treat PTSD.

128. Relations Between Laypeople's Beliefs About Memory and Their Perceptions of Children's Disclosures of Maltreatment During Conversations with Parents ♻️
Student Presenter: Katherine Elston
Faculty Mentor(s): Gabrielle Principe
Additional Authors: Catherine Hopkins(psychology), Lizzie Petagna (psychology), Madeline Keller(psychology), Rebecca Grosso(psychology), Haley Schonberg (psychology), Marley Leventis (psychology), and Megan Foster (psychology)

In most cases of childhood sexual abuse, children's testimony serves as the sole piece of evidence. Often, allegations first arise during interactions between the child and a non-offending parent. Research demonstrates (see Principe & London, 2022) that these conversations have the power to shape children's later formal statements. Specifically, at times, parents may unwittingly use high levels of leading or suggestive questions that can produce false accounts that can be as elaborate and compelling as reports of true experiences. As such, understanding laypeople's perceptions of parental influence on children's memory is paramount to arriving at accurate and just conclusions in cases involving young witnesses. In this study, we explored connections between people's beliefs about memory and suggestive questioning in the context of parent-child conversations modeled after those in real cases. Participants read and then recalled either a neutral, moderately suggestive, or highly suggestive conversation between a parent and child in which a singular disclosure of sexual abuse was made. We also asked participants about their beliefs about memory, suggestibility, and child sexual abuse, as well as several aspects of the conversation. Results indicated strong relationships between people's beliefs about memory and suggestibility and their ability in the conversations to distinguish suggestive from nonsuggestive parental questioning, whether the disclosure was spontaneous or occurred only after multiple suggestions, the appropriateness of suggestive questioning, the reliability of the disclosure, and their recall of who said what. The implications of these and other findings will be discussed for children's treatment in sexual abuse cases.

129. Effects of BDNF and estrogen on synaptic plasticity around injured motor neurons
Student Presenter: Heather Ghent
Faculty Mentor(s): Jenn Wilhelm

Peripheral nerve injury impacts hundreds of thousands of people each year. This type of injury can produce many debilitating physical effects such as muscle weakness or loss of sensation that require long-term rehabilitation. These deficits are caused at least in part by reorganization and loss of synaptic connections onto injured motor neurons within the spinal cord. Exercise is known to mitigate synaptic reduction in neurons after injury; however, exercise is often infeasible after injury. Previous research has shown that treatment with brain derived neurotrophic factor (BDNF), a protein necessary for the health and survival of neurons, and estradiol, an estrogen steroid hormone, can decrease the reduction of synaptic coverage on motor neurons after injury. Our study examined whether BDNF and estrogen signaling are part of a common pathway that can support the stabilization of synapses after injury to motor neurons. Using a mouse model of sciatic nerve injury, we examined whether pharmacologically blocking BDNF during estradiol treatment would change the ability for estrogen signaling to prevent the loss of synapses seen in untreated mice. If we discover that the effects of estradiol change based on BDNF signaling, then we may be able to apply these findings to novel pharmacological treatments for patients suffering from peripheral nerve injury during periods when they are unable to engage in exercise.

130. Data Judgment in the Tragic Launch of the Challenger
Student Presenter: Francesca Gibson
Faculty Mentor(s): Anthony Bishara

On an unusually cold day in 1986, the space shuttle Challenger exploded, killing all seven crew members. The physical cause of the disaster was failure of O-ring seals due low temperature. Importantly, the relationship between temperature and O-ring failure had been discussed before the disaster, yet key decision-makers still recommended launch. Their decision was guided by previous shuttle launch data, but at least three characteristics of the data and their use may have contributed to the tragic result: 1) rather than considering all previous flights, decision-makers only examined flights where damage to O-rings was present, 2) the discussion focused disproportionately on only 2 datapoints with the most extreme O-ring damage, and 3) temperature and amount of O-ring damage were presented in a table rather than a graph. Drawing on the psychological literature on feature-positive effects, data visualization, and function learning, we conducted a confirmatory experiment to test the impact of these characteristics in an analog task. The primary hypothesis was that restricting the range of data (characteristics 1 and 2) would make participants overlook the relationship between temperature and part failure, and thereby make them more apt to launch. The experiment had a 3 (Data Availability: complete, damage present only, two extreme damage datapoints only) x 2 (Data Presentation: table, graph) factorial between-subjects design. We found that exclusion of a subset of data led participants to launch at significantly colder temperatures.

131. Relationship Benefits of Nostalgia: Encouraging Forgiveness in the Wake of Transgressions
Student Presenter: Francesca Gibson
Faculty Mentor(s): Chelsea Reid
Additional Authors: Jamie Wirth, Psychology Department

Nostalgia is a positive reflection on past experiences that hold sentimental value or induce a sense of longing. Nostalgia can alleviate distress already present in a person's life, which has prompted research into the benefits of nostalgia. Because the moments that evoke the most nostalgia involve relationships with others, understanding romantic relationships and satisfaction can add information to nostalgia research and nostalgia's benefits; yet, little research has focused on nostalgia in romantic relationships. Importantly, nostalgia also has recognized benefits‚Äîrelationship nostalgia is positively associated with relationship satisfaction and relationship quality (Evans et al., 2022). Based on nostalgia's ability to assuage mental and physical distress (Reid et al., 2021) as well as nostalgia's ability to bolster empathy for others (Zhou et al., 2012), it is reasonable to believe that this pattern would be present for individuals in romantic relationships. Specifically, this study seeks to expand on the sociality function of nostalgia to understand the role of nostalgia in romantic relationships and nostalgia's ability to facilitate forgiveness following an interpersonal transgression. Research has found that transgressions can negatively affect mental health and interpersonal relationships (Cano & O'Leary, 2000; McCullough et al., 1998). We conducted a correlational study and found that higher relationship nostalgia was correlated with lower revenge motivations as well as lower avoidance motivations, both of which are subsets of unforgiveness. Our second study employs an experimental design and involves a community sample, which we expect will support the trends seen in the correlational data.

132. Sense of Coherence, Individualism, and Collectivism
Student Presenter: Natalia Halachev
Faculty Mentor(s): James Hittner

People who score high in the Sense of Coherence (SOC) personality trait report greater life satisfaction, less negative affect (e.g., depression, anxiety), greater positive affect (e.g., happiness, joy), and more resilience when stressed. In addition, although some studies have found cross-cultural differences in levels of SOC, the precise factors that account for such differences have not been delineated. One set of factors that might explain cross-cultural differences in SOC are individualistic and collectivistic belief systems. Previous research has found that experiencing both positive and negative affect differs across predominantly individualistic and collectivistic cultures, however, very little research has examined how these cultures are associated with SOC and other health-relevant psychological variables such as social support and life satisfaction. Toward this end, the present study used cluster analytic statistical methods to sort approximately 1000 college students from the United States and Hungary into different groups based on their individualistic and collectivistic beliefs. Four distinct types of beliefs were examined: horizontal individualism, vertical individualism, horizontal collectivism, and vertical collectivism. Results indicated that for cluster 1, which is defined by high horizontal individualism, low vertical individualism, and moderate horizontal and vertical collectivism, mean scores on the SOC, social support, life satisfaction, and positive affect measures were significantly different from the mean scores for the other two clusters. Furthermore, results indicated that there were country-level differences across many of the health-relevant variables. These findings highlight the importance of individualistic and collectivistic beliefs in influencing people's standings on various health-relevant psychological variables.

133. What, Me Worry? Students Who Believe in Free Will Worry Less
Student Presenter: Madison Jackson
Faculty Mentor(s): Chad M. Galuska
Additional Authors: Bella Burns, Emily Russell

Philosophical debates between free will and determinism beliefs have supposed implications on factors related to our well-being. The purpose of this study was to examine these relationships between free will and determinism beliefs on the propensity to worry. Our sample consisted of 93 undergraduate students who volunteered to participate for course credit in an introductory psychology course. Participants completed the Free Will and Determinism Plus scale (FAD-Plus) and the Penn State Worry Questionnaire (PSWQ) using the online platform Qualtrics. Scores from the FAD-Plus were broken down into four independent subscales: Free Will, Scientific Determinism, Fatalistic Determinism, and Unpredictability. The PSWQ assessed the level of worry in individuals held as a general trait. Results showed a significant negative correlation between Free Will and Worry and a significant positive correlation between Fatalistic Determinism and Worry. Both associations were consistent with existing research and suggest that people who believe in free will worry less, and people with fatalistic but not scientific beliefs worry more.

134. Variability in Past Human-Animal Interaction Research: A Plan for Future Studies
Student Presenter: Lizzie Ley
Faculty Mentor(s): Garrett Milliken

Research on Human-Animal Interaction (HAI) seeks to identify the benefits of the human-companion-animal relationship. This project first summarizes the history of HAI research and then presents key findings relating to how interaction with animals, specifically dogs, impacts the biological, psychological, and social influences on human health in medical, therapeutic, and everyday life settings. While HAI research has shown progress in the past four decades, the field continues to find contradictory results. Wells' 2019 review provides many examples of this issue. For example, in some studies, pet owners or people who interacted with animals experienced an associated positive health outcome, like a decrease in blood pressure. In other studies, HAI was not associated with a similar positive health outcome or was even associated with a negative health outcome, like an increase in blood pressure. The balance of the present project pertains to the high variability in HAI research, where a systematic review presents issues related to the wide variety of methodologies, the nature of the HAI, and human and animal participants themselves. Recommendations are made for future research directions that will increase our knowledge of HAI and help clarify past discrepancies and solidify the results from future research.

Sustainability-related project
*Graduate student

135. Examination of Resurgence for Operant Behaviors Differing in Energy Expenditure
Student Presenter: Abigail Limor
Faculty Mentor(s): John Widholm
Additional Authors: Sheana Barrett, Psychology

Resurgence is the relapse of a prior behavior induced by the removal of reinforcement alternatives. This pilot study aimed to determine whether differences in resurgence are obtained when the target behaviors differ in the effort necessary for reinforcement. Eight rats (4 males and 4 females) will be maintained at (or around) 85% of their free-feeding weight and then tested daily (7 days a week) in automated operant chambers. Subjects will learn one of two target behaviors: wheel running or chain pulling for a food reinforcer with the other behavior serving as the alternative behavior. The experiment will occur according to the following three phases: Phase 1 will consist of reinforcement for (only) the target behavior (VI 15" schedule); Phase 2 will consist of access to both target and alternative behaviors with reinforcement for (only) the alternative behavior; Phase 3 will provide access to both target and alternative behaviors but under conditions of extinction for both behaviors. It is hypothesized that target behaviors requiring greater effort will result in lower levels of resurgence, relative to baseline levels of response emission. This methodology may potentially reveal the implications of differing caloric demands on behavioral persistence and/or the relapse of previous habits.
Keywords: Operant conditioning, Resurgence, Response effort, Chain Pulling, Wheel Running, Relapse, Rats

136. Survival Processing: Why it improves memory
Student Presenter: Abby Limor, Sarah Miller, Angel O'Banner, Taleen Pratt, Karlie Silver, Adeline Youngblood
Faculty Mentor(s): Cindi May
Additional Authors: Mary Bearfield, Mia Diserafino, Jalie Hittner, Jackson Colby, Allison Klein, and Lydia Kurtiak. (All presenters are enrolled in PSYC 468)

Scientists have long sought ways to improve human memory. One technique that has received much attention lately is survival processing (Nairne et al. 2007). In the standard survival processing paradigm, participants imagine that they are stranded in the grasslands of a foreign land and must work to find water, food, and shelter. They then see a list of words (e.g., "finger, stone, fabric") and must judge how relevant each item is to their survival. Relative to many other encoding conditions (e.g., rating the pleasantness of words; imagining moving to a foreign land), survival processing produces better memory (Kazanas & Altarriba, 2015). Although the survival processing effect (SPE) is a robust phenomenon, there is ongoing debate regarding why SPE is observed. Some researchers take an evolutionary approach and argue that memory evolved to help humans survive and reproduce, and therefore processing information within the context of a survival-relevant scenario provides significant benefits. However, other researchers have noted that survival processing evokes other proximate mechanisms known to enhance memory, including relational processing, arousal or threat, self-referential encoding, congruency, and three specific goals that force a focus on the function of to-be-remembered items. To date, no other encoding condition that evokes all of these proximate mechanisms has been compared with survival processing. Here, we address this gap. Our experiment compared survival processing to a condition that included all of the proximate mechanisms listed above, without using survival. Our data offer insights into the mechanism(s) responsible for SPE.

137. Understanding Climate Literacy: Political Ideology Impacts One's Perception and Knowledge ♻
Student Presenter: Meghan Lord
Faculty Mentor(s): Stephen Short

This study aims to address the question of how political ideology affects one's understanding of both science in general, and specifically climate change (i.e., objective knowledge) as well as how they perceive their own understanding (i.e., subjective knowledge). In particular, we examined how much people think they know about climate change, what they actually do know, and how that knowledge may be moderated by conservatism. Objective climate change knowledge was measured by presenting participants with questions to measure their understanding of the causes and impacts of climate change. Subjective climate change knowledge was measured by asking them to rate how accurately they answered the questions compared to others in their country. Objective science literacy was also measured with questions about the scientific method, chemistry, and biology. Finally, conservatism was measured by asking participants how they self-identify politically on a 7-point scale ranging from 1 (strong Democrat) to 7 (strong Republican) with the midpoint 4 (Independent). Subjective climate knowledge (b = 0.48, p < .001) significantly predicted objective climate literacy, whereas conservatism did not (b = 0.37, p = .15). A significant interaction between conservatism and objective climate literacy was observed (b = -0.06, p < .05). Thus, the effect of one's objective climate literacy on their subjective climate knowledge changed based on their reported level of conservatism. When asked to rate their understanding of climate change, strong Republicans tended to rate themselves lower than others with similar objective understanding. However, this effect was not seen for general science knowledge.

138. How long does it last? Do the benefits of neurodiversity training persist. ♻
Student Presenter: Levi Moyer
Faculty Mentor(s): Cindi May
Additional Authors: Christopher Whelpley, Virginia Commonwealth University

Individuals with autism spectrum disorder (ASD) have high rates of unemployment (Bureau of Labor Statistics, 2015). One significant barrier to employment for people with ASD is the job interview (Whelpley & May, 2022). Although employers perceive candidates with ASD as qualified, they tend to reject those candidates because of atypical interpersonal and social interactions. Recent work demonstrates that neurodiversity training can mitigate these biases and level the playing field for candidates with ASD (May, Whelpley, & Kaup, submitted). When evaluators completed 30 minutes of neurodiversity training and were informed of candidates' ASD diagnosis during the interview process, they were just as likely to hire candidates with ASD as they were neurotypical candidates. Our study expands on this work to explore the duration of the training benefit. In the work by May et al., neurodiversity training immediately preceded the evaluation of job candidates. In the field, it is more likely that training will occur weeks or even months before candidates are interviewed. In our study, evaluators completed neurodiversity training and, two months later, watched and evaluated videos of mock job interviews of candidates with and without ASD. Immediately before watching each interview, raters were informed about whether each candidate did (or did not) have ASD. Raters evaluated each candidate on nine social dimensions. They also indicated whether each candidate was qualified for the job, and how likely they were to hire each candidate. Our findings suggest an enduring benefit to neurodiversity training for employment outcomes for those with ASD.

139. Happiness Is Not Insured
Student Presenter: Olivia Olson
Faculty Mentor(s): Lancie Affonso

Since the increased stressors and isolation of the pandemic started in 2020, mental health needs are on the rise; however, insurance and work benefits rarely cover fees related to these important resources. Though many workplaces offer full-time benefits for insurance plans that aid with medical bills, therapy and psychiatry fees are rarely considered. With the cost of living rising, these resources need to be made more accessible to the public. In South Carolina, an average therapy session costs $130 out of pocket (without insurance). A psychiatrist appointment, which often requires follow-ups weeks after beginning a new medication, ranges anywhere from $150 - $500 per visit. In 2021, just over a tenth of South Carolina's population was uninsured. Even with insurance, therapy can still be unaffordable for many individuals; in 2020, in-network care averaged $21 per session and out-of-network care averaged almost three times that amount. This project will compare the difference between the growth of mental health in recent years and if/how insurance coverage has increased with this growth. Alternative mental health resources will also be highlighted, and potential solutions will be discussed.

140. The Ability of Time of Day to Promote ABA Renewal in Rats
Student Presenter: Amber Richardson
Faculty Mentor(s): John Widholm
Additional Authors: Dr. Widholm and Abby Limor

In ABA renewal, the recovery of an extinguished conditioned response occurs when tested in a context different from that in which extinction treatment took place. This paradigm has been used to explain the impact of physical context (e.g., test chamber) and enteroceptive cues (e.g., drug effects) so the current study was performed to investigate whether time of day could serve as an abstract contextual cue for renewal. Eight Long-Evan rats were trained to lever press for a food reinforcer under a VI30" schedule of reinforcement in the afternoon (1645) and underwent extinction in the morning (0845). Following extinction, all rats were then tested for their tendency to lever press at both times of the day. It was hypothesized that the time of day would serve as a temporal context, resulting in an increased likelihood of responding at the time of day associated with reinforcement (1645). However, no differences in response rate were observed in the rats between the two time periods during renewal testing suggesting that rats may not be able to use time of day as a contextual cue in ABA renewal paradigms.
Keywords: Operant conditioning, ABA renewal, time, contextual cues, extinction, rats

141. The Effect of Transitions in Reinforcer Magnitude on Fixed Interval Response Patterns in Rats
Student Presenter: Anna Saracino
Faculty Mentor(s): Chad Galuska
Additional Authors: Tyler Cooper, Psychology

A fixed interval (FI) schedule of reinforcement delivers reinforcement for the first response after a specific period of time has elapsed. This schedule engenders a scalloped pattern of behavior in which organisms first pause (i.e., an absence of responding) and then accelerate their responding throughout the interval. When reinforcer magnitude varies within a single session, previous studies have found that pause duration on FI schedules is a function of both the past and upcoming reinforcer magnitudes, with pauses longest following larger reinforcers and before signaled upcoming smaller reinforcers. The purpose of this study was to determine if past and upcoming reinforcement continue to interact and influence responding following the pause and throughout the interval. Four male Long-Evans rats were studied on a two-component multiple FI 90-s schedule with signaled components of either a large (L; six pellets) or small (S; one pellet) reinforcer alternating to produce four transitions between components: from a just-received small reinforcer to a signaled upcoming small reinforcer (S-S), SL, LL, LS. Consistent with previous results, rats paused longest during the LS transition. Responding following the pause was jointly controlled by the past and upcoming reinforcers, with suppressed responding occurring throughout the entire 90-s interval during the LS transition. These results suggest that the disruptive effects of negative shifts in reinforcer availability are not localized to the pause but are temporally extended.

142. Effects of caffeine and exercise on salivary cortisol levels
Student Presenter: Emmalie Spina
Faculty Mentor(s): Jenn Wilhelm
Additional Authors: Sophia Brown (Dept of Psychology), Kate Green (Dept of Psychology), Ashley Kidd (Dept of Psychology), Tea Lungarini (Dept of Psychology), Cole Schleif (Dept of Psychology), Ashlyn Wells (Dept of Psychology), Lauren Wilson (Dept of Psychology), Jamie Wirth

Our study aimed to investigate the effects of consuming caffeine prior to exercise on salivary cortisol levels. We hypothesized that participants who consume caffeine prior to exercising will have a significant increase in their cortisol levels in comparison to those who did not consume caffeine before exercise. In a within-subjects design, participants were randomly assigned to consume either carbonated water with 0 mg caffeine or carbonated water with 70 mg caffeine at least 30 minutes prior to exercise (15-minute run). Saliva samples were collected before and after exercise, and cortisol levels were analyzed using a cortisol enzyme linked immunoassay. We found no statistically significant difference in cortisol levels after consuming the caffeinated water and exercising compared to consuming the uncaffeinated water and exercising.

143. Decentering Meditation to Prevent Burnout and Improve Academic Performance
Student Presenter: Samantha Tracey
Faculty Mentor(s): Ronda Swickert-Hittner
Additional Authors: Ashlyn Wells (Psychology), Lia Khachatryan (Psychology & Philosophy), Em Weimer (Psychology)

Emerging adults obtaining a college degree report high levels of stress and academic burnout that can impact their academic performance. Mindfulness, specifically the decentering component of mindfulness, has been shown to reduce stress and burnout. This study examines how decentering can help students improve their focus and academic performance and lower their stress after failing a test. Study 1 compared two different types of decentering against each other and a control: A more personal "affective" meditation, and a less personal "waterfall" meditation. Participants included 38 undergraduate students. Participants were told to complete a challenging test and were given a failing grade no matter how they responded. After reviewing their grade, they were then walked through either the "affective" or "waterfall" meditation or the control. They were then asked to complete a second timed test that was graded for accuracy. After completing this second test, participants filled out a questionnaire assessing their level of focus and perceived stress when taking the second test. While the findings were not statistically significant, the data trends suggest the "waterfall" meditation was the most successful. Based on this, in Study 2 we examined just the "waterfall" meditation compared to the control. The methods were the same, with slight alterations to the "waterfall" and control condition. We expect with a greater participant number in this second study, we will have significant results, with the "waterfall" group reporting lower stress and higher focus, along with better performance.

144. Correlations Between Area of Deprivation and Semantic Verbal Fluency
Student Presenter: Darby Watford
Faculty Mentor(s): Daniel Greenberg
Additional Authors: MUSC Department of Neurology: Sara Nolin, PhD and Andreana Benitez, PhD

The level of disadvantage that an individual faces has been shown to negatively affect social determinants of health an individual faces, therefore influencing cognitive abilities like memory. However, there has been a paucity of research investigating the correlation between deprivation and semantic verbal fluency specifically. The purpose of this research was to investigate this relationship, which could be used to help predict and identify areas at risk of exacerbated cognitive impairment and development of Alzheimer's disease. The Area of Deprivation Index, developed by researchers at the University of Wisconsin, was used as a measure of neighborhood-level disadvantage. This tool uses participants' residential addresses and ranks them according to relative deprivation at the state and national levels. Semantic verbal fluency tasks were administered, in which participants were asked to name as many animals and vegetables as they could in one minute. We hypothesized that more deprivation (ie. higher ADI scores) would be associated with lower verbal fluency scores. Pearson's correlation was utilized on Statistical Package for Social Sciences (SPSS), in which there was no correlation between semantic verbal fluency scores and disadvantage. These results suggest that there is no significant correlation between an individual's socioeconomic status and their verbal fluency, indicating the possibility of other factors such as education and aging to be major contributors to the decline of verbal fluency.

145. Correlation between Sense of Cohesion and Materialism in Young Adults in the United States and Hungary
Student Presenter: Reagan White
Faculty Mentor(s): James Hittner

Sense of Coherence (SOC) is a well-defined personality trait. High SOC scorers are more resilient to life stressors in that they see the world as being reliable and understandable. SOC is often measured through 3-dimensions: manageability, meaningfulness, and comprehensibility. Previous research has found that SOC is strongly related to genetics, health outcomes, coping strategies, values, and personality traits. However, one trait characteristic associated with personal values that has yet to be associated with SOC is materialism/consumerist tendencies. Given this gap in the literature, the present study addresses three specific research questions: What is the strength and direction between SOC and materialism across a large, diverse sample of young adults across two different countries, how do key health/positive psychology variables, such as perceived social support, positive and negative affect, mindfulness, and life satisfaction interact with SOC to influence materialism, and is there a significant gender difference between men and women as regards to the above two research questions? To address these research questions, we analyzed a sample of 1,023 university students from the United States and Hungary. We anticipate that SOC will be significantly negatively correlated with materialism. We also anticipate that one or more of the health/positive psychology variables will statistically interact with SOC to affect materialism. Regarding the third research question, we don't have a priori hypotheses concerning gender. We expect that the results will have implications for understanding how psychological resilience can influence materialism individually and in synergy with other health/positive psychology variables.

146. Baseline Slope Neglect in Graph Judgment
Student Presenter: Elana White
Faculty Mentor(s): Anthony Bishara

The feature presence effect is a tendency to take the presence of features into further consideration than the absence of features. This could potentially cause people to misinterpret scientific graphs. In a randomized experiment, participants view graphs showing a symptom trend for a fictional patient who takes a medication for a week, then switches to a new medication for the second week (feature present condition). Other participants view graphs that are identical except that the first week involves no medication (feature absent condition). Two-hundred college students in an Introductory Psychology course are participating in this online experiment (98 have completed it at the time of this abstract writing). To assess the accuracy of graph judgments, participants judge whether the medication taken during the second week caused symptoms to get better, worse, or neither. We predict that participants in the feature present condition will make significantly more accurate judgments compared to participants in the feature absent condition. Additionally, we expect the feature present condition to especially help judgment for challenging graphs that start with a sloped line. These findings can have important implications when considering graphs used to communicate medical, financial, or other quantitative or information.
Keywords: Graph Judgment, Feature Present Effects

147. How non-invasive vagal nerve stimulation via a cold face test affects cortisol level and heart rate
Student Presenter: Abby Williams
Faculty Mentor(s): Dr. Jennifer Wilhelm
Additional Authors: Maya Youssef (Biology), Briauna Hamlette (Psychology), Luna Riley (Psychology)

We aimed to understand if vagal nerve stimulation via a cold face test (CFT) affected cortisol levels, a key biological stress marker, and heart rate (HR) following an acute stress test. Stimulation of the trigeminal nerve with thermoregulation has been shown to positively affect HR, while decreasing cortisol levels, due to the activation of the parasympathetic nervous system (PNS) and down-regulation of the hypothalamic-pituitary-adrenal (HPA)-axis. Our hypothesis included two components. If exposed to an acute stress event, then an individual's cortisol level and heart rate will increase. If a cold compress is applied to an individual's face, then an individual's cortisol level and heart rate will decrease. Subjects (ages 21-23) enrolled in PSYC 464 during Spring 2024 were used for the study. Following baseline HR and cortisol level collection, participants underwent two stress tests, arithmetic test (AT) and Stroop Test (ST). Following these acute stress events, participants underwent a non-invasive application of CFT. Results collected were analyzed via a T-test statistical analysis and revealed that HR and cortisol levels following the stress tests were significantly higher than the collected HR and cortisol levels following the cold compress application. As prolonged-stress is a common issue among many college students, the goal of this study was to test the efficacy of cold compresses to provide a non-invasive coping mechanism to promote one's well-being.

148. Learning neuroanatomy with 3D-printed brain models versus photographs
Student Presenter: Alayna Wilson
Faculty Mentor(s): Nicholas Hindy
Additional Authors: Henry Horschman, Psychology

This classroom-based experiment aims to build upon ongoing research in neuroanatomy education. Most undergraduate neuroscience courses rely on images of the brain to teach neuroanatomy. However, previous studies have shown that students may need help to grasp spatial relations between brain areas when learning from images alone (Pitts et al., 2023). In contrast, medical schools typically use cadaver brains for instruction. To offer an alternative to cadaver-based instruction at the College of Charleston, we will test the hypothesis that 3D-printed brain models can facilitate a better understanding of neuroanatomy than brain images. The study will be conducted with undergraduate students in Systems and Integrative Neuroscience, using four different 3D-printed brain models along with photographs of the models. Each model will have five different structures represented with different colored stickers. During three training sessions, pairs of students will see cross-sections of the brain in which particular structures are highlighted. They will use either a 3D model or a photograph to identify the highlighted structure for each trial. This will be a within-subjects design where each student will experience both conditions. After all training sessions, students will have to identify brain structures in memory tests involving 3D models, photographs, and cross-sections of the brain that they did not see during training. We predict that 3D brain models will improve students' spatial understanding of the brain so that they perform better on memory tests for brain structures that they learned from 3D models than for brain structures they learned from photographs.

149. CHARACTERISTICS OF LONG DISTANCE RELATIONSHIPS: NOSTALGIA IN ROMANTIC RELATIONSHIPS
Student Presenter: Jamie Wirth
Faculty Mentor(s): Chelsea Reid
Additional Authors: Francesca Gibson, Psychology

Nostalgia, the sentimental longing for the past, can influence well-being (Newman, 2022). Nostalgia is considered a psychological resource that helps improve individual well-being when faced with challenging times (e.g., bereavement, Reid et al., 2022). Nostalgia might help to play a positive role in relationships by fostering emotional connection and contributing to overall relationship satisfaction. Another study found that the coping strategies preferred by nostalgia-prone people are associated with benefits during difficult times. Nostalgia-prone people are more likely to cope by seeking emotional support and demonstrate more heightened self-awareness about their own emotions during stressful situations (Batcho, 2013). We examine whether characteristics of long-distance relationships relate to nostalgia in romantic relationships. Because relationship nostalgia may be one means through which individuals cope with the challenge of long-distance, we expected that those in long-distance relationships would report higher relationship nostalgia than those in geographically close relationships (Hypothesis [H]1). Among those in long-distance relationships, we hypothesized that greater relationship nostalgia would be associated with longer durations of geographic separation from their partner (H2) and with greater geographic distance (H3). We also expected that those with less frequent contact with their partners would report greater relationship nostalgia (H4).

150. What do undergraduates with high childhood adversity want from campus sexual health services?
Student Presenter: Marion Wood
Faculty Mentor(s): Grace Hubel
Additional Authors: Daniella Frazzano (Psychology), Olivia Hawk, (Biology) Mccarthy Hickman (Psychology), Abby Limor (Psychology), Haley Schonberg (Psychology)

This study aims to determine how to tailor messages about campus sexual health services for college students exposed to adverse childhood experiences (ACEs). We have surveyed 576 College of Charleston students and plan to survey 24 more students to reach a total of 600 participants. The survey assesses an expanded concept of ACEs (i.e., ACEs that have been studied previously including indices of child maltreatment, household dysfunction, and community level ACEs) and regulatory focus. Regulatory focus is the type of goals individuals are driven to pursue and appears to be an important factor in health messaging. Individuals tend to fall into two categories of regulatory focus: prevention (driven to avoid failures) or promotion (driven to achieve success). After completing measures, participants are randomized to receive one of two ads in the following 3 sets: Set 1: prevention regulatory focus frame or promotion regulatory focus frame; set 2: in-person services at an on-campus clinic or telehealth services; and set 3: services that did not address partner relations or services that addressed partner relations. The dependent variable, intention to use the advertised service, is a score that ranges from 1-5 with higher values indicating greater willingness to use the service. We plan to analyze differences between scores for the ads using a 2 (high or low ACE group) X 2 (ad type) mixed subjects analysis of variance. Implications will be discussed for improving connections among college students to campus sexual health services, especially students exposed to high levels of childhood adversity.

Department of Religious Studies

151. Religious Rhetoric: Christian Language in America's Prison System ♻
Student Presenter: Anna Rowe
Faculty Mentor(s): Brennan Keegan
Additional Authors: Dr. Kelly Jakes, Department of Communication

This bachelor's essay will explore the powerful dynamic between authority and inmates, the language between the two, and how, if you listen closely, that language is riddled with Christian undertones, regardless of religious orientation. I will magnify the fundamentals of the prison structure and disassemble the formation of power to uncover the influences of religion. The questions that will motivate my research involve analyzing the fundamentals of religion and the American penal system. How did Protestant missionaries, reformers, and leaders help to construct the modern American penal system? How does Christianity continue to influence the inner workings of the American prison system? In what ways does Christianity impact the language, rhetoric, and relationship between authority figures and those incarcerated? How does Christian language create particular social relations and power dynamics within the prison system? This essay will situate the penal system within the broader history and system of power formulated by Christian values within the United States, with a focus on how communication in America has always been biased towards Christianity.

Department of Sociology and Anthropology

152. Assessing Food Apartheid in Charleston County Utilizing GIS and Urban Planning Policies ♻
Student Presenter: Grace Meade
Faculty Mentor(s): Tracy Burkett

Food apartheid is a social justice concern that affects communities worldwide. Addressing food apartheid within communities is crucial because it contributes to and amplifies the cycle of poverty as a whole. Stark contrasts in socioeconomic status and the presence of food access points make Charleston County an exemplary area to study food apartheid. Across the globe, cities of varying sizes, social environments, and economic profiles, have sought to assess and address food apartheid issues through research utilizing a variety of urban planning tactics. However, food apartheid in Charleston County has not been explicitly studied. To remedy this oversight, the current study examines the Charleston County food system from a social justice and planning perspective. Within this project, research on population demographics and the location of food access points was conducted and assessed. Transportation access, food access locations, and population demographics were mapped utilizing ArcGIS Pro software. These maps gave insight into what census tracts were most at risk for food apartheid. Beyond identifying the areas within Charleston County that are affected by food apartheid, policy is proposed to help mitigate and reduce food apartheid within Charleston. The proposed policies are based on policies employed in various cities. The utilization of these proposed policies would alleviate the pressures of food apartheid and slow the cycle of poverty that exists within communities of lower socioeconomic status within Charleston.

♻ Sustainability-related project
*Graduate student

153. Perceptions and Behaviors Related to Mental Health and Mental Health Services among Collegiate Student-Athletes
Student Presenter: Gabriella Nazari
Faculty Mentor(s): Sarah Hatteberg

Research on college athlete mental health indicates that athletes may experience a heightened need for mental health support, yet studies show that they are actually less likely than their non-athlete student peers to seek such support (Edwards, Froehle, & Fagan, 2020; Giovannetti et al., 2019). Furthermore, studies suggest that although athletes appreciate the specialized assistance they receive, there are many reasons they may avoid seeking support from within the athletic department, including concerns about stigma, confidentiality, and effectiveness. Extending this research, the purposes of this study are 1) to explore college athletes' perceptions of campus-based and athletic department mental health services and barriers to those services, and 2) to probe student-athletes' perspectives regarding strategies for reducing barriers and improving access to and use of services. To meet these objectives, focus group discussions were conducted with student-athletes participating in an NCAA Division I athletic program in the Southeast. Focus group transcripts are being analyzed qualitatively to identify themes. Initial analyses suggest that one of the most popular services, an in-house mental coach, was perceived as helpful and approachable, but was lacking in the scheduling availability athletes needed. Athletes also expressed apprehension toward utilizing athletic department services due to perceptions of systemic disorganization and the non-confidential process for booking appointments, which was perceived to pose negative consequences in other role related aspects of athletes' lives. Based upon these findings, strategies that could be implemented to strengthen mental health services and support resources available to athletes are proposed.

154. Foster Care to the Real World: Family Networks and the Transitioning to Adulthood
Student Presenter: Dondra Rodd
Faculty Mentor(s): Julia Arroyo

Rationale- Recently researchers have started to pay attention to the family networks for youth who become adults in formal foster care.
We have learned that relationships with biological parents are common, but we know less about other relationships. We have learned that during the transition to adulthood a robust network helps the youth to get multiple forms of support which can be crucial to well-being and success. This study aims to understand the bonds may form with other significant relationships in that youth's life‚Äîfor example, the bonds between their siblings, grandparents, and relatives like an aunt or uncle.
Methods-Conduct a literature review, using College of Charleston's library discovery database. We will include all quantitative and qualitative studies that aim to describe the nature, prevalence or impacts of family relationships for youth and young adults in the formal foster care system.
Outcomes-We will identify gaps and strengths in existing research, focusing on how relationships are conceptualized and measured, which relationships are studied most, or least, and which theories are used to link relationships to outcomes.
Broad Implications- This research can be shared with the child welfare system so they can help youth navigate and build their family relationships. This research will also identify future directions for studies and how family networks impact youth, including strengthening their support on how to thrive independently while acclimating to adult roles. For example, the youth transitioning out of the foster care system may need assistance and guidance in their finances and romantic relationships.

155. Jewish Views on End-of-Life Care ♻
Student Presenter: Michael Stein
Faculty Mentor(s): George Dickinson

The focus of this study is to gather information on the Jewish community and their views on end-of-life issues (EOL) such as palliative care, euthanasia, and the right to die movement, more specifically Pikuach Nefesh (the commandment of live-saving) and how it functions within today's healthcare system.
The work begins with a literature review, but primarily uses a survey system that is supported by a small batch of interviews from volunteers.

♻ **Sustainability-related project**
***Graduate student**

Urban Studies Program

156. The Impact of Hospitality and Tourism on Urban and Economic Development: A Remote Study of Charleston, South Carolina ♻
Student Presenter: Jordan Edenfield
Faculty Mentor(s): Melinda Kelley

This study is an examination of the hospitality and tourism industry in Charleston, South Carolina, and the effects it has on urban and economic development within that metropolitan area. Previous research has primarily relied on the Charleston metropolitan area's other major employers as key leaders for economic growth and development, but they fail to examine the largest industry in the Lowcountry, the tourism industry. With such a large sector of business left exiled from these studies, the public is often left in the dark about what the tourism industry really supports and how it drives urban and economic growth. Data was used from the College of Charleston's Office of Tourism Analysis, the Office of Economic Analysis, as well as from the Charleston Visitor's Bureau, and the Berkeley-Charleston-Dorchester Council of Governments to not only showcase what the economic impact is on the metropolitan area, but also to help explain how the industry takes burdens off of the local taxpayer environment. The findings indicate that the Charleston Metropolitan area would not be the economic powerhouse it is today without the tourism industry to not only support the continuous urban growth, but to help fund it as well.

157. Evaluation of the I-526 Highway Extension: Urban Sprawl, Congestion and Sustainability ♻
Student Presenter: Nina Norberg
Faculty Mentor(s): Melinda Kelley

The I-526 Extension has been a local debate since the original plan was introduced in the 1970's. The project has changed throughout the years of its drafting, and is today named the Mark Clark Extension.
The current version proposes to connect the existing highway that runs from West Ashley to Mount Pleasant to Johns Island and into James Island with an extension that would start from Savannah Highway. The main purpose of this extension is to help reduce congestion and allocate traffic from Johns Island and James Island onto the rest of Charleston County. The project has received opposition from residents and agencies who argue that the planned sales-tax of $1.9 billion should be prioritized for other more urgent projects in the county and that it will not solve issues that the city experiences with traffic today.
The Coastal Conservation League is one of the agencies arguing against the extension. They believe that these projects often lead to more development and ultimately incentivise further sprawl and displacement of existing homes and businesses. In addition, they have highlighted how the added extension would mean developing through 30 acres of saltwater and freshwater wetlands, which could worsen the already flood prone areas and harm the ecological well being of nearby communities.
This project will look at the pros and cons of the Mark Clark Extension, examples from cities in the United States and other nations, and will address public transportation systems as an alternative to further highway developments.

Women's and Gender Studies Program

158. The Effect of Anti-LGBTQ+ Legislation on Queer Mental Health in South Carolina
Student Presenter: Madelyn Byrd
Faculty Mentor(s): Christy Kollath-Cattano

This study explores the effect of anti-LGBTQ+ legislation on queer mental health in South Carolina. Numerous bills proposed by members of the State House over the past few years have had vehement anti-LGBTQ+ sentiments and aim to restrict LGBTQ+ rights within South Carolina. A mixed methods approach was used in this study, as 5 qualitative interviews with queer-centric educators and mental health professionals were performed, as well as an anonymous online survey with 53 participants, all of which provided responses from different perspectives. Data suggests that, despite some respondents' lack of in-depth knowledge of different forms of proposed legislation, most respondents feel uneasy as LGBTQ+ residents of South Carolina in terms their safety and emotional wellbeing, and that of their loved ones.

♻ Sustainability-related project
*Graduate student

School of Languages, Cultures, and World Affairs

Archaeology Program

159. Assessing Resiliency in the Land Use Histories of the Northeastern Peloponnese, Greece ♻️
Student Presenter: Xelyn Rogers
Faculty Mentor(s): James Newhard
Additional Authors: Juliet Riddle (Classics and Geology)

Regional survey is a principal technique for understanding long-term land use and corresponding social change. Recent studies have combined datasets from separate surveys to develop broader, interregional patterns and historical narratives. However, these efforts are often problematic given the various and contradictory methods used to collect data within each region.

Here, we contribute to an emerging approach that takes into consideration deviations in data quality. Within this approach (Bryan et al. 2023), survey data from four projects in the northeastern Peloponnese were assessed using standardized metrics that tracked changes in the number of settlements over time. Once individual patterns were developed for each survey region, these were then combined to illustrate cross-regional trends, tempered by regional variation.

Our efforts further enhance these metrics by considering the extent to which archaeological sites continue from one period to the next, are abandoned, and new sites emerge. While the previous study captured changes in site quantity, it did not fully explore the ways in which settlement patterns express continuity or change over time. Holding to the initial project's premise of developing individualized regional histories using identical algorithmic methods prior to data aggregation, metrics were developed to measure the constructs of site abandonment, continuity, and emergence. This data can then be used to develop narratives about regional and interregional patterns of resiliency over time.

Bibliography

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160. Using Multi-Criteria Decision Analysis to Inform Archaeological Reconnaissance in the Epidauria Region, Greece
Student Presenter: Jared Schiele
Faculty Mentor(s): James Newhard

Landscape archaeology involves the investigation of a region of interest to identify the vestiges of past human activity. Often, it is logistically impractical, unsafe, or legally impossible to investigate an entire region via in-person field reconnaissance. Devising an informed sampling strategy is therefore a critical element in the overall design process.

Selecting the sample is dependent on understanding multiple potential landscape uses and ensuring that the area inevitably selected for reconnaissance addresses those multiple conditions. It is further complicated by the fact that the same condition (e.g., locations for settlement) may have different criteria based on cultural or environmental needs at different points in time. Thus, conceptualizing landscape use requires the assessment of multiple criteria, applied to multiple conditions, within multiple socio-environmental contexts.

Multi-criteria decision analysis (MCDA) is an approach used to assess decision-making when several factors are involved. By identifying potential activities and the geographical contexts in which those activities likely would have taken place, the landscape can be classified according to its potential suitability for particular tasks.

Activities related to habitation, religious practices, agricultural production, defense, and trade are each defined by a weighted combination of their geographical and other spatial criteria via an analytic hierarchy process (AHP). This process is duplicated in instances where changing cultural contexts over time dictate different weightings of criteria for certain conditions. Once these weighted datasets are constructed and projected onto the landscape, a sampling regime can be employed that ensures representative coverage of potential landscape uses over time.

Department of Classics

161. Mothers in Mourning: Epigraphizing Grief on Roman Funerary Monuments, Christian and Pagan
Student Presenter: Catherine Rutherford
Faculty Mentor(s): Allison Sterrett-Krause

The inscriptions found on Roman funerary monuments provide fascinating glimpses into the lives and deaths of ordinary people in the Roman world. Of these monuments, several record the deaths of beloved children and express the abject misery of the parents who buried them. In this study, I analyze the language of ten inscriptions found on the funerary monuments of Roman children, all of which mention a mourning mother in some shape or form. Of these inscriptions, four are identifiably Christian, four are pagan, and the religious identity of the remaining two is unclear. Within these inscriptions, I identified four motifs, those being a denunciation of the force behind the child's demise, a denunciation of the self, a description of the funeral, and a mother's stated desire for their own demise. Not only do these inscriptions include shared motifs, but also shared language, suggesting that the mothers' religious identity had little to no impact on how they expressed their grief. In turn, this similarity suggests that mourning practices in ancient Rome were cultural rather than religious.

Department of French and Francophone Studies

162. L'écologie et le tourisme durable en France ♻
Student Presenter: Mariah Morrill
Faculty Mentor(s): Lauren Ravalico

My project on sustainable tourism in France explores the intersection of ecology as a fundamental value of French culture with tourism as a deeply unsustainable industry. The project centers mainly around understanding ecology as an everyday practice in France, the impact of the tourism industry within the country, how certain regions go about mitigating the effects of tourism and how we all can become more respectful and sustainable tourists. As the tourism industry grows and its impacts become more grave, understanding how we all can become more ecological in our travel endeavors is more important now than ever before. My research methods include reviewing sources in both English and French that address my question, alongside my future plan of conducting interviews with those familiar with the subject.

Department of Hispanic Studies

163. Perspectives of instructors of Spanish in K-12 and higher education concerning the integration of profanity, euphemisms, and taboos into the teaching of Spanish as a second language (L2) in US classrooms
Student Presenter: Sophie Faughnan
Faculty Mentor(s): Silvia Sabater

Profanities, euphemisms, and taboos are often among the last vocabulary items acquired by second language (L2) learners, but viewed as a major indicator of fluency to native speakers. Existing research demonstrates difficulty in implementation of knowledge regarding informal spoken language in formal L2 classrooms, with an array of opinions regarding its educational value from instructors. This study assesses the perspectives of language instructors of Spanish in K-12 and higher education concerning the integration of profanity, euphemisms, and taboos into the teaching of Spanish as an L2 in US classrooms. Instructors (N=20) were invited to participate in a survey that explored their teaching experience, their personal beliefs and ideas for implementing (or not) such vocabulary into their classrooms. Preliminary results indicate that the integration of such vocabulary into formal Spanish as a L2 teaching remains controversial in the field. While Spanish educators note words like "joder," "cabrón," and phrases using "mierda" or "puta" being personally used or encountered most, there exists disagreement in which kinds of vocabulary can be classified as educationally appropriate. The use of profanities in formal teaching was more frequently frowned upon, and deemed "not appropriate" or objectively not a component of "standard academic Spanish." Further qualitative research via interviews aims to shed light and understand their opinions and experiences.

164. How heritage learners of Spanish use of Spanish varies with L1 and L2 interlocutors and description of concrete v. abstract nouns
Student Presenter: Caroline Holbrook
Faculty Mentor(s): Colleen Moorman

In recent years, study of heritage learners (HLs) of Spanish in the United States has increased. HLs are individuals who have "learned a language from their family that differs from the primary language spoken in the country where they live" (Fajkus, 2022). In the U.S., Spanish HLs typically learn Spanish in their families, but receive formal education in English. They demonstrate systematic differences in their language production from native speakers (NSs), who learn Spanish and receive formal education in a Spanish-speaking country (Fajkus, 2022). Anecdotally, HLs often modify their speech with different speakers, sometimes changing structures, vocabulary, or pronunciation, but much remains to be learned about HLs' competencies in various linguistic domains (Bowles et al., 2014).

This experiment examines more finely how Spanish HLs modify their speech with different interlocutors and could inform how we instruct Spanish HLs, especially in mixed L2-HL classes. Thirty college-age Spanish HLs, between 18 and 22 years old, will be recorded interacting with two peer interlocutors: NSs of Spanish and L2 students of Spanish. The Spanish NSs grew up in a Spanish-speaking country. The L2 students grew up in the U.S. and are enrolled in fifth-semester Spanish. Each HL will play three 5-minute rounds of Taboo with each interlocutor, describing concrete nouns, abstract nouns, and idioms in Spanish. Afterwards, trained Spanish Linguistics professors will evaluate each participant's speech, in terms of pronunciation, rhythm, vocabulary, and morphosyntactic features (agreement; verb aspect and mood) to compare production with the NS versus L2 interlocutors.

International Studies Program

165. Exploring Attitudes Towards COVID-19 Vaccination in Kono District, Sierra Leone ♻
Student Presenter: Liza Malcolm
Faculty Mentor(s): Kristen McLean

As COVID-19 spread rapidly, many communities around the globe anxiously waited for a vaccine to shield themselves and their loved ones. At the early stages of the pandemic, it was widely believed that Africa would be a major source of infection. Vaccinating communities became a major goal among local and global health authorities. However, when the COVID-19 vaccine became available in March 2021 in Sierra Leone, it did not gain traction with local communities. While much literature has focused on access and distribution, a growing number of studies discuss vaccine hesitancy as influencing low vaccine uptake. Shifting attention to understanding the determinants of vaccine hesitancy remains fundamental to increasing vaccination rates, as negative vaccine beliefs might delay or prevent vaccination. The local community perspective is especially important as vaccine behaviors may be more malleable when met with historically and contextually sensitive interventions (Fisayo 2021).

This study seeks to do this by assessing, through semi-structured qualitative interviews, the vaccine attitudes and experiences of residents of Sierra Leone's Kono District. Furthermore, in contrast to applying "knowledge-deficit" models of belief, this study draws upon the vaccine anxieties framework (Leach et al. 2022). This framework recognizes that vaccines are "substantially emotional, social, and political devices" (Fisayo 2021). This study's findings suggest that important bodily, social, and political factors, including fear of side effects and distrust of government, influence people's COVID-19 vaccine attitudes. It is hoped that this study's findings will inform future policy and interventions related to vaccine uptake in Africa and globally.

166. Cultural Citizenship in the Rising Generation: Maghrebin Identity Construction in the French Republican System
Student Presenter: Jack Watson
Faculty Mentor(s): Vish Sakthivel
Additional Authors: Dr. Gareth Smail - International Studies

In France today, the conversation surrounding the issue of integration of the Maghrebin (North African) diaspora into the French Republic has coincided with a global call for racial equity in a context of ever-expanding globalization. Employing the theories of racialization and cultural citizenship, this qualitative research study examines the identity construction process of French youth with Maghrebin origins, specifically exploring the implications of transnational practices, intergenerational changes, and forms of systematic marginalization on how this population identifies itself. Semi-structured interviews were conducted with youth participants between the ages of 18 and 25 who either were born in the Maghreb and emigrated early or were born in France.

While data collection and analysis for this Bachelor's Essay is ongoing, the current dataset suggests the identification of Maghrebin youth in France along binational lines, meaning they view themselves as both French and of their country of origin (e.g. French-Moroccan). This demonstrates a failure in the goals of the French Republican system, which understands its citizens as French and only French. This dissonance between the identification process of these Maghrebin youth and the objectives of the French government holds implications in the context of broader, long-standing debates on the integration of Maghrebin immigrants into France, especially when taking into account the role of globalization. Access to novel technologies thanks to the modern globalizing world may further root the rising Maghrebin generation in France in a transnational identity, which holds broader implications on conceptions of citizenship and integration within the French context.

Jewish Studies Program

167. Teaching History, Sharing Stories: Student-Produced Podcasts on Holocaust Education
Student Presenter: Leah Davenport
Faculty Mentor(s): Chad Gibbs
Additional Authors: Natalie Peyton

H.E.A.R. (Holocaust Education, Awareness, and Remembrance) emerged as a passionate student group dedicated to fostering Holocaust education at the college level. Despite initial challenges in member engagement during traditional meetings, an innovative solution arose. Inspired by the vision of our advisor, Dr. Chad Gibbs, the idea of a podcast was embraced and swiftly set into motion with the enthusiastic collaboration of vice-president Natalie Peyton.
Since its debut on November 12, 2023, on Spotify and Apple Podcasts, we have released three episodes and are committed to a monthly schedule. Our mission extends beyond conventional historical accounts, aiming to unearth and share personal stories of survival. Episodes have shed light on events like the Nazi atrocities in Kaluszyn, Poland, and the journey of Czech Torah scrolls from Holocaust survival to South Carolina.
In just three months, H.E.A.R. has garnered 165 total plays and cultivated a dedicated following. With 17 Spotify followers, its impact reaches across borders, resonating in countries such as the United Kingdom, Norway, Canada, and Argentina, along with 27 states in the U.S. Our diverse audience spans ages, reflecting a commitment to making Holocaust education accessible to all.
Looking ahead, we. remain steadfast in our dedication to sharing intricate Holocaust narratives, with plans to expand its listener base and illuminate the lesser-known aspects of this crucial chapter in history.

168. Resistance in Writing: Examining the Legacy and History of Rachel Auerbach
Student Presenter: Natalie Peyton
Faculty Mentor(s): Chad Gibbs

In 1941, Emanuel Ringelblum recruited Rachel Auerbach to a secret project within the Warsaw Ghetto. As a member of Ringelblum's Oneg Shabbat underground archive, Auerbach and dozens of other volunteers documented and collected testimony about the experiences of Jews in the ghetto. With her background in journalism, Auerbach's skills were uniquely suited to help preserve the facts of life for Jews in Warsaw under Nazi control. Auerbach's influence on the Oneg Shabbat was through her dedication to testimony collection. She meticulously archived documents, testimonies, and artifacts to ensure that no one's story was lost. Her efforts to document the Holocaust served not only as a way to record the horrible facts of Jewish life during the Holocaust, but also as an act of resistance against the Nazis, who aimed to eradicate Jews and their memory.
Following her work with Oneg Shabbat, Auerbach continued to be an important recorder of Holocaust history and memory. She dedicated her life to the pursuit of justice against perpetrators and remembrance of victims as an archivist at the Israeli Holocaust memorial, Yad Vashem. Her efforts included reshaping the future of trials in Israel, collecting valuable testimonies, and creating a repository for survivors and victims of Nazi genocide. As the era of the witness comes to an end, we must extend efforts to document and recognize the means by which we learned to do so.

Linguistic Studies Program

169. Voices From the East: Investigating Linguistic Bias and Discrimination Towards East German Dialects Post-Reunification
Student Presenter: Riley Mazey
Faculty Mentor(s): Ricard Vinas De Puig
Additional Authors: Dr. Nancy Nenno (German and Russian Studies)

This study focuses on the use of East German dialects following reunification, by evaluating the bias and prejudices against East German dialects from L1 speakers of German.
After the fall of the Berlin Wall in 1989, much of the East German vocabulary was abandoned; West German dialects became the standard. East German dialects are still used within areas that belonged to former East Germany and used by speakers of East German descent. According to the relevant existing literature, most East German vocabulary in everyday German life is associated with ‚Ààostalgie' (nostalgia for life in East Germany) and exists as a symbol for life in the East. There is also a negative connotation towards East German dialects. The primary goal of this research is to determine if there is existing linguistic discrimination against the East German dialects.
Participants in this study were asked to respond to an online questionnaire containing 40 questions about various German dialects to evaluate their attitudes towards speakers of the presented dialect. Preliminary results indicate that participants who were unfamiliar with an East German term gave a non-positive response. Participants who responded as living in or being born in cities that overlap with former East German territories expressed more positive attitudes to those terms.
This study confirms a linguistic bias against East German varieties outside of the former East Germany borders, something not previously noted in the relevant literature. This research provides a better understanding of how East German dialects are generally viewed among L1 German speakers.

170. Tlingit: The Tongass Dialect and Language Preservation
Student Presenter: Kevin Riley
Faculty Mentor(s): Ricard Vinas De Puig

Diversity is a pertinent part of today's world as it provides various outlook and knowledge all can benefit from. Linguistic diversity, in particular, yields cultures and new perspectives of the human experience. Indigenous languages in the Americas are frequently endangered and face language death. These languages contain anthropological, ecological, agricultural, medicinal, etc. knowledge that can only be shared as long as the language is maintained. One such case is Tlingit, a critically endangered language located in southeastern coastal Alaska. Estimates in 2018 put the total number of speakers at around 130. Not only is the language critically endangered, but one dialect of Tlingit, the Tongass dialect, is now extinct. The dialect itself was very unique in its features and intelligibility with other dialects, but now the dialect has been lost, and along with it lots of valuable data. Language death is a very real threat all around the world. It is estimated that we will lose 90% of the world's languages by the end of the century. We should call for a greater protection of all languages, but especially indigenous languages since they face the threat at a greater rate, and now more than ever since we are in UNESCO's International Decade of Indigenous Languages.

School of Sciences, Mathematics, and Engineering

Department of Biology

171. Investigating The Downstream Targets of The Hedgehog Pathway in Cancer Associated Fibroblasts
Student Presenter: Alexandra Adams
Faculty Mentor(s): Agnes Ayme-Southgate

Pancreatic ductal adenocarcinoma (PDAC) is the third leading cause of cancer deaths in the US, and only 10% of PDAC patients survive five years after diagnosis. PDAC is characterized by desmoplasia, an abundance of cancer associated fibroblasts (CAFs). The Hedgehog pathway is upregulated in PDAC compared to normal pancreas. The Hedgehog pathway is a paracrine signal where the signal ligands are secreted by tumor cells and the signal received by CAFs. The Hedgehog pathway plays complex roles regulating PDAC formation, but the precise targets of this pathway in CAFs are still not fully determined. Previous studies showed that CAFs in PDAC originate from cells of the splanchnic mesenchyme. Intriguingly, the Hedgehog pathway is active in the splanchnic mesenchyme, with Foxf1 and Gata6 being two important targets. We hypothesize that Foxf1 and Gata6 are also downstream targets of the Hedgehog pathway in adult pancreatic fibroblasts. To test this, we examined the expression of Foxf1 and Gata6 in tissue resident fibroblasts (TRFs) derived from the normal adult pancreas and in CAFs derived from tumor-bearing pancreas. Our preliminary data showed that Foxf1 is upregulated while Gata6 is downregulated in CAFs compared to TRFs. Upon treatment with the Hedgehog agonist PMA, Foxf1 expression in TRFs increased while Gata6 in CAFs decreased. This suggested Foxf1 as a positive target and Gata6 as a negative target of the Hedgehog pathway in adult pancreatic fibroblasts. These data could be leveraged to better design therapeutics targeting the Hedgehog pathway in treating PDAC patients.

172. The Impact of TaVNS on Recovery and Neuroinflammation after HIE in neonatal rats
Student Presenter: Marie Akirtava
Faculty Mentor(s): Serena-Kaye Sims
Additional Authors: Kyndal Adams- Biology, Kennedy Camburn- Psychology, Aniston Hong- Biology, Maya Youssef- Biology, Luke Watson, PhD- MUSC, Melanie Gail, PhD- MUSC, Catrina Robinson, PhD- MUSC

INTRODUCTION: Neonatal hypoxic-ischemia (HI) results from decreased oxygen to the brain resulting in deficits in cognition, language, sensory, and motor function. Few neuroprotective options exist to combat these adverse outcomes. Transcutaneous auricular vagus nerve stimulation (taVNS), a potential treatment option for HI, may decrease HI-induced brain injury and improve outcomes. In addition, preclinical and clinical research over the last decade has identified a role for the protein Brain-Derived Neurotrophic Factor (BDNF) in brain plasticity within the intact brain and following central nervous system damage. Recent studies have also explored the relationship between taVNS and BDNF levels in other disease states. Hence, we explored the benefit of taVNS on functional recovery, BDNF, and plasticity after HI.
METHODS: In post-natal day 7 (PND7) Sprague-Dawley rats, HI was induced using the Vannucci Model and were then subject to 30-minute taVNS treatments for 7 days. Rats were evaluated at PND 7 through 10 on the righting reflex, cliff avoidance, 2-arm wire suspension, left arm wire suspension, negative geotaxis. Immunohistochemistry for synaptophysin and MAP2, which are reliable indicators of synaptic and dendritic plasticity, were also quantified. We also performed ELISA protein analysis for both mature BDNF and its precursor proBDNF.
RESULTS: Preliminary data suggests a predictive relationship between taVNS treatment and recovery after HI. Preliminary results also suggest taVNS treated animals exhibited elevated levels of both mature BDNF and proBDNF in serum. Our results imply that greater functional recovery correlates with higher levels of synaptophysin and MAP2 which suggests greater neuroplasticity with taVNS treatment.

173. Larval and juvenile fish composition in the upper intertidal zone, Charleston Harbor estuary
Student Presenter: Sydney Bates
Faculty Mentor(s): Tony Harold

Larval and juvenile stages of many coastal marine fish species thrive in estuarine habitats, but little is known about their occurrence within the intertidal zone. This study addresses the following question: Of the numerous fish species found in shallow water at low tide which, if any, move into the upper levels of the intertidal zone during high tide? Whether they rise with the increasing water level is a crucial component in the patterns of larval fish. Published research from other geographic areas have shown that Leiostomus xanthurus... larval and juvenile forms do move to higher levels. This study sampled shallow water during high tide at a beach in Charleston harbor approximately once a month through fall and winter (2023-2024). A fine-meshed beach seine was pulled through a transect of 10 meters in length parallel to shore. Of the fishes collected the Atlantic Silverside (Menidia menidia) was the most abundant species collected and only incidental captures of young stages of Mojarras (Gerreidae). Previous similar research on the upper subtidal zone has shown more larvae and juveniles to be present, but also including large Menidia menidia. The results of these findings support that some fishes do move into the intertidal zone with the rising tide, and particularly the Atlantic Silverside. The absence of larval and early juveniles could be due to the lack of suitable food and cover in the upper intertidal zone. Further studies related to such forage fishes and their distribution are essential for managing biodiversity and fisheries.

174. Role of the Kynurenine Pathway in Microglial Senescence and Alzheimer's Disease
Student Presenter: Jimeace Bonaparte
Faculty Mentor(s): Renaud Geslain
Additional Authors: MUSC Department of Pathology and Laboratory Medicine: William D. Hill, II, Ph.D. , Maxwell Cook, BS, Steven Dixon, Gavin Y. Wang, Ph.D.

Aging is the greatest known risk factor for Alzheimer's disease (AD) and other forms of dementia. Aging is associated with increased inflammation, which stimulates the activation of the kynurenine pathway and the production of kynurenine metabolites, including kynurenine (KYN), kynurenic acid (KYNA),
3-hydroxykynurenine (3HK), and quinolinic acid (QA). Previous studies have shown an elevated level of KYN and its metabolites in age-related diseases, including AD. Growing evidence suggests that age-associated accumulation of senescent cells plays a critical role in brain aging and AD pathogenesis. However, it remains to be determined how KYN or its metabolites affect neural cell senescence. The goal of this study was to investigate the effects of KYN and its metabolites on senescence induction in HMC3 human microglial cells. HMC3 cells were treated with a range of doses of KYN metabolites over multiple time points (3-48 hrs). Results showed that multiple independent senescent biomarkers were increased in 3HK-treated HMC3 cells, including SA-Œ≤-gal, whereas KYN-treated cells exhibited only a low level of SAŒ≤-gal. The senescence induction effect of 3HK was further confirmed by increased expression of the p21 and p19 senescence markers. Furthermore, our data reveals that 3HK is the most potent metabolite to
stimulate the secretion of the neuroinflammatory cytokine interleukin-6 (IL-6) by microglia compared to other KYN metabolites, and this result also demonstrates the SASP phenotype of 3HK-treated HMC3 cells. Taken together, these new findings suggest that KYN and its metabolites may contribute to the pathogenesis of AD via stimulating glial cell senescence and SASP-mediated neuroinflammation.

175. Historical Bird Eggs: Characterization and Identification
Student Presenter: Madison Cantrell
Faculty Mentor(s): Melissa Hughes

In 2022, the family of Thomas Pinkney Rutledge Rivers donated a large collection of bird eggs to the College of Charleston. The 326 egg collection dates back to the early 1900s and includes native species such as Brown Pelican, Black Skimmer, Northern Mockingbird, and Northern Bobwhite in addition to non-native species such as an Ostrich and a Cassin's Auklet. To maximize the future educational and research potential of this generous donation, I cataloged each egg and collected multiple measurements, documenting the pattern, color, shape, and size of each egg. To preserve information such as what eggs were collected together and which collection labels align with specific eggs, I documented the spatial relations and characteristics of the specimens as I unpacked each box. In addition, each egg was photographed with a size and color standard, using StackShot to create a 3-D photo. StackShot directs the camera to take multiple photographs focused at different heights; all of the photographs were then merged using Zerene Stacker. All eggs were hereafter organized into smaller collection boxes. Preliminary species identifications were confirmed using published sources. Collection of bird eggs is now illegal without proper permits, and so these historical egg collections are invaluable for studying bird biology, behavior, and taxonomy, and can provide insights into changing species ranges and environmental conditions.

176. Couriers of Contaminants: A characterization of suspected microplastics in bottlenose dolphin prey species ♻
Student Presenter: Eric Conger
Faculty Mentor(s): Leslie Hart
Additional Authors: Miranda K. Dziobak Department of Environmental Health Sciences, University of South Carolina, and Department of Health and Human Performance, Tita Curtin Department of Health and Human Performance, Ayushi Gaur Department of Biology, Elizabeth J. Berens McCabe

Our oceans contain trillions of plastic particles, 90% of which are microplastics (< 5mm diameter). These tiny particles have been observed in tissues of many marine fauna, demonstrating exposure vulnerability across trophic levels. Studies of bottlenose dolphins (Tursiops truncatus) in Sarasota Bay, FL, have revealed prevalent exposure to microplastics and chemical plasticizers. We explored whether this may be attributed to contaminated prey by characterizing microparticles in muscle and gastrointestinal (GI) tissues of 11 species (Gulf toadfish, Opsanus beta; spot, Leiostomus xanthurus; spotted seatrout, Cynoscion nebulosus; pinfish, Lagodon rhomboides; sheepshead, Archosargus probatocephalus; ladyfish, Elops saurus; pigfish, Orthopristis chrysoptera; menhaden, Brevoortia tyrannus; Atlantic threadfin herring, Opisthonema oglinum; scaled sardine, Harengula jaguana; hardhead catfish, Ariopsis felis). During September 2022 - August 2023, 90 fish were collected from Sarasota Bay. Organic material (non-plastic) was digested from the sample using potassium hydroxide and vacuum filtered onto GF/A 1.6 ¬µm glass fiber filters. Suspected plastics were determined via visual identification criteria. Laboratory blanks were processed concurrently to account for ambient or procedural contamination. Suspected microplastics were observed in >80% of muscle and >95% of GI samples. Overall, GI tissues contained more suspected microplastics than muscle; total counts per fish were 1-335, and most particles were fibers and films. Across all species, the particle load (# particles/g tissue) was highest for pinfish (muscle: 0.38; GI: 15.20), which is the most frequent prey item for dolphins and a common baitfish for anglers. This study suggests that marine wildlife and human seafood consumers could be exposed via contaminated prey.

177. Neural Mechanisms in AUD: PV-NAc Circuit in Alcohol Seeking
Student Presenter: Cynara Cooper
Faculty Mentor(s): Christopher Korey
Additional Authors: Amy Ward, Department of Neuroscience, MUSC, Dr. Jen Rinker, Department of Neuroscience, MUSC

Alcohol Use Disorder (AUD) is a prevalent disorder in the United States, characterized by the inability to stop alcohol seeking, despite negative consequences. While the mechanisms underlying alcohol seeking are not completely understood, previous research has shown that the paraventricular thalamus (PVT) to nucleus accumbens (NAc) pathway activates parvalbumin interneurons (PV-INs) in the NAc which act as a brake on alcohol-seeking behaviors during a head-fixed self-administration paradigm. This project expands our understanding of these PV-INs as it relates to alcohol seeking in a freely moving paradigm.
PV-INs in the NAc were directly manipulated through the use of chemogenetics. Specifically Cre-dependent mCherry Gq DREADDS (designer receptors exclusively activated by designer drugs) were bilaterally injected into the NAc of transgenic PV-Cre mice. PV-INs were activated by intraperitoneal injections of deschloroclozapine (DCZ), the DREADD agonist. The mice underwent alternating cycles of Drinking-in-the-Dark (DID) and chronic intermittent ethanol exposure (CIE) to measure drinking after chemogenetic PV-IN activation.
Following four cycles of CIE, saline treated animals exhibited escalations in drinking in comparison to air controls. In animals who received DCZ treatment, activation of PV-INs diminished CIE-induced escalation of alcohol drinking.
While activation of PV-INs did not appear to decrease drinking in control animals, it did temper escalation in the CIE animals. It is possible that these interneurons are engaged in more goal-directed alcohol seeking, which may not be fully modeled in the free-access paradigm used here. Therefore, further expansion on this study is required to understand how these PV-INs are engaged during alcohol-seeking behaviors.

178. Citicoline administration repairs THC-induced cognitive deficits
Student Presenter: Caitlyn Costa
Faculty Mentor(s): Matthew Rutter
Additional Authors: Jordan Carter - Reichel Lab - Department of Neuroscience, Medical University of South Carolina

Deficits in memory processes have been reported following exposure to Œî9- tetrahydrocannabinol (THC), the main psychoactive component in cannabis. Previously, we have shown that THC vapor exposure during adolescence impairs performance on the spontaneous location recognition (SLR) task in rodents. This task assesses pattern separation, a hippocampus-dependent process requiring intact memory encoding capabilities. Citicoline (cytidine-5'-diphosphocholine), is a source of choline and cytidine, precursors involved in several important metabolic signaling pathways. Citicoline has previously been investigated for potential nootropic effects, but not in the context of THC-induced deficits. The objective of this study was to investigate the effects of citicoline on THC-induced impairments in SLR performance using a longitudinal design. We hypothesized that citicoline would restore pattern separation ability following disruption by THC across the lifespan. At three different age points (adolescence, young adulthood, and middle adulthood), male and female rats were tested on the SLR task before (SLR PRE) and after (SLR POST) vaporized cannabis extract exposure. This occurred via either forced vapor exposure (14 days during adolescence) or vapor self-administration (20 days during young and middle adulthood). Efficacy of THC delivery was assessed by measuring changes in locomotor activity across the experiments. During the SLR POST task, subjects received an injection of saline or citicoline (250 mg/kg). At each age, rats demonstrated robust performance of the SLR PRE task. Cannabis vapor exposure suppressed locomotor activity in males and females, in agreement with the known physiologic effects of THC. Following vapor exposure, rats had impaired SLR POST performance. Their behavior was rescued by citicoline administration, particularly when given during the memory encoding phase of the task. Citicoline did not improve baseline SLR performance. These results indicate that citicoline may be useful for repairing THC-induced cognitive deficits clinically.

179. The Effect of Oxytocin Administration on Voluntary Alcohol Drinking in mice model.
Student Presenter: Maria Cova
Faculty Mentor(s): Jennifer Wilhelm

In the United States, alcohol use is the leading cause of preventable deaths. Reports estimate that from 2011-2015, 261 deaths a day were caused by excessive drinking, with binge drinking accounting for most potential years of life loss. Rodent models are used to study several substance use disorders, including alcohol use disorder (AUD). Rhodes and colleagues (2005) validated a drinking in the dark (DID) model that employs a simple voluntary ethanol administration in mice. In the model, drinking reaches significant blood ethanol concentration (BEC>80 mg/dl) and can be used for screening pharmacological interventions. For this study, we used the DID model to screen the pharmacological potential of oxytocin and investigate sex-related differences in treatment. Oxytocin is involved in brain areas related to drug and social reward, and its systemic administration has been studied in pre-clinical and clinical models of addiction. Adult C57BL/6J male and female mice received access to 20% v/v ethanol for three days, 2 hours per day, and a 4-hour access on the 4th day. After two weeks of baseline, mice were challenged with intraperitoneal injections: vehicle (saline), 0.25, 0.50, or 1.0 mg/kg of oxytocin. Following another baseline, mice were challenged with vehicle, oxytocin, oxytocin receptor antagonist (L368,899), or oxytocin plus antagonist. We hypothesize that oxytocin will reduce ethanol consumption in a dose-related manner and is mediated by the oxytocin receptor in the brain. Preliminary data shows a reduction of ethanol intake after oxytocin treatment in both males and females; however, all data is still under analysis.

180. Identifying reward-specific neural ensembles in the mediodorsal thalamus: Implications for Alcohol Use Disorder
Student Presenter: Matthew Davis
Faculty Mentor(s): Michael Ruscio
Additional Authors: MUSC Department of Neuroscience, Charleston Alcohol Research Center.
Dr. Patrick Mulholland, Dr. Jennifer Rinker, and Dr. Kaitlin Reeves

Alcohol Use Disorder is associated with a narrowing of engagement in behaviors related to non-alcohol rewards. The mediodorsal thalamus (MD) is a higher-order thalamic nucleus that plays a critical role in adaptive goal-directed choice behavior. However, it is unknown how the MD contributes to alcohol-biased choice behaviors.
Adult male and female double transgenic FosTRAP2;Ai14 mice (n=12-16 mice/group/sex) were allowed to drink ethanol, water or sucrose in a two-bottle choice drinking model prior to chronic intermittent ethanol (CIE) vapor exposure to induce alcohol dependence. Prior to CIE, mice were treated with 4-hydroxytamoxifen 30-min prior to a preference test. Following CIE exposure, mice underwent another preference test and were perfused 30 minutes after this session. cFos immunolabeling was used to compare with tdTomato+ cells.
Females consumed more ethanol than males, and CIE exposure significantly increased ethanol drinking compared with controls. Preference was >75% for ethanol over water and <20% for ethanol over sucrose, which were changed by CIE. cFos+ cell number during EtOH vs water or sucrose vs water preference tests did not differ by sex or treatment. However, there was a significant increase in the number of cFos+ cells for ethanol compared with sucrose. A similar trend was observed for tdTomato+ cells. Colocalization of cFos and tdTomato was <50% and was only increased by CIE exposure in female mice.
These results suggest that the MD is differentially engaged by alcohol compared to sucrose, and CIE exposure potentially produced sex-specific effects of reward processing in the MD.

181. The Influence of Microhabitats on the Distribution and Abundance of Larval and Juvenile Estuarine Fishes
Student Presenter: Lexie DelViscio
Faculty Mentor(s): Antony Harold

The distribution and abundance of larval and juvenile fishes are among the important indicators of biodiversity, ecosystem health, and recruitment success within marine and estuarine communities. Research regarding the distribution and association of larval and juvenile fish between different microhabitats remains limited. Microhabitats are composed of differing environmental characteristics in a small area, which varying species or size classes of fish may depend upon. This study compares the distribution and diversity between microhabitats within Grice Marine Cove, Charleston Harbor. Fish were sampled at two sites located on either side of a sand spit exposed at low tide. Collections were made using a fine-mesh beach seine pulled along a 10 m transect. Temperature, salinity, oxygen concentration, vegetation cover, substrate grain-size composition and chlorophyll-a concentration were determined for each sample. Fish specimens were identified to the lowest possible taxonomic level. The microhabitats were compared using non-metric multidimensional scaling. The first microhabitat was characterized by a channel with low vegetation cover and larger grain sizes. Adult Atlantic Silversides (Menidia menidia) and few juvenile fishes were caught. The second microhabitat, on the exposed side of the spit, was characterized by higher vegetation cover of Gracilaria and smaller grain size. Menidia menidia was most common, however Engraulid, Gerreid, and other larval fishes were present, unlike in the channel. 114 fish were collected during this study, forty-two of which were identified as larval or juvenile. This study detected a difference in fish assemblage between the two microhabitats although several environmental factors may be the cause.

182. Leaf functional responses in mutant Arabidopsis to abiotic environmental variation
Student Presenter: Tina Dong
Faculty Mentor(s): Courtney Murren
Additional Authors: unPAK 2022 REEU, Department of Biology, Matt Rutter, Department of Biology, Allan Strand, Department of Biology, April Bisner, Department of Biology, Courtney J. Murren, Department of Biology

Leaves change in response to external stimuli such as temperature and nutrient levels, and play crucial roles in metabolism and growth. Phenotypic plasticity in leaf morphology and size contribute to plants' adaptation to quickly changing environments. We investigate the genetic basis for the capacity to respond to changing environments by observing leaf size and fruit production. We examined 24 mutant lines of Arabidopsis thaliana for their rosette and fitness responses under different temperature and nutrient conditions, specifically studying lines previously noted to have large or small rosettes in a genetic screen. The wild type COL70000, is used as a reference of comparison. We found genotype and environment interactions of leaf and fruit traits with variation in individual responses among mutant lines. Most accessions show a general decrease in rosette diameter from 20C to 24C. Accessions that show a general decrease in rosette diameter also show a decrease in fruit production from 20C to 24C. Arabidopsis mutants are widely used to study gene function. Mutant studies allow for understanding the genetic basis of phenotypic plasticity, easily isolating and studying one gene and its effects on the plant responses. With data on the genetic mechanisms behind plasticity, we can enhance crops to be more resilient and require less human input such as fertilizer to maintain yields. Additionally, these mutant studies allow for a better understanding of genotype by environment processes.

183. Investigating the Relationship Between Wild-type Transthretin Amyloidis and Hypertrophy of the Ligamentum Flavum
Student Presenter: Gracyn Drury
Faculty Mentor(s): Sarah Porto
Additional Authors: Penelope Perkins- Biology

Back pain is commonly the result of spine degeneration such as osteoarthritis or hypertrophy of the ligamentum flavum (LF). This not only causes physical pain, but also creates financial burden for patients. The LF stabilizes the spine, distributing weight and controlling direction of extension and rotation. LF hypertrophy can cause spinal stenosis, the compression of the spinal cord. While the cause of LF hypertrophy remains unclear, literature suggests a link to wild-type transthyretin amyloidosis. The objective of this study is to determine the relationship between LF hypertrophy and transthyretin amyloidosis. We hypothesize a relationship between LF hypertrophy and transthyretin amyloidosis, and amyloid deposition in the LF damages its structural integrity.
LF tissue (n=2 (1M/1F); age=71¬± 7.07) from surgical patients and fresh frozen cadavers (n=4 cervical spines) were examined for wild-type transthyretin amyloidosis through histological (i.e.Hematoxylin-Eosin (H&E), Movat's, and Congo red), immunohistochemical (IHC), and 2D/3D MRI modeling (i.e., Amira 3D 2021.1) techniques.
        Amyloid deposits were visualized in surgical tissue as green birefringence in the Congo red stain under polarized microscopy. H&E and Movat's stains of surgical LF visualized under light microscopy revealed disruption of the extracellular matrix. IHC markers for transthyretin amyloid deposition displayed positive fluorescence in the surgical LF samples similarly to the Congo red stain. Axial and sagittal MRIs quantitatively demonstrated LF hypertrophy.
        These data indicate that transthyretin amyloidosis and LF hypertrophy may correlate, providing foundational knowledge for future development of treatment and prevention of spinal stenosis.

184. Impact of Epithelial-mesenchymal transition on tRNA stability
Student Presenter: Ansley Elkins
Faculty Mentor(s): Renaud Geslain
Additional Authors: Dr. Simon Grelet, Department of Biochemistry and Molecular Biology, University of South Alabama

Tumor metastasis is considered the primary cause of cancer's high mortality rate, with studies estimating between 66% and 90% of cancer-related deaths are caused by metastases. During the early stages of metastasis, cancer stem cells utilize the epithelial-mesenchymal transition (EMT) to detach from the primary tumor and initiate the multistep process of metastasis. Through EMT, polarized epithelial cells undergo multiple biochemical changes and assume a mesenchymal phenotype. Such a dramatic shift in phenotype requires a remodeling of protein expression and the cell's translation machinery. This project seeks to establish the specific effects that EMT has on the stability of transfer-RNA stability. Practically, mouse-mammary epithelial (MME) cells were treated with Transforming-Growth Factor beta-2 (TGFŒ≤-2), a cytokine that induces EMT. Using a unique microarray platform, we monitored the stability of forty-six mouse tRNA species across the span of the transition and identified subsets of tRNAs that are actively degraded and potentially turned into short regulatory RNAs sustaining the transition.

185. Seeking the Snail Intermediate Host Cardiocephaloides medioconiger in South Carolina Estuarine Systems
Student Presenter: Rea Fauser
Faculty Mentor(s): Kristy Hill-Spanik
Additional Authors: Isaure deBuron: Biology

Digeneans are flatworm parasites with complex life cycles which undergo multiple parasite stages and host transitions. Digenean larvae lack distinctive criteria and therefore identification using morphology alone is unreliable. Larvae of the digenean Cardiocephaloides medioconiger were reported for the first time in South Carolina infecting a promising aquaculture fish, Atlantic tripletail Lobotes surinamensis; possibly causing altered swimming patterns. Because congeneric species use gastropod snails as intermediate hosts, we aimed to identify the snail intermediate host(s) of C. medioconiger using molecular analysis. A total of 1,009 snails Ilyanassa obsoleta and 55 Phrontis vibex were collected from 15 sites in South Carolina estuaries and examined for the presence of digenean larvae. Parasites were preserved for morphological and molecular identification. Although specimens of I. obsoleta and P. vibex were found to be hosts for seven digenean parasites, C. medioconiger was not found.

186. Enrichment Analysis of Muddy Brown Granular Casts - Are these Proteins Enriched in the Kidney Tubules?
Student Presenter: Elizabeth Fongheiser
Faculty Mentor(s): Michael Janech
Additional Authors: Dr. Juan-Carlos Velez of Ochsner Medical Center

Muddy brown granular casts (MBGCs) are cylindrical structures sometimes found in urine sediment and are pathognomonic for acute kidney injury. Understanding the protein composition of MBGCs may assist physicians in detecting MBGCs in urine; however, the protein composition is largely unknown. Proteomic analysis of specimens containing MBGCs from 12 patients was compared to urine supernatants and urinary sediments from specimens without MBGCs. We used enrichment analysis to determine if MBGC proteins were enriched in kidney proteins and, if so, determine where the proteins were enriched within the kidney tubule. Protein inclusion criteria based on exclusivity thresholds were used to examine the effect of selection criteria on enrichment results. We hypothesized that unique MBGC proteins would be classified as "kidney" proteins and enriched in distinct nephron regions. Proteins were analyzed using the Human Protein Atlas to identify tissues of origin within GProfiler. For proteins that were discovered in at least 50% of MBGC samples and were unique to MBGCs, 68 proteins were defined by a single term, "kidney" ($p<0.001$). Restricting the protein list to common MBGC proteins identified in at least 75% of MBGC samples and unique to MBGCs resulted in 17 proteins being defined by two kidney terms: "collecting duct ($p<0.05$) and "distal tubule" ($p<0.02$). We conclude that the proteins exclusive to MBGCs are likely derived from the kidney, as suggested by enrichment analysis, and that these proteins probably reflect later portions of the kidney tubule, which are known to contribute to cast formation.

187. Mutant lines of Arabidopsis thaliana experimentally evaluated across temperatures representing climate variation through rosette diameter and fruit production.
Student Presenter: Jodi Garrett
Faculty Mentor(s): Courtney Murren
Additional Authors: Allan Strand, Matthew Rutter, April Bisner, and unPak consortium

The exploration of the genotype and phenotype relationship is connected to the plant's environment. However, genotypes can respond differently to environmental gradients. Here we are interested in whether lines with mutations in the temperature or water sensory genes and ones with broad cellular environmental response functions have phenotypic effects on rosette size and fitness in comparison with wildtype across temperature treatments. Are there common reaction norms across the temperatures?
We experimentally grew mutant lines and wildtype in growth chambers across temperature treatments (16C, 22C, 24C), and measured rosette diameters with ImageJ. We counted the fruit at maturity. We found that the plants in the 16C treatment had the lowest rosette sizes and fitness followed by 22C then 24C. Lines with mutant insertions in temperature sensitive genes showed phenotypic effects across temperatures, but in water sensitive lines there was only an effect at 24C. Lines with broad environmental response functions produced variation in phenotypes across temperatures. We found that there are some lines with common reactions across the temperature treatments, and others with distinct responses. With information on genes that show phenotypic effects at specific temperature treatments, we can utilize this information to further understand adaptations in the wild.
Quantifying the reaction norms of the different mutants can help to predict how these genes will react in different environments, beyond temperature to further aspects of climate change, and human land use change. Further such data on plant's response to the environment can inform agriculture and conservation.

188. Invertebrate analysis of abundance in Chondria tumulosa ♻
Student Presenter: Chelsea George
Faculty Mentor(s): Heather Spalding
Additional Authors: Ray Radick, College of Charleston

Chondria tumulosa is a new species of mat-forming, red algae in the Papahƒ Ånaumokuƒ Åkea Marine National Monument (PMNM), Northwestern Hawaiian Islands. Chondria is a cryptogenic invader of unknown origin, and readily overgrows native algae and corals. Despite its negative impact on benthic organisms, its mat-like structure may provide habitat for invertebrates. The primary goal of this study was to determine the distribution and abundance of macroinvertebrates (> 2 mm) found in 10 x 10 cm C. tumulosa mat samples (n=20) collected from six sites at Manawai Atoll, PMNM. Invertebrates were sorted from each sample in a glass dish with a white background, photographed using a stereoscope equipped with a digital camera and scale bar, and identified to the level of phylum. A photolibrary was developed for the rapid identification of each invertebrate, and verified by an invertebrate expert. The total number of invertebrates from each mat ranged from 4 to 97 individuals. Mats from the same site had a similar abundance of individuals. The most common phylum found was the Anthropoda, then Mollusca and Annelida. Mat samples contained a high abundance of small amphipods and molluscs, such as gastropods. These data suggest that C. tumulosa mats are being used by invertebrates for habitat despite the alga's recent increase in abundance. The invertebrate composition within C. tumulosa mats should be compared with native algae to determine if this cryptogenic invader is favoring a different diversity or abundance of invertebrates.

♻ **Sustainability-related project**
＊**Graduate student**

189. Is relic DNA problematic when characterizing living benthic diatom communities using metabarcoding?
Student Presenter: Becca Hauser
Faculty Mentor(s): Craig Plante
Additional Authors: Kristina M. Hill-Spanik, Molecular Core Facility Grice Marine Laboratory

Microphytobenthos (MPB), primarily diatoms, are photosynthetic, single-celled algae that live on shallow seafloor sediments and are significant primary producers. Previous research in South Carolina estuaries using DNA metabarcoding to characterize MPB communities unexpectedly found that ~35% of diatom DNA in sediments was that of planktonic diatoms, and the planktonic DNA found in feces of sediment-feeding invertebrates was disproportionately reduced. Therefore, phytoplankton may contribute nearly as much to benthic food webs as MPB. On the other hand, sediments can contain abundant "relic" DNA, i.e., free DNA or that associated with dead cells, which may confound metabarcoding studies. We examined whether the planktonic diatom DNA detected in sediment and invertebrate feces was from living diatoms or just an artifact. We cultured known benthic and planktonic diatom species to construct live and dead culture combinations, and collected environmental samples from intertidal sand- and mudflats in the Charleston area. Cultures and samples were treated with and without DNase I using a protocol we developed to eliminate relic DNA prior to DNA extraction. Treated culture combinations showed less PCR amplification of diatom DNA, demonstrating the efficacy of the method. Sediment and fecal samples also showed relic DNA removal with treatment, varying by site and sample type. Metabarcoding and sequencing will be used to compare the species composition of treated and control samples. This project will help clarify the role of MPB as a food source to animals and whether commonly-employed molecular methods accurately characterize microbial communities or if additional protocols are necessary for environmental-DNA studies.

190. Examining the Optimal Surgical Approach for Sagittal Synostosis in Pediatric Patients: a scoping review.
Student Presenter: Avery Jackson
Faculty Mentor(s): Jaap Hillenius
Additional Authors: Dr. Ramin Eskandari- Department of Pediatric Neurosurgery at the Medical University of South Carolina

Sagittal synostosis is a condition in infants and young children wherein the sagittal suture along the top of the head fuses prematurely. This causes the baby's skull to become too small for the brain to grow, thus requiring surgical intervention. However, there is uncertainty about which surgical approach is most beneficial to treat this condition. The two major surgical techniques are open cranial vault remodeling (CVR) and endoscopic strip craniectomy + postoperative helmet therapy (ESC). Both procedures have demonstrated exceedingly high success as well as some poor outcomes. Evaluation of long-term reoperation rates can aid in defining the surgical method that contributes to the best overall longevity of these patients with this condition. This study critically assessed the published literature on long-term reoperation rates (24 months or more following the initial surgery). The secondary goal was to compare the difference in poor outcomes between the ESC versus CVR techniques. My project consisted of a systematic scoping review of peer-reviewed articles on this topic published after 2010. This study reveals that, while there is ample literature that evaluates optimal surgical approaches for pediatric sagittal synostosis in the short term, far fewer studies examine the long-term reoperation rates for either technique. This lack of documentation of extended patient follow-up may be a hindrance in assessing the prolonged success of these procedures. Standardized outcome measures should be established to eliminate the uncertainty regarding which surgical approach yields better long-term outcomes. Additional studies should be formulated to address this lack of evidence.

191. Sustained, Steady, or Precipitous? Testing how sprint performance decreases with fatigue in a lizard ♻
Student Presenter: Christa Joby
Faculty Mentor(s): Eric McElroy

Fatigue occurs when animals run for extended periods and exhibit a reduction in locomotor performance. This study examines changes in locomotor performance as a small lizard species is fatigued due to repeated sprinting locomotion. Texas horned lizards, Phrynosoma cornutum, were sprinted down a racetrack repeatedly in rapid succession to elicit a degradation in sprinting performance. The position of the mid-pelvis marked was digitized and used to quantify sprint speed and acceleration for each successive run. These data were used to examine how performance degrades, testing the three alternative possibilities of: 1) precipitous performance degradation after the first rapid sprint, 2) steady performance degradation over successive sprints or 3) sustained performance over the first several sprints followed by precipitous decrease in performance just before fatigue. Support for one of these alternatives may provide insight into which proximate mechanisms determine fatigue and also might determine how fatigue influences lizard behavior.

192. The role of calretinin-expressing cells in the medial PFC in modulating alcohol consumption in mice
Student Presenter: Savanna King
Faculty Mentor(s): Agnes Ayme-Southgate

Background
Calretinin (CR)-expressing interneurons represent a small proportion of GABAergic neurons in the medial prefrontal cortex (mPFC). While they have been shown to be related to neuronal processing and energy metabolism, their role in the mPFC is not fully understood. The loss of CR interneurons escalates cortical excitability linked to mental diseases in humans, and the suppression of these interneurons may be linked to a stress-like response in rodents.
Methods
We infused Cre-dependent inhibitory designer receptors exclusively activated by designer drugs (Gi-DREADDs) into the mPFC of Calb2-Cre mice, restricting expression of Gi-DREADDs to the calretinin cells. Animals could orally consume the inert DREADD agonist, clozapine n-oxide (CNO), inhibiting CR interneurons. Mice were given two-bottle choice for 4 days, one bottle contained regular water and the other bottle contained water with 100 mg/L of CNO. Consumption measurements were determined by measuring both bottles at the beginning and end of each 4-hour drinking session.
Results
There was a steady reduction in the choice of CNO water compared to regular water from day 1 to day 4. Percent preference of the CNO solution was significantly reduced from day 1 compared to water on day 4.
Conclusion
Inhibition of mPFC CR neurons produces an aversive state when animals orally consume a 100mg/dL CNO solution, as indicated by a reduction in volitional CNO consumption. Consistent with the literature, inhibition of calretinin neurons in the vmPFC appears to be aversive, and activation of the interneurons may represent an exciting new target for mitigating stress-related conditions.

193. Potential for Increased Intake of Tributyltin Through Ingestion of Microplastics in Sea Urchin Larvae ♻
Student Presenter: Layne Leggett
Faculty Mentor(s): Robert Podolsky

The consumption of microplastics is of growing concern because they can leach toxins and interfere with normal feeding. Additionally, they could act as a vehicle for the ingestion of environmental contaminants that adsorb to their surface. Because pollution regularly exposes aquatic organisms to both microplastics and contaminants, it is essential to understand how they impact organisms independently and synergistically. We tested these possible effects using sea urchin (Arbacia punctulata and Lytechinus variegatus) larvae, which ingest microplastics of similar sizes to the algae they normally consume. Larvae were exposed to one of several treatments: microplastic beads at low concentration, dissolved tributyltin (TBT), beads and TBT together, and two seawater controls, including one without food in case the TBT was depleting the food supply. Based on studies with other contaminants, we predicted that the larvae exposed to the TBT-contaminated microplastics would have greater effects on growth and development than the sum of effects of exposure to TBT or microplastics alone. We found a consistent but non-significant interaction between the presence of beads and TBT in their effect on skeletal growth, suggesting the need for larger sample sizes and the study of a greater range of microplastic concentrations. Based on these results, further research is needed to determine if TBT and its antifouling replacements are affecting other marine organisms in combination with microplastics.

194. The Clinical Impact of Metabolic Factors and Race on Stroke Recovery
Student Presenter: Chandler Manusky
Faculty Mentor(s): Serena-Kaye Sims

The American Heart Association reveals stroke is the fifth leading cause of death and disability in the United States and leads to long-term disabilities in survivors. Metabolic factors such as cholesterol, triglycerides, and hemoglobin A1C, all independently contribute to the risk of stroke and worsen outcomes. While the impact of metabolic and cardiovascular risk factors on stroke outcomes is more known, the interaction between these factors and race continues to be understudied. Many studies have found that there is a higher incidence of stroke in African American populations compared to Caucasian populations, however, the impact of race on overall recovery and interaction of metabolic factors and race continues to require further study.
60 patients between the ages of 30-75, without a prior history of stroke, were recruited as a part of the American Heart Association/American Stroke Association Strategically Funded Research Network that is funded by the Wide Spectrum Investigation of Stroke Outcome Disparities on Multiple Levels (WISSDOM) study. Metabolic data was also obtained for cholesterol, hemoglobin A1C, and triglycerides and scoring using the stroke impact scale (SIS) and modified rankin score (mRS) were obtained at the baseline, 3 month, 6 month, and 12 month mark.
Preliminary data suggests very few significant differences between African-American and Caucasian populations in overall recovery after stroke within this population of patients. Preliminary data suggests this may be due to similar levels of adverse metabolic factors in both groups. However, patients do demonstrate recovery on the MRS and SIS assessments at the measured timepoints post-stroke.

195. Larval Osteological Development of the Caudal Region of the Silver Perch, Bairdiella chrysoura (Sciaenidae: Teleostei) ♺
Student Presenter: Evan Marque
Faculty Mentor(s): Antony Harold

Research has been conducted into the sequence by which cartilage ossifies in larvae and juveniles of the Red Drum, Sciaenops ocellatus, and the Spotted Seatrout, Cynoscion nebulosus, but not in other, less economically important members of Family Sciaenidae. What are the body sizes at which comparable structures are ossified in phylogenetically related species? To address this question, six juvenile specimens of Bairdiella chrysoura (SL range 6.06mm-26.55mm) and 11 juvenile specimens of Leiostomus xanthurus (SL range 12.26mm-17.21mm) were cleared in a buffered trypsin solution, the bones stained red in Alizarin Red S and the cartilage stained blue in Alcian Blue G stain. Based on microscopic examination, all treated specimens appeared to be juveniles that had already undergone the process of dorsal flexion of the notochord. Many skeletal elements were at an intermediate stage between cartilage and bone. The proximal half of each hypural, epural, and hypural was bone while the distal half was cartilage. In some specimens of both species, only the spines of the anal fin had ossified while both the spines and rays of the dorsal fin had ossified. Further avenues of research could include examining larval specimens and the process of flexion to determine the size at which flexion takes place - these characters can be used to identify particularly difficult larval and juvenile specimens for research and management of economically important fish populations. The method employed here could also be repeated with other species as a contribution to understanding the evolution of patterns of ossification in Sciaenidae.

196. splicing regulation in wasps
Student Presenter: Stephanie Moore
Faculty Mentor(s): Agnes Ayme-Southgate

RNA alternative splicing enables cells to produce multiple related proteins (AKA isoforms) from a single gene. The isoforms produced by this process usually differ slightly in their regulation and activity while conserving their main function, thus providing cells and tissues with an important means of plasticity, and physiological adaptation. Alternative splicing requires special proteins known as splicing factors which help define the borders at which to cut introns from the preRNA. Many alternative splicing factors themselves are expressed as multiple isoforms with different potential activities (from activator to suppressor of splicing). One of these is the Held Out Wings (HOW) factor, which regulate exon inclusion in muscle and brain proteins.
We use the wasp Polites sp as a model system to address if the expression of HOW isoforms is regulated differently in several tissues of the adult organism. We dissected adults into heads, legs, and thoraces and extracted RNA from these tissues. The use of different alternative NH2-terminus was tested by RT-PCR followed by gel electrophoresis. We used four different forward primers in combination with the 6R reverse primer to detect the various splice variants.
Current data indicate that the longer isoform with the RNA domain is expressed in all tissues. We also have evidence that other isoforms may be expressed in the head. These would not include the RNA binding and would possibly work as inhibitor of splicing.

197. Identifying Proteins that Bind SoxB1 and Brn 1/2/4 Nuclear Localization Signals in Developing Sea Urchins
Student Presenter: Adaora Okeke
Faculty Mentor(s): Christine Byrum
Additional Authors: Christine Byrum, Department of Biology

The main objective of this experiment is to utilize protein affinity purification to identify potential binding partners transporting neurogenic transcription factors across the nuclear membrane in embryos of the sea urchin Lytechinus variegatus. Using Eric Davidson's Endomesoderm and Ectoderm Gene Regulatory Networks, key transcription factors acting in development were identified in the related species Strongylocentrotus purpuratus and their sequences were downloaded using Echinobase. Putative nuclear localization signals (NLSs) were located in these sequences using bioinformatic software. Subsequently, we focused on two neurogenic transcription factors: SoxB1 and Brn1/2/4. The homologous NLS sequences for each were determined in L. variegatus using BLAST and then submitted to Biosynth International for peptide synthesis. After that, developing sea urchin embryos were collected at the gastrula through prism stages and collected samples were then processed for protein purification. Protein affinity purification leads to the separation of molecules and allows us to observe the specific binding interactions between the synthesized NLS peptides and L. variegatus proteins. Through this research, the broader aim is to garner better understanding of the roles of nuclear transport in early sea urchin development. This project focuses on identifying protein binding interactions involved in NLS-mediated transport of the transcription factors Brn1/2/4 and SoxB1 across the nuclear membrane during sea urchin development.

198. The role of cytochrome p450s in the environmental stress response of Arabidopsis thaliana
Student Presenter: Sara Ormond
Faculty Mentor(s): Matthew Rutter

Cytochrome P450s are a vital enzyme family that are crucial in the detoxification process of foreign substances in both plants and animals. Within the realm of plants, they serve multifaceted roles, including the regulation of hormone signaling, facilitation of NADPH- and O2- dependent hydroxylation reactions, and modulation of stress responses. While extensive research has delved into the involvement of cytochrome P450s in stress response mechanisms, significant knowledge gaps persist concerning the precise functions of many individual genes within this family. In this investigation, we sought to elucidate the phenotypic ramifications associated with the disruption of three cytochrome P450 genes in Arabidopsis thaliana. Specifically, we targeted three A.thaliana P450 genes AT4G39950, AT4G22690, and AT4G15440, all recognized for their critical roles in the plant's stress response pathways. We grew three lines with disruptive mutation in each of these genes alongside control plants in controlled growth chamber conditions. We measured traits involved with growth and reproduction including germination rates, size at senescence, branching patterns, and fruit production. By studying these characters in these mutant lines, we aimed to gain a better understanding of the interplay between these genes and their impact on the development of the plant and stress response mechanisms.

199. Development of novel therapeutics for clear cell renal cell carcinoma
Student Presenter: Sara Ormond
Faculty Mentor(s): Anastasia Zimmerman
Additional Authors: Aguirre De Cubas PhD (MUSC), Emily Villella MsC (MUSC), Chandler Judd (MUSC)

This study presents a significant advancement in the pursuit of effective therapeutics for clear cell renal cell carcinoma (ccRCC), a common subtype of kidney cancer known for its resistance to conventional chemotherapy and radiation. Our investigation focused on the mechanism of action of sensitivity to BCL-XL inhibition in SETD2 deficient ccRCCs. SETD2 is a histone methyltransferase that is mutated in up to 30% of ccRCCs and 5% of solid malignancies. Further, SETD2 deficiency is associated with increased tumor heterogeneity and is associated with more aggressive disease.

Our lab is further investigating the tendency for SETD2 deficient cells dependency on BCL-XL and the mechanism behind A-1331852 cell death. We found robust induction of ER stress markers (ATF3, ATF4, and CHOP) at the protein level in A-1331852 treated SETD2 deficient cells, while this was not observed in SETD2 WT cells. ATF3/4 is known to activate NOXA expression. Our lab has previously determined that sensitivity to BCL-XL inhibition is dependent on NOXA in our model. Suggesting a potential mechanism for NOXA upregulation in SETD2 deficient ccRCCs.

Thus, our investigation unveils a potential role for BCL-XL in suppressing endoplasmic reticulum stress in SETD2 deficient ccRCCs. Additionally, our research reveals that treatment with A-1331852 exacerbates ER stress leading to apoptosis. Thus, our research suggests that targeting BCL-XL may represent a promising therapeutic strategy in SETD2 deficient tumors.

200. The effect of muscular activity on gene expression
Student Presenter: Emma Pataky
Faculty Mentor(s): Agnes Aymes Southgate

RNA alternative splicing enables multiple related proteins (isoforms) to be produced from a single gene. Such isoforms differ slightly in their regulation and activity while conserving their main function, providing cells and tissues with an important means of physiological adaptation. Alternative splicing requires special proteins known as splicing factors which help define the borders at which to cut introns from target preRNAs. Muscleblind (Msb) is one such splicing factor and is known to be expressed in all animal cells. Many alternative splicing factors themselves are alternatively spliced with different potential activities. Msb isoforms differ in their number of RNA binding domains, as well as the inclusion or exclusion of a protein binding region (polyQA)
We use Drosophila (fruit fly) as a model system to understand how the synthesis of different Msb isoforms is controlled. To mimic the absence of flight activity, the flies were confined to a small container at eclosion and aged for a few hours to 5 days. Flies of the same age but without flight restriction were used as the control. We tested RNA extracted from Drosophila thoraces using molecular techniques such as PCR and qRT-PCR to determine the Msb isoforms present.
Current data indicate that in the absence of flight activity, the predominant Msb variant contains the polyQA region, whereas active flight prevents its expression. We propose that these two Msb isoforms would perform alternative splicing of their mRNA targets differently, resulting in variant muscle proteins which would in turn affect flight muscle efficiency and power.

201. Complete Genome Sequences of the Mycobacterium phages Jobypre and Hashim76
Student Presenter: Dhruvi Patel
Faculty Mentor(s): Christine Byrum
Additional Authors: Christian Herring – Biology, Christa Joby – Biology, Hams Kamil - Biology

In nature, the comparative studies of genomes can shed new light on the processes of evolution. A crucial component to expanding this evolutionary understanding is the study of bacteriophages and viruses that attack bacteria. Through the Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program, various universities and research institutions around the world are able to upload and compare the genetic sequences of local bacteriophages. Students at the College of Charleston discovered, isolated, and sequenced two of these phages from local soil samples using the host bacterium Mycobacterium smegmatis. These two phages have been named Jobypre and Hashim76. Students in the Biol312 and Biol337/437 labs at the College of Charleston used a wide variety of bioinformatic tools to annotate and assign putative functions to predicted gene sequences within the genomes of these two phages. This data will be available in databases such as PhagesDB and Genbank and is being prepared for publication in the journal Microbiology Resource Announcements. At the EXPO, we will present our final findings, including the methods of isolation and sequencing as well as predicted sequence functions. This research endeavor contributes to the expansion of our understanding regarding phage diversity and evolution, thereby carrying implications for diverse fields, including medicine, biotechnology, and ecology.

202. Amyloid Effect on the Integrity and Structure of Ligamentum Flavum in the Spine ♻
Student Presenter: Penelope Perkins
Faculty Mentor(s): Sarah Porto
Additional Authors: Gracyn Drury

Rationale: Spinal spondylosis, including ligamentum flavum (LF) hypertrophy, is a prominent health and economic issue in the U.S. due to its impact on well-being and work productivity. LF hypertrophy leads to a reduced spinal canal size, or stenosis, which often necessitates surgical treatment. Previous literature suggests a link between wild-type transthyretin amyloidosis in the LF and LF hypertrophy. The objective was to determine the relationship between LF hypertrophy and transthyretin amyloidosis. It was hypothesized that the hypertrophic changes mediated by wild-type transthyretin amyloidosis affect the extracellular matrix structural integrity of the LF.
Methods: Surgical LF specimens [n=2(1M/1F); age=71+/,Äì7.07] and cadaveric spines (n=4) were collected. The surgical samples were examined for transthyretin amyloid deposition using histology (i.e., Congo Red, Movat, Hematoxylin Eosin) and immunohistochemistry (IHC) techniques.
Outcomes: Amyloid deposition in the surgical LF was visible as green birefringence under a polarized microscope with the Congo Red stain. Amyloid-positive surgical LF tissue revealed associated changes in the extracellular matrix structure, including the collagen and elastin fiber organization. IHC probes (prealbumin and amyloid P/SAP) displayed positive fluorescence and a similar amyloid pattern as the histological stains in the surgical LF tissue.
Broad Implications: These data support that transthyretin amyloidosis may correlate with LF hypertrophy and provide foundational knowledge for the future development of treatment and prevention of spinal stenosis.

203. A Biomimetic Approach: Coral Reef Resilience to Thermal Stress ♻
Student Presenter: Corrina Raeann Phillips
Faculty Mentor(s): Deb Bidwell

Coral reefs are declining due to global warming. Zooxanthellae symbionts provide sugar when the temperatures are favorable and are expelled when outside of critical operating conditions inducing coral bleaching. High levels of visible light exacerbate the issue. This study describes a biomimetic innovation prototype assisting coral resistance to bleaching from thermal stressors. Biomimicry imitates nature's problem-solving abilities. A "challenge to biology" approach (Scoping, Discover, Create, Evaluate) was utilized according to the B3.8 design lens (Baumeister 2011).To gather data, a bio-brainstorm was completed discovering one hundred of nature's mentors that satisfied the function: protect from temperature. Nature's design lessons were generated for five champion mentors: the Alvinella pompejana (Pompeii worms), Ferocactus acanthodes (Barrel Cactus), Cataglyphis bombycina (Saharan Silver Ant), Discosoma striata (Mushroom Anemone), and Camelus dromedarius (Camel). The context, function, strategy, mechanism, and natural history for each mentor were thoroughly researched and illustrated. Each mechanism utilized by the mentors was translated into engineering/design lesson terminology to be incorporated into the design. Emulation of these mechanisms were done using inspiration from these five organisms and a novel biomimetic innovation was reached. The innovation was evaluated using the Life's Principles framework (Biomimicry 3.8) and excels at adapting to changing conditions and being locally attuned and responsive. This poster shares the prototype design as a bio-inspired outcome.

204. Mutant Arabidopsis responses to flooded environmental conditions: comparison of genotypes of distinct gene function categories for rosette size and fruit production
Student Presenter: Lucas Piller
Faculty Mentor(s): Courtney Murren
Additional Authors: unPAK Consortium, Matthew Rutter: Biology, Allan Strand: Biology

Genetic mutations are a necessary occurrence for species to evolve and often lead to fundamental variation that affects trait expression. Analysis of mutations within Arabidopsis thaliana can provide evidence of how insertion mutations can lead to phenotypic variation. We investigated whether lines with a single insertion mutation at known locations in the genome have an effect on rosette size and fruit count, in controlled and flooded conditions. We studied the correlations between these phenotypes and whether that varies across mutant line types and across treatments. Arabidopsis were planted in growth chambers (31 lines, 6 replicates, 2 treatments, N= 384, with wildtype over-replicated). These plants were then photographed and analyzed. Rosette diameter was measured at 17d and 28d. Fruit number was quantified after the plants had finished flowering. We found the rosette sizes and fruit counts for our mutant lines of the control group to be above and below the wild type with genetic variation in response to our treatments. In our flooding group we found a wider range of fruit count among lines. Additionally, we found the correlation between rosette size and fruit count for our mutant lines varied compared to the wild type and photometers. We demonstrated that single insert mutations have a direct affect on plants fitness response in stressful environments, along with providing novel information on correlation between phenotypic characteristics. The discoveries within this system can be applied to a variety of different organisms, as well as application in horticulture and agriculture.

205. Identifying Novel Proteins Involved in development of BAV and other aortopathies
Student Presenter: Vineel Prathipati
Faculty Mentor(s): Christine Kern
Additional Authors: MUSC Regenerative Medicine and Cell Biology

Bicuspid aortic valve (BAV) is known to be the most common congenital heart defect affecting around 2% of the population. BAV can often lead to aortic stenosis or aortic regurgitation. Other serious risks of BAV may involve developing an aortic aneurysm, potentially resulting in sudden death. Excess proteoglycans in the extracellular matrix (ECM), correlate with BAVs and aortopathies in patients and mouse models of disease. This study seeks to identify novel proteins involved in the development of BAV and aortopathies.
Using a murine model, Adamts5-/- (n=8) was compared to the Adamts5+/+ (n=8) to assess the variation in protein quantity and protein interactions. The outflow tract (OFT) was dissected from embryonic day 14.5 (E14.5) embryonic hearts; OFT tissue was sonicated in a lysis buffer. To execute the LC-MS based proteomics, two orbitrap mass spectrometers were utilized to assess the protein abundance within each OFT tissue sample. The initial findings of the proteomics study displayed an increase in quantities of Vav2, Itih3, Ptx3, SerpinF1, and Hapln1 in the Adamts5-/- OFTs. To validate proteomic results, Western blots and Immunohistochemistry (IHC) will be performed. These findings were explored using multiple computer softwares such as Gene Ontology, Reactome, ToppFun, and String database to explore the protein-protein interactions that result in these aortic abnormalities. Identifying these interactions of the proteins within the tissue can help identify the role ADAMTS5 plays in aortic development. As a result, they can potentially suggest downstream therapeutic therapies or drug approaches to target these aortic anomalies.

206. A Potential Role for Shisa9 in Substance Use Disorders
Student Presenter: Divya Proper
Faculty Mentor(s): Mark Lazzaro
Additional Authors: Jessica Huebschman, PhD (MUSC Department of Neuroscience), Brandon Hughes, PhD (Icahn School of Medicine Department of Neuroscience), Claire Herrington (MUSC Department of Neuroscience), Makoto Taniguchi, PhD (MUSC Department of Neuroscience), Christopher Cow

Substance use disorders (SUDs) are characterized in part by problematic and uncontrolled substance use, which is often vulnerable to relapse even after significant periods of abstinence. The Neuronal PAS domain protein (NPAS4) is an intracellular calcium-dependent immediate early gene (IEG) and transcription factor whose expression is rapidly induced in a small ensemble of cells within the nucleus accumbens (NAc) following exposure to drugs of abuse. Prior work from our lab has demonstrated that NPAS4 functions in D2-receptor expressing medium spiny neurons (D2-MSNs) to facilitate drug-cue associations and drive cue-induced reinstatement of drug-seeking in a rodent model of SUD, though the downstream molecular mechanism by which this occurs remains unknown. We hypothesize that this facilitation is mediated via NPAS4's regulation of NAc D2-MSN Shisa9 expression, as Shisa9, an AMPA receptor auxiliary protein, is dysregulated following drug exposure when NPAS4 is absent. Here, we develop and validate shRNAs targeting the Shisa9 sequence and cloned into pAAV2-shRNA-eGFP vectors for eventual in-vivo use focused on investigating the role of Shisa9 in drug-related behavior.

207. Impacts of Phosphate and Nitrogen Addition on the Growth of Natural Phytoplankton Communities in Charleston Coastal Waters
Student Presenter: Kade Rice
Faculty Mentor(s): Jack DiTullio
Additional Authors: Nicole Schanke (Department of Biology)

Charleston Harbor is an estuary with freshwater inputs from the Ashley, Cooper, and Wando Rivers. Expansion of urban development around Charleston, as well as heavy rainfall and flooding events, is expected to increase nutrient input into the estuary. Elevated nutrient concentrations may alter phytoplankton community composition and increase the potential of harmful algal bloom formation. Phytoplankton support the base of marine food webs and affect carbon cycling, so changes in community composition may have ecosystem-wide impacts.
To investigate the significance of elevated nutrient concentrations on the phytoplankton community, three nutrient addition experiments were conducted in the summer, using seawater collected from three sites around Charleston Harbor: Sunrise Park, Stono River, and Ashley River. An additional winter experiment was conducted at Sunrise Park to compare results during summer and winter conditions. During each experiment, phytoplankton growth and dissolved nutrient concentrations were measured to observe which nutrients, if any, may be limiting the phytoplankton community. Results from this preliminary study will guide the further exploration of potential nutrient limitation in Charleston Harbor.

208. Serum and Neuronally Derived Exosome BDNF Levels in Stroke Patients and its Relationship with Metabolic Outcome Measures
Student Presenter: Madelynne Saddow
Faculty Mentor(s): Dr. Serena-Kaye Sims
Additional Authors: Like Watson, MUSC WISSDOM Investigators, Dr. Catrina Robinson MUSC Neurology Department

Introduction: Low circulating levels of brain derived neurotrophic factor (BDNF) has been associated with poor long term functional outcomes after ischemic stroke. BDNF has also been associated with abnormal and adverse metabolic factors, which often precedes and exacerbates complications post-stroke. BDNF levels in serum and neuronally derived exosomes (NDE) are indicative of greater post-stroke recovery, these studies aimed to explore the correlations between metabolic factors and BDNF. Materials and methods: Serum, exosome, and metabolic samples from 60 Patients between the ages of 30-75, without a prior history of stroke, were randomly selected. The isolation of extracellular vesicles (EVs) was processed from aliquots (0.5 ml) of plasma from randomly selected patients. A subset of 30 patient serum samples were analyzed for both mature BDNF and proBDNF in serum and NDE using enzyme-linked immunosorbent assay (ELISA) analysis. Modified Rankin Scores (mRS) and Stroke Impact Scale (SIS) outcome measures along with adverse metabolic measures (triglycerides, hemoglobin A1C, and cholesterol) were analyzed. Results and Conclusions: Serum ELISA analysis revealed significant differences between mature BDNF 3- and 12-month samples compared to baseline levels post-stroke. ELISA analysis for proBDNF serum levels also decreased at 3- and 12 months post-stroke indicating a possible predictive relationship between BDNF and stroke recovery. Mature BDNF serum levels were also positively correlated with overall recovery on the mRS and SIS assessment. As there were no significant differences in NDE BDNF levels, future directions will be to analyze the BDNF produced in glial derived exosomes as a possible indicator of post-stroke recovery.

209. Macroalgae as water quality bioindicators: A tale of two species in Charleston Harbor ♻
Student Presenter: Ella Salinski
Faculty Mentor(s): Heather Spalding
Additional Authors: Chris Carbon, Marine Biology

The water quality of many southeastern waterways has decreased in recent years due to eutrophication and urban development. This has led to a demand and need for more accurate water quality testing methods. This is especially true in Charleston, South Carolina because of the high number of surrounding waterways. The aquaculture industry is also important to the city's economy and requires an understanding of the possible sources of nutrient pollution. An additional method for water quality testing is the use of macroalgae as water quality bioindicators, which can provide information about the long-term sources of nutrients in the water. The goal of this study was to determine nutrient sources in Charleston Harbor using macroalgal tissue from Ulva spp. and Gracilaria tikvahiae. Monthly samples of macroalgae (n=3 per site) were collected at three sites in Charleston Harbor. The algae were rinsed with DI water, dried to a constant weight at 60∞C, ground to a fine powder, and sent to a laboratory for analyses. The stable isotopes (Œ¥15N) and % nitrogen in algal tissues suggested that some sites contained an enriched source of nitrogen, such as sewage, that varied on a monthly basis at each site. Further studies should evaluate the impact of precipitation events on macroalgal nutrient uptake and the bacterial composition on the algal tissue. These data have significant implications regarding water quality and the safety of macroalgae for local consumption, which influence the economic, cultural, and ecological use of Charleston Harbor.

210. The Biomass and Abundance of the Cryptogenic Invader Chondria tumulosa within the Papah?naumoku?kea Marine National Monument, Northwestern Hawaiian Islands ♻
Student Presenter: Hannah Savage
Faculty Mentor(s): Heather Spalding

Invasive algae pose a significant threat to coral reefs because of their ability to readily invade and outcompete benthic organisms. Mat-forming algae, in particular, can negatively impact coral reefs via the physical overgrowth and smothering of benthic organisms. In 2019, a new mat-forming red alga was described as the cryptogenic species Chondria tumulosa in the Northwestern Hawaiian Islands within the Papah?naumoku?kea Marine National Monument (PMNM). The primary objective of this study was to determine the biomass of C. tumulosa across a range of depths (2 to 13 m) based on 10 x 10 cm mat samples (n=20) collected in 2023 at Manawai Atoll. The samples were individually frozen for preservation. In the lab, each sample was rinsed, teased apart, and other algal species and invertebrates were removed. Following sorting, each mat was lightly dried, weighed (wet weight), and subsequently dried at 60∞C for seven days and weighed (dry weight). The biomass of C. tumulosa mats ranged in wet weight from 14.94 g to 46.73 g. The dry weights ranged from 1.31 g to 4.40 g. The data was then used to extrapolate the biomass of C. tumulosa at each site based on percent cover estimates, and then compared to similar, invasive mat-forming algae. These findings will be used to inform management regarding the biomass of C. tumulosa as compared to other invasive algae. This research sheds light on the potential ecological consequences of mat-forming invasive species overgrowth in a nearly pristine, protected marine ecosystem.

211. Quantitative Abundance of Heterotrophic Bacterium Vibrio on Rising Sea-Water Temperatures and Eutrophication in Charleston Harbor
Student Presenter: Isabel Schutz
Faculty Mentor(s): Jack Ditullio
Additional Authors: Heather Fullerton (Department of Biology)

Climate change and urbanization heavily impact Charleston's coastal and estuarine environments, potentially stressing marine ecosystems. Additionally, eutrophication resulting from episodic storm events can lead to elevated levels of ammonium from stormwater runoff, triggering bacterial blooms. Bacteria from the Vibrio genus are potentially pathogenic species that can cause fatal human illnesses such as cholera. These bacterial pathogens tend to increase in abundance during the warmer summer months, posing a greater threat to human health. With the impacts of climate change, urbanization, storm-water runoff, and rising sea surface temperatures, quantifications of V. cholerae, V. parahaemolyticus, and V. vulnificus are projected to rise in warmer months. The study addresses the possibility of higher temperatures and ammonium levels stimulating the abundance of potentially pathogenic Vibrio species in Charleston estuarine waters. Throughout the summer of 2023, water was collected from three sites along the Ashely River for Vibrio and coliform enumeration. Controlled experiments were performed to investigate the impact of temperature on Vibrio abundance. through warmer and colder conditions. Nitrogen (as urea, ammonia, and nitrate) addition assays were also conducted to better understand how eutrophication may alter Vibrio abundance, Overall, this study provides better insight into the influence of microbial communities in marine environments, offering informative perspectives for public health, aquaculture, and water-treatment management groups.

212. First Observations of Harbor Porpoise Mating in Alaska & Preliminary Results from Photo ID Matching: Conservation Implications for this Elusive Species in Kachemak Bay ♻
Student Presenter: Josie Shostak
Faculty Mentor(s): Christopher Freeman
Additional Authors: Deborah Boege-Tobin, University of Alaska Anchorage-Kenai Peninsula College-Kachemak Bay Campus. UAA-KPC-KBC

Harbor porpoises (Phocoena phocoena) have a reputation for being inconspicuous, despite their common nearshore occurrence across the Northern Hemisphere. We have studied this species near Homer, Alaska, in conjunction with our team in San Francisco (NOAA Fisheries permit #20386). We describe our sightings and resightings to date (using photo ID), and our study defining habitat use and behavior of this species in Kachemak Bay. We documented the first six observations of aerial behavior using still/video imagery. Mating may occur while traveling or aggregating for feeding and when calves are present. Observations of aerial mating, foraging behavior, and the presence of calves, should be considered when defining conservation hotspots for harbor porpoises. In Jan. 2021, the Kachemak Bay Critical Habitat Area, home to the largest NOAA National Estuarine Research Reserve, was reopened to personal watercraft. For the first time since 2001, many species are impacted by this vessel traffic. We plan to expand our study of harbor porpoises in Kachemak Bay to ultimately determine if such watercraft disturbance may affect their distribution and behavior.

213. Two-Photon Imaging of the Area Postrema in Mice
Student Presenter: Emma Stacy
Faculty Mentor(s): Matt Rutter

Nausea is a sensation that causes discomfort and vomiting in humans and can be an adverse side effect of different medications and medical treatments. Researchers still do not completely understand how nausea is triggered within the body, but the area postrema is a part of the brain that could provide new insight into this field of study. The area postrema is a small nucleus homologous between humans and mice located in the fourth ventricle of the medulla oblongata outside of the blood-brain barrier. Its position outside of the barrier has implications for its ability to intercept and transmit signals between the brain and the rest of the body. In humans and other mammals, the area postrema is associated with nausea, vomiting, and detection of toxins in the blood. There is little known about how this nucleus operates in a living animal model, therefore, the goal of this project was to expand on previous literature by mapping the functional and anatomical properties of neural circuits in the area postrema using in vivo two-photon imaging. This method allowed for the responses of neuronal cells and clusters to be visualized in vivo in real time with high spatial resolution and further helped us define the functions and connectivity of living synapses. Understanding the neural projections and mechanisms of the area postrema could allow for the improvement of treatments and medications that can cause nausea, such as chemotherapy or antibiotics.

214. Estrogen Receptor Variants in Lupus: TLR7-Mediated Immunomodulation in Hek293 Cells
Student Presenter: Nicole Tinnerello
Faculty Mentor(s): Anastasia Zimmerman
Additional Authors: MUSC- Cunningham Lab, Dr. Melissa Cunningham

There is an evident sex bias in the diagnosis of Systemic Lupus Erythematosus (SLE), disproportionately impacting women and minority populations. Among many possible risk factors, escape genes such as TLR-7 that evade X Chromosome Inactivation, contribute to that risk. However, it is predicted that the estrogen receptor variant, ERŒ±46, protects against the development of lupus nephritis as this variant could act as an immunomodulator, its properties modulating cells to become less inflammatory and more tolerant through its membrane localization in response to TLR7 activation. As a result, TLR-7-induced effects on the immune system would be downregulated, reducing the risk of Lupus development and progression. Through the overexpression of ERŒ±46 and ERŒ±66 by transfection of Human Embryonic Kidney, Hek293, cells, it can be determined the effect on TLR-7 induced inflammatory response and the extent of immunomodulatory behavior in these estrogen receptor mutants.

215. Discovering the Role of Metallothioneins in Cellular Defense and Potential Targeted Therapies for Low-Metallothionein Ovarian Cancers
Student Presenter: Evan Villamor
Faculty Mentor(s): Courtney Murren
Additional Authors: Dr. Joe Delaney (MUSC Department of Biochemistry and Molecular Biology), Clare Fallon

There has been recent evidence of metallothioneins' role in DNA damage prevention in cancer cells. Metallothioneins sequester divalent cations including >90% of intracellular $Zn2+$ ions. When cells are exposed to toxic heavy metals, such as cadmium, the metals displace the chelated $Zn2+$ and induce a conformational change, essentially preventing the toxic metals from causing damage to the cell. To detect the DNA damage caused by these metals, an 8-OHdG DNA Damage Quantification Assay was used since 8-OHdG is a biomarker for oxidative stress. It has been found that differences in DNA damage caused by $CdCl2$ in scramble control CAOV3 ovarian cancer cells versus the same cell line with a metallothionein knockout can be seen in $CdCl2$ concentrations as low as 5 uM, and the differences only widen as the concentrations increase. Since the metallothionein gene cluster is deleted in many high-serous ovarian cancers, along with other types of cancer, the Delaney Lab is currently undergoing drug screening to discover the potential of FDA-approved drugs that could be effective specifically against low-metallothionein cancer cells.

216. Effects of Aging and Menopause on the Myocardium
Student Presenter: Kim Vu
Faculty Mentor(s): Kristine Deleon

Premenopausal women have a smaller incidence of heart disease compared to age-matched men however, post-menopause the occurrence of heart disease increases, likely due to the decrease in estrogen. This study aims to compare mice with and without chemically induced menopause to the effect of age alone. We hypothesize that reduced estrogen levels during and after menopause lead to immune cell activation and infiltration in the left ventricle (LV), exacerbating aging-related effects in mice. To mimic menopause, female C57BL/6J mice (10-weeks old) mice received 20 days of intraperitoneal 4-vinylcyclohexene diepoxide (VCD) injections at a concentration of 160 mg/kg. Within 15 days after the cessation of daily dosing, VCD has depleted all primordial follicles resulting in an increase in cycle length. Estrogen levels fluctuate until they reach low levels, and follicular stimulated hormone levels increase mimicking perimenopause. Mice aged to 10 months old before hearts were collected for histological analysis. A separate cohort of mice (adolescent (n=7; 2-4 months), young (n=4; 6-10 months), and middle-aged (n=4; 10-13 months) was collected to study aging effects independently. Tissues were stained for macrophages (Mac3) as well as picrosirius red (PSR) and analyzed for percent area. Histological analysis shows Mac3 staining demonstrated an increase in VCD-induced menopause group compared to age-matched controls. PSR staining showed an increase in collagen levels with VCD-induced menopause and increased age. In summary, our data illustrates that collagen deposition is an age associated effect not reliant on estrogen. In contrast, macrophage increased only with VCD-induced menopause indicating an estrogen mediated mechanism.

217. The effects of age and flight on thoracic muscle mass in the adult stalk-eyed fly, Teleopsis dalmanni
Student Presenter: Catherine Waggoner
Faculty Mentor(s): Jason Vance
Additional Authors: Kayla Pehl (College of Charlesotn), John Swallow - University of Colorado, Denver

The stalk-eyed fly, Teleopsis dalmanni, reaches sexual maturity at 4 weeks post-eclosion, which contributes to an increase in abdominal mass with age, presumably due to investment into gonads. However, thoracic mass also increases during this period, improving thorax-to-body mass ratio and maximal flight capacity even as flies become heavier. The purpose of this study was to investigate the basis of this growth in the thorax, and determine whether flight restriction impacts this growth. We investigated 1-to-42 day old male (n=126) and female (n=114) flies, which either were restricted from flight by removing their wings on day 1 (n=97), or were allowed to fly, having intact wings (n=143). Flies were euthanized by freezing, photographed, and dissected, and wet and dry mass of body segments were obtained. Thoraces were soaked in petroleum ether, then desiccated to determine lipid dry mass; then, thoraces were soaked in KOH, then desiccated to determine muscle dry mass. Age-related variation in thorax mass reflected investment into flight muscle, as muscle dry-mass increased logarithmically with age in both treatment groups; thorax lipid mass did not change with age. However, flies that were restricted from flight had less muscle mass than flies with intact wings. Thus, investment into flight muscle coincides with -and offsets- the ontogeny of sexual maturation, but training contributes to the trajectory of this growth. Flies restricted from flight also had less abdominal non-lipid tissue mass, which suggests that investment into flight muscle does not compete for resources with reproductive tissues.

218. Mechanisms of Gata6 function in fibroblasts to regulate pancreatic cancer progression
Student Presenter: Thomas Walter
Faculty Mentor(s): Renaud Geslain
Additional Authors: Lu Han, MUSC department of Biochemistry and Molecular Biology
Michael Ostrowski, MUSC department of Biochemistry and Molecular Biology

At 12%, pancreatic cancer has the lowest five-year survival rate of all cancers. The most common type of pancreatic cancer, pancreatic ductal adenocarcinoma (PDAC), is characterized by a dense stroma primarily composed of cancer associated fibroblasts (CAFs). Our group recently performed a lineage tracing study demonstrating that the majority of CAFs in PDAC originate from the fetal splanchnic mesenchyme, an area of mesoderm next to the foregut endoderm. Gata6, a transcription factor involved in the differentiation of the splanchnic mesenchyme from surrounding mesenchymal tissue, is expressed in some PDAC CAFs. Preliminary results from a CAF specific Gata6 knock out (KO) PDAC mouse model suggest that CAF-expressed Gata6 plays a tumor restraining role in PDAC. For the project described here, using two DNA recombinase systems, we developed a more robust CAF specific Gata6 KO PDAC mouse model. CAFs from this new mouse model and littermate controls were cultured, and preliminary assays of important fibroblast factors including Œ±SMA, IL-6, and COL1A1 revealed dysregulation in KO CAFs relative to non-KO CAFs. Immunostaining was also performed on fixed and sectioned pancreata from this model and littermate controls, revealing that Gata6-expressing CAFs may play a role in structuring the stroma. Together, my data suggest two potential mechanisms for Gata6's observed tumor restraining role: through the regulation of critical fibroblast factors, and/or through the regulation of stroma structure.

219. Evaluating Cannabis-Seeking in Rodents with a Translational Self-Administration Model
Student Presenter: Aoife Weiss
Faculty Mentor(s): Jennifer Wilhelm
Additional Authors: Jordan S. Carter (MUSC Department of Neuroscience), Caitlyn C. Costa (CofC Biology Department), Caroline Limbaker (MUSC Department of Neuroscience), Carmela M. Reichel (MUSC Department of Neuroscience)

With pushes to legalize medical and recreational cannabis, better understanding the neurobiological effects of Œî9-tetrahydrocannabinol (THC) has become a matter of great urgency, especially for vulnerable populations such as pregnant women. However, prior rodent self-administration methods are insufficient to study drug-seeking behaviors in response to THC. To address this, here we have piloted a translationally relevant method of cannabis vapor self-administration in rats to better evaluate drug-seeking behaviors. Furthering the translational relevance, the study also examined the effect of progesterone (which endogenously increases during pregnancy) on cannabis-seeking in female rats. We hypothesized that rats would reliably self-administer vaporized cannabis and that progesterone would reduce cued drug-seeking. Male and female rats at three different ages self-administered vaporized cannabis extract for 20 days. Active nose pokes resulted in delivery of a vapor puff and illumination of a cue light for 60s. A separate cohort of female rats self-administered cannabis extract, then following 3 weeks of abstinence, tested for cue-induced drug-seeking with or without progesterone. Overall, subjects maintained low levels of THC self-administration relative to vehicle controls, though females self-administered more cannabis. After abstinence, acute progesterone administration did not impact cued drug-seeking. However, in a second cue test on the following day (without progesterone), females exhibited a dose-dependent decrease in cued THC-seeking. Interestingly, progesterone administration into the prefrontal cortex recapitulated these findings. These findings are important as they support a translational model of cannabis use in rodents to be used in future studies.

220. Impacts of ocean acidification on green porcelain crab (Petrolisthes armatus) intermolt growth, cuticle strength, and calcification. ♻
Student Presenter: Zoe Willis
Faculty Mentor(s): Robert Podolsky
Additional Authors: Kate Mullaugh, Chemistry

Marine calcifiers are especially sensitive to pH changes caused by anthropogenic ocean acidification. Ocean acidification has been shown to elicit a variety of responses from crustaceans, from increasing to decreasing overall calcification and cuticle strength. The green porcelain crab, Petrolisthes armatus, is a highly abundant invasive species that has expanded its range up the eastern North American coast. In order to understand how future ocean acidification may impact the calcification and performance of P. armatus, juvenile crabs were kept in artificial atmospheres of either current (400 ppm) or expected future (1000 ppm) atmospheric pCO_2 conditions. Once a crab molted, it was allowed to recalcify for three days. After this period, it was measured for growth and cuticle flexural stiffness, then analyzed with atomic absorption spectrophotometry to determine the calcium and magnesium content of the shell. Future atmospheric conditions caused a statistically insignificant decrease in the growth of both claws and carapace. A possible inverse relationship was noted between the amount of time a crab was in future atmospheric conditions before molting and its growth in claw length, although more data is required to provide insight into this observation. Analysis is underway to gather flexural stiffness data and Ca/Mg content. Understanding how different marine calcifiers are structurally, and therefore functionally, impacted by ocean acidification is vital in understanding how future changes in ocean chemistry can change the overall performance and diversity of this group of organisms.

Department of Chemistry and Biochemistry

221. Water Purification and Nutrient Reclamation Using Magnetic Nanoparticles ♻
Student Presenter: Griffin Balkey
Faculty Mentor(s): Katherine Mullaugh
Additional Authors: Casey O'Brien (Chemistry & Biochemistry)

To achieve long-distance space travel, it is necessary to develop systems capable of recycling water and recovering nutrients to support the cultivation of plants for food in space. This research investigates the use of magnetic nanoparticles to reclaim life-supporting elements from water by adsorbing target nutrients to a magnetic nanoparticle surface. This approach is compatible with the unique challenges of long-term space missions: a magnet can be used for separation in low or no gravity, the high surface-to-volume ratio of nanoparticles means relatively little adsorbent mass is required and recycling nanoparticles could decrease the demand for consumables. The efficiency of phosphate removal with the nanoparticles has been investigated with respect to solution pH, contact time, total phosphate concentration, nanoparticle size and nanoparticle coating composed of the biopolymer chitosan. In general, adsorption efficiency was higher at a lower pH (pH~5) and equilibration is reached quickly (<1 hour). Smaller nanoparticles (1 - 15 nm diameter) had a higher overall efficiency (mg P/g nanoparticle) than larger nanoparticles (50 - 100 nm), and coating with chitosan did not provide any apparent benefit for phosphate removal. We have also assessed the recyclability of the nanoparticles by carrying out multiple adsorption-desorption cycles. Ongoing studies will determine if nanoparticles can be adapted to capture N-containing nutrients like nitrate. In addition to applications for space travel, magnetic nanoparticles could help address phosphate nutrient availability on Earth, which is poised to become a challenge as worldwide demand for food increases and nonrenewable phosphate reserves are depleted.

222. The Microwave Spectrum of the conformers of 1-Ethyl-silacyclobutane
Student Presenter: Jacob Bethke
Faculty Mentor(s): Gamil Guirgis
Additional Authors: Shane Schroeder

Ethyl-silacyclobutane has been prepared for the first time to determine the preferred conformational structure of the molecule. The conformational analysis will be done by utilizing theoretical calculations and experimental microwave spectroscopy. The synthesis was carried out using a three-step process. First a hydrosilation between ethyl-dichlorosilane and allyl chloride, then an intramolecular Grignard from the product of the hydrosilation forms the ring produce ethyl-chloro-silacyclobutane. The latter compound is reduced with lithium aluminum hydride in dibutyl ether producing the desired compound, ethyl-silacyclobutane which is confirmed with nuclear magnetic resonance and microwave spectroscopy. Microwave spectroscopy can also determine the preferred conformers of the molecule, and this experimental data is compared to the theoretical calculations. Data is also compared to previous literature results for the conformation of ethylcyclobutane to determine the effect of the silicon atom in the ring.

223. New Knockout Strains to Study Electron Transport Chain Assembly
Student Presenter: Alyssa Craft
Faculty Mentor(s): Jennifer Fox
Additional Authors: Erik J. Daquilanea, Ella S. Harris, McKenna Kelly, Zaria K. Killingsworth, Madison M. Meeks (All co-authors will present)

The mitochondrial electron transport chain (ETC) and its associated proteins are essential for human health. Cytochrome c oxidase (complex IV of the ETC) is an integral protein involved in respiration and it requires several assembly factors, including Cox15. Cox15 synthesizes a specialized cofactor (heme a), without which complex IV cannot function. Previous studies suggest Cox15 may also perform other roles in the cell that have yet to be elucidated. One study demonstrates that Cox15 interacts with complex III of the ETC, which (like complex IV) requires many subunit proteins and assembly factors. However, the purpose and details of this interaction are unknown. To study the interaction between Cox15 and complex III and determine whether it is related to an undiscovered function of Cox15, we created three gene knockout strains of baker's yeast that each impair complex III assembly. Each knockout strain encodes a protein epitope tag on Cox15 to enable its purification. PCR and growth tests demonstrated successful creation of each knockout strain, and these strains exhibit the expected growth impairments due to defects in complex III assembly. Next, these tagged knockout strains will be used in co-immunoprecipitation experiments to analyze interactions between Cox15 and complex III. Elucidating the functions of Cox15 and other ETC assembly factors is essential for the development of future therapies for mitochondrial diseases associated with complex IV.

224. Structural and functional characterization of gamma-coronavirus and letovirus NendoU
Student Presenter: Erik Daquilanea
Faculty Mentor(s): Meredith Frazier

RNA viruses are not only a large human health concern, but also a large economic concern, due to animal infections in major industries. Infectious bronchitis virus (IBV) and Kanakana letovirus (KLeV) are enveloped single-stranded RNA viruses in the Nidovirales order. IBV significantly affects the poultry industry while KLeV infects lampreys with high cross-species transmission, potentially affecting salmon fisheries. Additionally, with IBV, high mutation rates have caused vaccine efficacy to decrease. These viruses encode a conserved protein (NendoU) that require self-association to function and cleave viral RNA, ultimately to evade host immune systems. Currently, the structure and oligomeric states of IBV and KLeV NendoU proteins, and their RNA cleavage preferences are unknown. Studying the NendoU will lay the foundation for more effective drug design and to further understand the conservation and differences of NendoU across the nidovirales order. NendoU proteins were overexpressed in E. coli and then biochemically purified to isolate the protein. Size exclusion chromatography (SEC) was then performed to find the concentrations and proposed oligomeric states. To track purification progress, samples were taken throughout purification and ran on denaturing gels.
Here, we present the current purification progress of both viruses. More research and optimization must be performed in the future to determine the structure and function of IBV and KLeV NendoU.

225. Metallothioneins in High-Grade Serous Ovarian Cancer
Student Presenter: Della Evans
Faculty Mentor(s): Joseph Delaney

Aneuploidy, an abnormal number of the same chromosomes within a cell, is common in cancer. In the past, my lab has shown that aneuploid autophagy gene deletion drives high-grade serous ovarian cancer (HGSOC) progression, leaving a ripe area for drug targets: autophagy-selective therapeutics. As this novel drug combination enters clinical trials, our focus has shifted to metallothioneins. Metallothioneins are cysteine-rich proteins that predominantly chelate cations, namely zinc, and protect against heavy metal toxicity. Zinc is an important cofactor in several enzymes and transcription factors, including p53, a commonly mutated tumor suppressor gene. In the HGSOC cell lines CAOV3 and OVCAR3, MT2A was the most expressed metallothionein gene. To investigate metallothioneins as potential tumor suppressors, the phenotypes of cells containing an MT2A knockdown are compared to the hallmarks of cancer. A scratch wound migration assay was used to assess metastatic effects of metallothioneins, which are insignificant. Soft agar assays are used to determine effects on replicative immortality and proliferative signaling, however results are inconclusive so far. In the coming months, syngeneic and immunocompromised mice will be used to evaluate the effect of MT2A on immunomodulation and angiogenesis. By further understanding the regulatory roles of MT2A and the cellular effects of its aneuploid loss, novel metallothionein loss selective drugs may be able to be produced and used to treat tumors containing this aneuploid loss. This is similar to our lab's prior discovery of autophagy gene deletion in HGSOC and novel treatment option, Combination Of Autophagy Selective Therapeutics (COAST).

Sustainability-related project
*Graduate student

226. Characterization of the structure and function of toroviral endoribonucleases
Student Presenter: Jaci Fleming
Faculty Mentor(s): Meredith Frazier
Additional Authors: Patrick O'Reilly- CofC Alumni, Meredith Frazier- PI

Toroviruses (ToV) are enveloped single stranded RNA viruses in the Nidovirales order, which also includes coronaviruses. Toroviruses cause disease in animal industries worldwide that lead to economic losses; additionally, there have been cases of toroviruses causing mild disease in humans. Many non-structural proteins (nsps) involved in replication and transcription are conserved across nidoviruses; therefore, understanding the structure and function of these proteins across nidoviruses will help identify possible therapeutic targets and inform rational drug design. One viral protein of interest is an endoribonuclease (NendoU), which regulates viral RNA to evade host immune systems. Using a literature search and bioinformatic tools, we annotated the equine torovirus (EToV) genome to identify the viral protease cleavage sites that produce the mature nsps. We then expressed EToV NendoU in E. coli, purified it, and performed RNA cleavage assays and structural studies. Our bioinformatics analysis enabled us to identify the boundaries of the EToV NendoU protein and design constructs for protein expression and purification. RNA cleavage assays reveal a preference for uridines, like other members of the family. Structural studies suggest a different oligomeric state compared to other EndoUs; high resolution data processing is still underway. This research will provide insight into the evolution of nidoviral endoribonucleases through comparing EToV NendoU activity and structure to NendoU proteins in MERS, SARS, and SARS-2 coronaviruses.

227. The Somatostatins and Hydrophobic effects in cyclic peptides ♻
Student Presenter: Christian Herring
Faculty Mentor(s): Michael Giuliano
Additional Authors: Stuart Parnham, UNC Chapel Hill Department of Chemistry

Neuropeptides are molecules found in the human body, composed of their building blocks, amino acids, which transfer signals. One of these neuropeptides is Somatostatin (SST), which has implications in the treatment of neuroendocrine cancers and diabetes. Somatostatin comes in two forms, SST-14 and SST-28, with the numbers describing the lengths of their sequences. The primary focus of the Giuliano Laboratory is to explore the structural differences in various neuropeptides. For SST, we have a unique opportunity to study a previously unknown difference between the two forms. SST is cyclic (ring shaped), and from that ring extends a "tail" of amino acids. The "tail" of SST-28 is much longer than SST-14, and is hydrophilic (water attractive), while the ring itself is hydrophobic (water repellant). We hypothesize that if a cyclic peptide has a long, hydrophilic tail, it could potentially bring in water molecules and increase how rigid the ring is, which has implications for how SST binds with receptors in the body. We access the peptides using solid phase peptide synthesis, and then use Nuclear Magnetic Resonance (NMR) to determine and compare the three-dimensional structures of our peptides. We have successfully synthesized SST-14 and have begun assigning NMR data. We are currently preparing multiple SST-14 variants with progressively more lysine (a hydrophilic amino acid) on the tail to test our hypothesis about the rigidity of SST's receptor binding residues within its ring. We will then assign their NMR data and compare it collectively to wild-type SST-14.

228. Biophysical influence of polar residues on neuropeptide conformation
Student Presenter: Ella Kasten
Faculty Mentor(s): Michael Giuliano

Neuropeptides are molecules involved in cell-cell signaling in the nervous and endocrine systems, which bind to G protein-coupled protein receptors. Somatostatin is a 14 amino acid neuropeptide responsible for endocrine regulation and is important to research in neuroendocrine disorders and tumors. Substrate organization has been cited to be important to protein-protein interactions, such as with Somatostatin and its five identified receptors. However, the intrinsic organization, or shape of Somatostatin has not yet been fully elucidated. Prior study in our laboratory of a different, linear neuropeptide - Galanin- suggested that large hydrophilic domains in neuropeptides bring with them a large amount of polar solvent, which causes their hydrophobic regions that usually bind receptors to become more rigid and ordered. The goal of this research is to understand, using a different small signaling peptide, an analog of somatostatin, whether this is a general effect. A hydrophilic amino acid tag was added to the end of somatostatin 14 to explore any remote solvation effects of on the structure of the hydrophobic region. We hypothesize that the added hydrophilicity will force a more ordered hydrophobic domain, and may play a role more generally in how signaling peptides bind their receptors.

229. Nucleophilic Aromatic Substitutions in Acetonitrile and DMSO
Student Presenter: Kelly Matera
Faculty Mentor(s): Marcello Forconi

Nucleophilic aromatic substitutions are an important class of reactions in organic chemistry. They usually proceed through a stepwise mechanism with the formation of an intermediate (Meisenheimer complex). However, recent experiments and computational results showed that a concerted mechanism, with no intermediate formed, is also possible.
In this work, we studied reactions of thiols with the aromatic compound 2,4,6, trifluorobenzonitrile (TFBN) in the presence of different bases that are used as catalysts for the deprotonation of the thiol. We ran these reactions in different solvents, such as acetonitrile and dimethylsulfoxide (DMSO). We managed to measure reaction rates in pure acetonitrile and in acetonitrile/DMSO mixtures, but reactions in pure DMSO proceeded too quickly to measure.
In the future, we would like to continue to refine these reactions and use this information to guide other experiments to determine through which type of mechanism (either concerted or stepwise) the reaction is proceeding in different solvents.

230. The Implementation and Engineering of Affordable Alternatives for Cryo-Electron Microscopy (Cryo-EM)
Student Presenter: Andrew O'Brien
Faculty Mentor(s): Meredith Frazier
Additional Authors: College of Charleston Department of Chemistry and Biochemistry

Cryo-EM is imperative in finding the structures of proteins to find out more about their properties. Despite this, Cryo-EM can often be expensive and difficult to accomplish in order to get proper micrographs from obtained samples. With this in mind, there are a variety of tools that can be used in the lab in order to reduce the costs and make Cryo-EM more accessible in order for our protein structure databases to grow larger. To this end, making affordable methods of vitrification (as noted within the Rubenstein Shake-it-off project), using common materials in the lab, and making computer programs more accessible, the process of Cryo-EM can be streamlined. Using Alphafold2 multimer to predict the structures while using NaOH and an electrolysis machine for grid preparation in place of plasma cleaning, the resolution and interpretation of Cryo-EM micrographs can be greatly enhanced in a cost effective manner.

231. Exploring helical composition in peptides
Student Presenter: Jordyn Pieper
Faculty Mentor(s): Michael Giuliano

Neuropeptides, small chains of amino acids which carry chemical signals, are found throughout the human nervous system and help modulate synaptic messaging in the brain. Due to this functionality, peptide-based drugs targeting their receptors have become increasingly popular, with potential to produce great therapeutic benefits. Although these small peptides are of great importance, the Protein Data Bank (PDB) contains relatively few neuropeptide examples despite the hundreds of known sequences. The Giuliano laboratory seeks to learn more about neuropeptide structures and fill this knowledge gap. The specific peptide that we work with is galanin, which carries out various physiological roles such as mood regulation and possesses anticonvulsant properties. Full length and fragments of galanin have been studied in our group and show that one of the fragments adopts a particularly interesting structure, with clusters of hydrophobic amino acids but none of the more commonly found shapes associated with folded proteins. This hydrophobic clustering lacks the patterns of chemical bonds that more common methods of spectroscopy used to study protein structure, such as circular dichroism (CD) require. We are therefore utilizing a different spectroscopic method, 2D Infrared spectroscopy (IR), via collaboration with a group at Vanderbilt University. We hope that this technique will allow us to observe and quantify the various peptide conformers which are a consequence of the structural features of galanin previous reported by our laboratory, but otherwise impossible to study by conventional methods.

232. Ab Initio Calculations of 1-amino-2,2-bis(trifluoromethyl)-2-ethanol
Student Presenter: Revs Revels
Faculty Mentor(s): Kristin Krantzman
Additional Authors: Richard Lavrich (Chemistry Department)

High-level quantum calculations performed at the MP2/6-311G++(d,p) level have been performed to study the conformational preference of 1-amino-2,2-bis(trifluoromethyl)-2-ethanol (BFMAE). Structural parameters from the lowest energy ab initio conformer were compared to experimental values obtained from Fourier-transform microwave spectroscopy. BFMAE is an amino alcohol, which can form two different intramolecular hydrogen bonds: (i) alcohol to amine (OH---N) and (ii) amine-to-alcohol (NH---O). Several geometric parameters can be used to characterize the strength of an intramolecular bond. Stronger hydrogen bonds are associated with increased bond distance, decreased intramolecular hydrogen bond distance, a preference for a more linear angle, and a torsional angle approaching planarity. In BFMAE, there are two electron withdrawing CF3 groups bonded to the carbon atom that is adjacent to the hydrogen donating alcohol group. It is hypothesized that the CF3 groups strengthen the OH---N intramolecular hydrogen bond. The introduction of two CF3 groups in BFMAE adds two additional types of hydrogen bonds that can form with the fluorine atom serving as a donor and the hydrogen atom bonded to either O or N serving as the acceptor. The strength of the intramolecular hydrogen bonds in BFMAE will be compared to those in 2-aminofluoromethylethanol (2ATFME) and in 2-amino alcohol (2AE).

233. Solar Phototransformation of Melatonin in Simulated Natural Water
Student Presenter: Anthony Rovinski
Faculty Mentor(s): Wendy Cory

Pharmaceuticals are a part of everyday life, but water treatment facilities are not designed to remove them. As a result, they enter the waterways after passing through these facilities and pose a threat to the health of the environment. These medications breakdown (degrade) over time from exposure to sunlight and organic materials. The resulting transformation products are also pollutants that can negatively impact the aquatic environment. In this study, the solar phototransformation of melatonin (MEL) — a common sleep aid supplement — was studied in aqueous solution. Phototransformation products were also identified. The data collected from each of the simulated natural water solutions was used to determine the rates of PRN solar phototransformation with respect to humic acid or fulvic acid concentration. The results from this study can play a part in the ongoing effort of understanding the toxic impact of pharmaceuticals to both humans and the aquatic environment.

234. Ab Initio Calculations and Inductive Effects of Intramolecular Hydrogen Bonding of 2-amino-1-methylethanol
Student Presenter: Mackenzie Sturkie
Faculty Mentor(s): Kristin and Richard Krantzman and Lavrich

The conformations of linear amino alcohols have been shown to be stabilized by the presence of intramolecular hydrogen bonds. The strength of this stabilizing intramolecular hydrogen bond has been hypothesized to depend on inductive effects from electron donating/withdrawing groups near the hydrogen bond donor/acceptor groups. An electron-withdrawing group will increase the acidity of the hydrogen atom and the strength of the intramolecular OH---N hydrogen bond. Alternatively, an electron-donating group will decrease the strength of this hydrogen bond.
High-level ab initio calculations have been used to examine the role that these inductive effects have on intramolecular hydrogen bond strength in linear amino alcohols. The amino alcohol under investigation in the current study is 2-amino-1-methylethanol (2AME). Substitution of a hydrogen atom adjacent to the hydrogen bond donating alcohol group in 2-amino-1-ethanol (2AE) with an electron-donating CH_3 group, resulting in 2AME, is proposed to weaken the intramolecular hydrogen bond. Several geometric parameters can be used to characterize the strength of an intramolecular bond. A weaker hydrogen bond is associated with increases in the OH and OH---N bond distances, a non-linear OH---N angle, and a nonplanar COH—N torsional angle. The parameters discussed above are obtained from high-level quantum calculations performed at the MP2/6-311G++(d,p) level and used to infer the relative strength of the intramolecular hydrogen bond found in 2AME. In addition, a comparison to a previous study done with 2-aminotrifluromethylethanol (2AFTME), containing an electron-withdrawing group, CF3 adjacent to the hydrogen donating alcohol group will be discussed.

Department of Computer Science

235. Code for ALL: Promoting Diversity in Computing
Student Presenter: Jeriel Adejobi
Faculty Mentor(s): Lancie Affonso
Additional Authors: Josh Smith; Computer Science

Our project aims to analyze the data and examine plans to increase the retention and graduation rates of Black and Hispanic computing students at the College of Charleston.
The Department of Computer Science is implementing a Broadening Participation in Computing (BPC) initiative, a framework centered around data-driven strategies to foster diversity in computing supported by the NSF's Directorate for Computer and Information Science and Engineering (CISE). The department has a gender-and racial-balanced roster faculty of 16, with 46.2% female and 53.8% people of color. The Department graduation rates show that most graduates are white (72.3%) but only hold a small number of female graduates 30% compared to the enrollment figures of 66% at the College of Charleston. While the Department's female student population is not in parity with the college-wide enrollment, the percentage of women students within the Department is higher than the Integrated Postsecondary Education Data System (IPEDS) national average (21.7%). The first phase of the BPC departmental plan will primarily be collecting data to learn whether or not there are disparities in student persistence among students from historically underrepresented groups (HUGs).

236. "In Love and Warcraft" - Building an Interactive, Smartphone-Based Experience for a Theatrical Play
Student Presenter: Bootsie Baldwin
Faculty Mentor(s): Bill Manaris
Additional Authors: Drew Smuniewski, Taj Ballinger, Maddie Reed, Autumn Lloyd, Dr. Peter Spearman, Dr. Bill Manaris

This is a collaborative student and faculty research project to create an immersive audience participation experience, during the staging of "In Love and Warcraft" - a theatrical play. This work lies in the intersection of Theatre and Computer Science. Traditional theatre employs live actors on stage to communicate a narrative to a passive audience. Video games invite active participation of live and virtual players, through digital avatars and controllers, and allow shaping of the story narrative and its potential outcomes. Our project combines these storytelling media in an experimental setting, by blending elements of theatre and gaming into an immersive and interactive experience. We designed a specific gaming experience, in JavaScript and HTML, which combines visuals and sounds, to support and complement the theatrical script. The audience was invited to battle a boss - a powerful, animated virtual character - projected onto the stage screen, via their smartphones. This boss battle provided climactic moments in the play, at different times, through audience participation. Contemporary humans own and carry smartphones, which they are told to turn off during theatre performances. Our approach instead asks the audience to take out their smartphones and use them to contribute and potentially help shape an experience. This synthesis of art & technology opens new avenues for immersive storytelling, by giving the audience agency and control to affect outcome, at smaller or larger levels, in traditionally passive experiences, such as movies and theatrical plays. The system will be available to try out during the poster presentation.

237. The Game of Life - Memory: A Smartphone-Based Interactive Automaton
Student Presenter: Taj Ballinger
Faculty Mentor(s): Bill Manaris

We present a multiplayer game inspired by Conway's Game of Life. Game of Life is a 0-player simulation, where the system's initial state and a set of rules determine how the system evolves, over time. The board - a two-dimensional grid of squares (cells) - represents a universe where each cell can be alive or dead. Through iteration, each cell interacts with neighboring cells to determine its fate: survival (a living cell that remains alive), birth (an empty cell that comes to life), or death (due to underpopulation or overpopulation). These simple rules, over multiple generations, create intricate / complex patterns, resembling behaviors of real-world organisms.

Game of Life - Memory, preserves these rules, and adds two new dimensions - (a) interaction with multiple human players, who can control aspects of the board, influencing evolution; and (b) generational memory, to show the effect of choices over time. Through Javascript and HTML, smartphones become game controllers, allowing users to navigate the board and begin or take away life from cells. Each cell brought to life through user interaction gains an additional quality - color - selected by the user. This color is inherited and blended among a cell's offspring, highlighting the effect players' actions have on the world over successive generations - introducing the effect of generational memory.
In a vast universe, it is often difficult to see how our choices ripple outwards beyond our perception. This project illustrates the power of simple decisions, and how our collective choices shape future generations.

238. Flood App HPC Cluster Research and Full-Stack App Development ♻
Student Presenter: Kyle Barretto
Faculty Mentor(s): Lancie Affonso
Additional Authors: Norman Levine (Geology Department)

This project encapsulates the Full-Stack life cycle of the Low Country Hazard Center's Flood Data: Data Retrieval, ArcGIS Computing, High Throughput Cluster (HTC) Implementation, Frontend Development, and App Native Development. Our data is sourced, both privately and publicly and includes expected precipitation, elevation levels, buffer regions, and tide levels. This data covers multiple surrounding regions including Charleston and Myrtle Beach. Due to the size and volume of this data, the use of a computing cluster was necessary. Powered by ArcGIS, leveraging Python to develop data processing methods, the data is fed into our on-site HTC; Our initial focus was to optimize the use of the HTC, enabling users with minimal programming knowledge to run the cluster on their own.
The next step was the creation of our frontend app - the creation of an interface, displaying data and resources. We utilized ArcGIS Experience Builder, a low-code web platform. ArcGIS Experience Builder gave access to ArcGIS' data, maps, and tools, enabling an easy turnaround time: Important, since this served as our initial app prototype. This phase concluded at the first inaugural Charleston HarborHack Competition where our team placed third.
Looking ahead, we are currently developing both Android and Swift-native apps; These apps are to be built using Swift and Kotling with ArcGIS' Software Development Kit at its foundation. This will continue the project's goal of providing accurate and accessible flood app data to Charleston County and neighboring counties.

♻ **Sustainability-related project**
* **Graduate student**

239. Crunching Numbers, Not Nerves: Enhancing Classroom Performance with Timely Stress Monitoring
Student Presenter: Latherial Calbert
Faculty Mentor(s): Navid Hashemi

In an age where stress among students is a prevalent concern, leveraging technology and innovative methodologies becomes imperative. This study delves into the realm of predictive analytics, utilizing machine learning algorithms, to anticipate stress levels among students. However, rather than relying solely on traditional metrics or self-reported data, a unique approach is adopted by incorporating cardiovascular and movement data collected within classroom settings.The research encompasses a diverse array of students, capturing real-time physiological responses during academic activities. By employing wearable devices capable of monitoring heart rate, breathing rate, and movement patterns, a rich dataset reflective of students' physiological states is amassed. Through meticulous analysis and feature extraction, key indicators correlated with stress levels are identified, thereby paving the way for predictive modeling.The novelty of this approach lies in its ability to transcend subjective self-assessments, providing objective insights into students' stress dynamics. Furthermore, by integrating cardiovascular metrics with machine learning techniques, remarkable predictive accuracy is achieved, empowering educators with timely interventions and personalized support mechanisms.In presenting these findings, light is shed on the intricate interplay between physiological responses and psychological well-being, advocating for the integration of technology-driven solutions in educational settings. This research not only serves as a pioneering endeavor in stress prediction but also underscores the transformative potential of data-driven approaches in fostering student success and well-being.

240. Parking Lot Vehicle Recognition and Counting
Student Presenter: Daisy Clavijo Ramirez
Faculty Mentor(s): Mia Wang

In response to the evolving needs of commercial environments, this research project aims to transform inventory monitoring through real-time drone surveillance, offering a novel approach to address inventory management challenges. The primary objective is to utilize real-time video feeds from drones to provide accurate and up-to-date information on vehicle inventory in various commercial settings, including parking lots and manufacturing plants. Leveraging advanced techniques such as computer vision and deep learning, a new YOLOv5 model incorporating oriented bounding boxes will be employed to enhance accuracy and efficiency in vehicle detection. The project focuses on developing a model capable of accurately identifying and counting vehicles, enabling precise inventory monitoring. Progress has been made in developing a vehicle detection model, with efforts focused on refining the model's accuracy and efficiency. Groundwork has been laid to understand deep learning principles to tackle upcoming challenges, ensuring the robustness of the system. Spring 2024 has been dedicated to the collection of data through drone surveillance and the refinement of the vehicle counting program. Future steps include developing a program capable of selectively counting vehicles in designated lots for enhanced efficiency. The integration of real-time drone surveillance in inventory monitoring has the potential to revolutionize commercial operations, offering businesses a more reliable and efficient inventory management solution to ultimately lead to greater productivity and profitability. The incorporation of a new YOLOv5 model utilizing oriented bounding boxes distinguishes this project and sets it apart from existing approaches, further enhancing its potential impact on the field.

241. Are We Losing the Rights to Our Own Stories?
Student Presenter: Roswell Diederich
Faculty Mentor(s): Lancie Affonso

While many consumers are aware that their personal data is being collected and sold online, the intricacies of the data industry as a whole are less well known. Approximately 79% of Americans express concern over how companies use their data, but only 22% read company privacy policies before agreeing. Data collection is ubiquitous across the internet, and most believe there is no way to avoid it in everyday life.
This project will explore the difficulty of tracking where all your personal data is on the web and the ever-present threat of data breaches. In 2019 alone, it was recorded that 28% of Americans had experienced a serious personal information breach within the year. For the majority of Americans, security concerns are inevitable because the data industry is so lightly regulated, but how does this compare to the rest of the world? The European Union's General Data Protection Regulation (GDPR) sets the standard, covering prominent issues like consent, security, and individual rights, and California developed the California Consumer Privacy Act (CCPA) in suit.

242. Data Science with Amazon Web Services
Student Presenter: Bo Dwyer
Faculty Mentor(s): Lancie Affonso

The research project will focus on the use of AWS educational services and their applications to Data Science. In an ever developing technological world, education about the services that are available are paramount to any Data Scientist to fully understand how to approach a given problem. We will explore the tools available and their capabilities to show the typical Data Science workflow. The poster will begin with Data Storage and ETL capabilities in Amazon Redshift and Glue. It will also discuss the capabilities of analytical and visualization products such as Athena, S3, Kinesis and more. Finally, it will discuss Machine learning capabilities through Amazon SageMaker to show how Data Scientists can deploy models to all applications from Business Analytics to Recommendation Models to Natural Language Processing. We will conclude by sharing information about access to cloud and AWS education to emphasize the importance of using these resources to their fullest potential.

♺ **Sustainability-related project**
***Graduate student**

243. Reasoning by Counterfactuals and Counterexamples in Artificial Intelligence Based Software
Student Presenter: Julia Kempton
Faculty Mentor(s): Kris Ghosh

Over the last several years, artificial intelligence has been adopted in a variety of software-driven applications. Rapid integration of artificial intelligence has created several challenges, including the explainability of decisions undertaken by software based on artificial intelligence and the ethical implications of these decisions. In this study, reasoning that uses counterexample and counterfactual concepts will be formalized in order to evaluate ethical properties of software. Counterexamples are concrete cases or examples that disprove or contradict a claim and prove that it is false, while counterfactuals explore a hypothetical "what-if" scenario that is different from the real world in some way and are used to explore possible outcomes of different situations or choices. This analysis evaluates counterexamples and counterfactuals with model-checking software like PRISM and Storm, which use formal verification methods to model and analyze systems that have probabilistic behavior. These programs allow us to prove or disprove certain properties of models and can generate a counterexample if the property is found to be false. Those counterexamples and counterfactuals will be used for the evaluation of ethical properties of software, which has broad implications in a world that is increasingly intertwined with artificial intelligence.

244. Fractals in Filigree
Student Presenter: Isaac Linthicum
Faculty Mentor(s): Rebekah Compton
Additional Authors: Elizabeth Bick, Max Charney, Marco Bresciani, Maddy Preston, Dr. Rebekah Compton, Dr. Bill Manaris

In this collaborative research project synthesizing Art History and Computer Science, our focus revolves around fractal geometry and recursive subdivision of images, particularly within the intricate landscape of large-scale filigree letters found in the Choral Books of Santa Maria degli Angeli, produced between c. 1370-1420. Our project aims to unravel the intrinsic beauty and mathematical complexities embedded in these ornate designs, shedding light on the underlying patterns and nuances that may be indicative of a common artistic hand. Through rigorous tests and analyses, we aspire to ascertain whether these filigrees exhibit consistent characteristics, enabling us to assert their common origin or discern prevailing patterns confidently. The overarching goal of our project is to demonstrate the inherent value in understanding these filigree artworks, not only for the sake of appreciating their aesthetic merit but also to contribute valuable insights to the field of Art History. We are accomplishing this through image processing, machine learning, and statistical algorithms, in the end blending the arts and sciences. By providing a comprehensive analysis of these intricate designs, we aim to equip art historians with a functional, computer-based toolset that may enhance their ability to attribute, classify, and interpret similar filigree works, ultimately advancing the broader understanding of historical artistic practices.

245. Musical Boids: A Smartphone - Based Instrument Combining Chaotic Systems with Music Generation
Student Presenter: Julian Maiorino
Faculty Mentor(s): Bill Manaris

We present MusicalBoids, a smartphone-based musical instrument that blends simulation of bird flight with musical performance, to create a space of ever-unfolding musical exploration, involving different sounds and user interaction. It is inspired by an early, influential computing algorithm, called Boids, developed by Reynolds in 1986. The algorithm simulates flocking behavior of birds, and particle movement. It has been used to create artificial, yet realistic crowds in movies (e.g., Titanic), and explosions (e.g., Star Trek II), among others.
In MusicalBoids, these realistically moving particles can be controlled / directed by the user. We add a musical dimension - boids fly through musical spheres, causing them to play notes from predefined musical scales, and instruments, selected by the user. Speed, and other parameters of boid movement (separation, alignment, cohesion, etc.) affect the quality of sounds generated, and - over time - can be learned and anticipated. There is an element of surprise, as boids exhibit chaotic (quasi-periodic) behavior. The result is unpredictable, yet natural, and even beautiful to observe.

Our program maps this natural, mesmerizing quality of boids to music.
By customizing boid behavior, users may generate infinite organic patterns of movement. The experience combines interactivity, music, automation, and captivating visuals. Boids may be "played", or left uncontrolled, to generate music by themselves - like a windchime.
MusicalBoids is easy to learn. Based on early tests, we expect it will be enjoyed by musicians and non-musicians alike, children and adults, looking for a moment of tranquility and inspiration.

246. Generating Images and Igniting Debate: The Ethical Implications of AI Art
Student Presenter: Shelby Olive
Faculty Mentor(s): Lancie Affonso

Art is subjective. Everything from an end-result to an original inspiration can invite conversation, evoke emotion, and amplify future creativities tenfold. The subjectivities stem largely from the public nature of the field, as all openness allows for unwarranted and opposing viewpoints to be made known? As is often the case with human-generated ideologies or products, differing perceptions always spur passionate opinion. This spirit is the human nature of art, and it is something that computers cannot yet replicate or replace. Artificial Intelligence applications, such as Midjounrey and OpenAI's DALL-E, promise rapid creation based on user prompts: any style from realism to abstractionism is considered fair-game when it comes to the visual aesthetics of the AI's outputs. This project aims to stimulate dialogue amongst academics and everyday users alike, recognizing that ethical considerations are not static but require ongoing examination and debate. For the ethical implications of this burgeoning field are as complex as the directions that application utilizers create. By highlighting the tension between technological innovation and ethical responsibility, this project invites reflection on the broader implications of AI art for society, culture, and individual expression. The very nature of AI-generated art raises questions about authorship, authenticity, and the commodification of creativity. These concerns extend to issues of cultural appropriation, bias, and the reinforcement of societal stereotypes embedded in the datasets used for training. Thus, as users increasingly engage with these tools online, fostering awareness and critical engagement becomes paramount in shaping a more ethically conscious approach to AI-generated art.

247. Artificial vs. Artistic Intelligence
Student Presenter: Harrison Penley
Faculty Mentor(s): Lancie Affonso

This project will discuss research regarding the severity and implications of art generating A.I., specifically its currently unchecked ability to steal from human artists and overstep copyrights. A foundational building block of this research is to see how often the "three C's" (Consent, Compensation, and Credit) of artwork are broken by A.I. software. Using a better understanding of this researched topic from data collection, I aim to explore the legal and moral implications of this as well as solutions to avoid potential damage to the progress of A.I. from future legal tie-ups. Additionally, ethics will be discussed, referring to the Association of Computing Machinery (ACM) Code of Ethics and Professional Conduct as a guideline for the proper use and creation of computing as a tool for society. In our case, "Should artificial intelligence step into the boundaries of human creativity and the human experience?" This project will explore the statistics regarding the modern landscape for occupations in creative fields. In the work culture-scape of today, the appreciation of some of the most fundamental aspects of what it means to be human are consistently overlooked and overstepped by the tools of tomorrow. The project will explore the major considerations to be made regarding the ACM guidelines for ethical computing for artificial intelligence as a tool, and to expound on how this acceptance of automation in expression is only adding to a growing belief of anti-intellectualism and anti-self.

248. JazzFlow: Exploring Harmonic Spaces via a Smartphone Interface
Student Presenter: Trevor Ritchie
Faculty Mentor(s): Bill Manaris

We describe a smartphone-based, musical instrument for computer-assisted Jazz composition and performance. This research project blends Computer Science and Music. Rooted in the harmonic teachings of the bebop-pianist, Barry Harris, JazzFlow offers an intuitive smartphone interface for fluid, polyphonic motion. Using touch inputs, users navigate chord progressions and explore harmonic substitutions. Through accelerometer data, users explore automated contrary, parallel, and oblique motion, to generate novel musical material.
Coleman Hawkins used to say, "I don't play chords, I play movements." In JazzFlow, there are four "scales of chords." Each scale of chords, with a total of eight notes, consists of a four-note "on" chord, interleaved with a four-note "off" chord. The "on" chord provides consonance and the harmonic home of the musical moment. The "off" chord creates tension, which resolves back to the "on" chord. JazzFlow allows users to borrow notes, combining notes from the "on" and "off" chords.
JazzFlow was prototyped in JythonMusic and Ableton Live, utilizing an Open Sound Control (OSC) communication protocol. The functionality has been ported to JavaScript and HTML, utilizing a framework developed in the AI, Music, and Interaction laboratory at the College of Charleston. For a smartphone user, this makes accessing JazzFlow as simple as visiting a URL, without having to install any external software, or own a MIDI controller. Through its simplicity and usability, JazzFlow invites musicians of varying levels (experts and learners alike) to experiment with inspiring Jazz harmonies, and to potentially create engaging polyphonic material for musical performance.

249. Neural Networks in Identification of Duplicate Bug Reports
Student Presenter: Aaron Rosenberg
Faculty Mentor(s): Kris Ghosh

Bug reports are necessary for software development as they allow developers to identify and address issues in their software. However, in large-scale applications, the proliferation of multiple bug reports addressing the same or similar issues is common. Identifying these duplicates or even trends in issues is a problem that previously required the allocation of someone to categorize and deal with all the duplicate reports. This research outlines a supervised approach for the detection of duplicated reports. In this work, we automate the identification of duplicate bug reports using deep neural networks. We are currently evaluating seq2vec and graph2vec approaches in our experiments.

250. Tackling Plastic Pollution: Understanding Production, Impact, and Solutions ♻️
Student Presenter: Kristina Rydbom
Faculty Mentor(s): Lancie Affonso

Plastic is everywhere. It has become an ever-present part of our lives due to its usefulness and affordability. However, our plastic use comes with a caveat: its negative impact on our planet if plastic waste is not managed well. It is important for us to notice that as we continue to produce more and more of it, we are only making our existing waste problems worse. One of these big problems involves tons of plastic waste that ends up polluting our oceans. This project aims to look at how much plastic we are producing and where it is coming from. Concerningly, plastic production has risen in recent years, doubling in just two decades. It happens to be that a significant portion of the plastic that finds its way into oceans originates from countries with inadequate waste management systems. Despite growing awareness, the recycling rate for plastic remains incredibly low, with the majority of discarded plastic either ending up in overflowing landfills or contaminating natural habitats. This is unfortunate, but not entirely surprising. This project argues that we urgently need better ways to manage our plastic waste. By improving how we handle plastic trash, especially in places where it may not be managed as well, we can start to tackle this environmental crisis. The goal is to find practical solutions that will reduce plastic pollution and protect our planet's precious ecosystems.

251. Software Holmes: Using Answer Set Program to detect Parsed Code
Student Presenter: Adam Schaich
Faculty Mentor(s): Kris Ghosh
Additional Authors: Lancie Affonso

As software becomes more important for use in our everyday lives, the code behind many of the critical programs used daily becomes more complex. For development of complicated programs, programmers often rely on established code-bases or other projects to learn how they can implement a given function into their project. As these code-bases grow in size and complexity, the difficulty of searching these files increases as well. Developers will struggle to find examples of the function they are attempting to recreate in their own project due to the scale of the project they are searching.
This project examines the use of Artificial Intelligence, namely Answer Set Programming (ASP) to function as a search engine for software developers. ASP via the Clingo and Clorm packages will be used with Python to parse code into Answer Set Programming factbases. These factbases will then be queried by the user when searching for particular functionality within a code base. Additionally, the ideas surrounding counter-factuals will be explored to increase the efficiency of the codebase search engine and improve results.

252. FRC - Tech For Good ♻️
Student Presenter: Logan Segal
Faculty Mentor(s): Iris Junglas
Additional Authors: Mindy Allen - Family Resource Center, Vitalii Drabyshinets - CS Student, Hallie Jenkins - CS Student

The Charleston-based Family Resource Center (FRC) is a non-profit organization, set out to promote opportunities for learning, inclusion, and empowerment for individuals with disabilities and special needs, their families, and their communities through education, advocacy, and outreach. It is part of a nationwide network of nearly 100 Parent Training and Information Centers and Community Parent Resource Centers, employing about 10 people in the Charleston office. The Charleston office is a predominantly paper-based operation. Intake forms, contact logs, information releases, and mentoring worksheets are all recorded on paper and stored in file cabinets.
As part of FRC's digital transformation effort, our student project set out to formulate a holistic strategic IT plan, catering to the diverse needs and varying levels of technological proficiency among FRC staff members. Since then, we have worked on the following:
we have designed and modeled a data structure that is accommodating of the various types of data captured by FRC by implementing a central database using Firebase; we have digitized the intake process and provided an easy-to-use interface for data access and data entry; we have created a platform for mentors to track their schedules and activities when working with clients; and we have created an initial dashboard that summarizes key data about the intake process and the activities of mentors. The dashboard visualizes data, offers status reports, and provides the information necessary to guide organizational practices. With this project we hope to use tech for good and make a real difference.

♻️ **Sustainability-related project**
*Graduate student

253. Ethics Aware Artificial Intelligence Software ♻
Student Presenter: Channing Smith
Faculty Mentor(s): Kris Ghosh

As technology continues to grow in our society, more and more artificial intelligence systems are making decisions than ever before. It is crucial that we look at the impact such systems have on our daily lives and examine whether the decisions made are ethical. Software must be developed to respect our morality and make decisions without bias and discrimination. Without having ethics integrated in the software decision making process, there poses a risk of unethical principles embedded in systems that we interact with every day. Ensuring that software is developed with ethical principles in mind would protect all parties involved, including the user, the developer, and the organization. We create a formalism that models ethical dilemmas. The actions made by the software are represented in the form of logic formula and posed as a query in the model representing the actions of the software. We then evaluate the computational feasibility of our formalism. Ethics can be defined as a moral decision making in order to protect living things. As technology continues to grow in our society, it is crucial that we consider how this technology affects our decision making and whether it is ethical or not. Technology must be developed to respect our morality and make decisions without bias or discrimination. Without having ethics integrated in the software decision making process, this could lead to unethical principles and potentially immoral behavior from the users perspective.

254. Formal Analysis of Uncertain Discrete-Time Markov Chains in Systems Biology
Student Presenter: Hailey Sparks
Faculty Mentor(s): Kris Ghosh

Discrete-time Markov chains (DTMC) are commonly used to model stochastic biological pathways, where the value of the next state depends only on the value of the current state. When the transition probability between states is unknown, undetermined discrete Markov chains (IDTMC) can be implemented. The uncertainty in the probabilities is addressed in the transition intervals of the IDTMC. Partial models were derived from the IDTMCs to model and measure uncertainty. Probabilistic model checking is performed on the partial models to verify their accuracy in modeling a pathway. Model checking results are integrated with the expectation-maximization algorithm for reasoning by temporal logic. We present results from experiments on the formalism and computational feasibility of the partial models.

Department of Engineering

255. Stress Factors In Human-Robot Collaboration: Investigating Speed, Robot Density, and Orientation Effects
Student Presenter: Alex Barradas Perez
Faculty Mentor(s): Qian Zhang
Additional Authors: Nisa Soltani-Electrical Engineering, Addi Bankson-Electrical Engineering

Machinery is truly helpful in increasing the efficiency of a production plant, especially if they are not fully staffed. A factory at half its required personnel with some automation could be able to produce an equal amount as a plant that is fully staffed. However, there is a lack of research conducted on how operators are being affected by being near these collaborative robots (cobots). In this study, participants are tasked with building small stacks with Legos handed to them by robots all while wearing a wristband for biological signals, being recorded for facial data, and filling out a form on their stress, attention, and mental workload after each session. Each of the 8 total sessions would have different parameters set such as there being 1/2 robots, fast/slow speed, or robots on the participants left/right side. Analyzing the form data from 15 participants, we have found that more robots are correlated with higher attention levels and higher speeds are correlated with higher attention, stress and mental workload levels. These conclusions show that factories should not increase the speed of the robots, they can instead include multiple robots at slower speeds to increase productivity at lower stress levels. In the continuation of this work, the biological and facial data will be analyzed and the participant number increased to give us further insight into these results.

256. Data Driven: A Statistical Analysis of Who Deserved to Win the 2021 World Drivers' Championship
Student Presenter: Reese Michaelson
Faculty Mentor(s): Lancie Affonso

The disorderly conclusion to the 2021 Abu Dhabi Grand Prix, the final act of the already tumultuous 2021 Formula 1 season, was one of the most controversial events in motorsports history. With the championship title fight neck and neck going into the contest, whoever finished the race in a better position between Lewis Hamilton and Max Verstappen would emerge as a world champion; for the former, it would be his record-breaking eight, and for the latter, his first of potentially many more to come. Ultimately, however, the championship wasn't decided on pace. With roughly six laps of the original 58 to go and Verstappen on the charge from second place 11.9 seconds back of Hamilton, another driver crashed; this permitted Verstappen to catch up easily behind a safety car mandating Hamilton's pace and win the race on the final lap. This project aims to create and display linear and quadratic models that map the drivers' lap times in the laps leading up to the crash to conclusively deduce which competitor would likely have won had the race been clean. These models will take into account the diminishing fuel load the drivers' cars carried as they used more of it up, tire wear from prolonged stints on a single set of rubber, and the overall trends from the drivers after their last pit stops to determine who truly deserved to be named World Drivers' Champion.

Department of Geology and Geosciences

257. Tracking tread: levels of three tire additive chemicals in road-impacted sediments and soils in comparison to tire road wear particle abundance
Student Presenter: Kayce Browder
Faculty Mentor(s): Barbara Beckingham

Tire road wear particles (TRWPs) are tiny rubber fragments that result from tire friction on road surfaces. These particles contain a range of chemical additives that can be harmful and are classified as a type of microplastic. Annual global TRWP emissions per capita are estimated to be between 0.2 and 5.5 kg. Research has revealed that TRWPs account for 17% of all MPs found in sediments from the main river tributaries of Charleston Harbor, and present in local fish. The impact of tire pollution on aquatic life is significant, affecting the growth, reproduction, behavior, and survival of organisms in water bodies. Additionally, it can alter the composition and function of coastal sediment microbial communities. Our research aims to determine the mass concentrations of a tire additive chemical, identified as 6PPD, in roadway-affected sediments in the Charleston Harbor watershed. This compound has been found to cause neurological issues in COHO salmon, indicating its toxicity. Our study has two primary objectives. 1) it will inform the community and environmental managers about the current levels of this potentially harmful chemical. 2) it will investigate the correlation between the tire additive chemical and TRWP abundance to develop alternative proxy measures for environmental monitoring. Improving monitoring techniques can aid future studies on pollution management.

258. When it Rains, it Floods: An Analysis of Fecal Bacteria, Tidal Cycles, and Precipitation in Peninsular Charleston Floodwaters ♻
Student Presenter: Harrison Caspino
Faculty Mentor(s): Vijay Vulava
Additional Authors: Dr. Heather Fullerton (Department of Biology), Luke Boudreau (Department of Geology and Environmental Geosciences)

Flooding is a widespread and worsening problem on the Charleston peninsula. Recent studies suggest tidal fluctuations and rainfall are linked to the increased transport of pollutants through urban environments. The aim of this project is to test water quality at various sites for fecal bacteria and nutrient ions (nitrate and phosphate) as impacted by tide cycles and precipitation trends. Six sites across the Charleston peninsula impacted by rainfall, tidal, and compound flooding were selected. Standard field sampling and laboratory techniques were used. Results suggest that water from across the peninsula frequently had fecal bacterial counts exceeding the SCDHEC stream water quality standard. Phosphate results indicate relatively high levels of urban runoff, especially in heavily trafficked areas with impervious surfaces. Both nutrient ion concentrations and bacterial counts seemed to vary with fluctuations in tidal height and precipitation, although no definitive trend was observed due to limited data collection.

259. Eye Spy with my Little Eye: Method Recovery of Microplastics by Community Scientists ♻️
Student Presenter: Mia DiPietro
Faculty Mentor(s): Barbara Beckingham
Additional Authors: Britney Prebis

Aquatic environments worldwide are contaminated by microplastics, which are tiny plastic particles less than 5 mm in size. Monitoring microplastics is crucial for locating sources and developing risk assessments to guide efforts to protect ecosystems against the potential detrimental impacts of plastic pollution. However, identification and characterization techniques vary, and it is critical that method accuracy be reported for quality assessment. Several research designs exist to study microplastics in water samples, and given the need for spatially rich datasets, community science has recently been proposed as an advantageous approach. Charleston Waterkeeper, a local 501(c)3 nonprofit organization, with College of Charleston has involved community scientists in monitoring 12 sites over 6 months (July through December of 2023) to expand data collection efforts and provide a more comprehensive understanding of microplastic distribution and abundance in the Charleston Harbor watershed. In one test of the accuracy of the community science protocol, this study investigates the recovery rate of microplastics in water samples by community scientists using samples spiked with 50 high- and low-density microplastic particles (25 polyester fibers, 25 polyethylene spheres) in two size classes (63 ¬μm or 300 ¬μm). The microplastics will be highly visible so that recovery through sample collection and processing is assessed rather than visual identification. This recovery experiment will help to assess the community science microplastic monitoring program's ability to produce actionable data that improves our understanding of microplastic pollution in local waterways.

260. Impact Crater Size-Frequency Mapping to Determine the Timing of Volcanism on Mars
Student Presenter: Abigail Dunn
Faculty Mentor(s): John Chadwick
Additional Authors: Lili Ross- Geology, Dr. John Chadwick- Geology, Dr. Norm Levine- Geology

This research project seeks to better understand the volcanic activity that has taken place in the Tharsis Montes, a large volcanic region on Mars characterized by three large shield volcanoes named Arsia (63,360 ft), Ascraeus (58,080 ft), and Pavonis (45,936 ft). As a frame of reference, the tallest volcano on Earth, Mauna Kea, is considerably smaller than the smallest of the Mars volcanos in this group, with a 32,736 ft. summit. Mars has a long history of volcanism, and with each major eruption, the erupted lava resurfaces the landscape and buries pre-existing impact craters. Over time, asteroids impact this new surface, forming a new population of craters. The older a feature is, the more craters it will have accumulated. Our project is two-fold: first, we are mapping craters in satellite images using GIS (Geographic Information Systems) software called CraterTools. Using the locations, sizes, and frequencies of the craters, we are creating a model which allows us to determine the ages of the volcanoes. The rich geologic history of Mars is divided into three periods: the Noachian (4.1-3.7 billion years), Hesperian (3.7-2.9 billion years), and Amazonian (2.9 billion years-present). Our results show that there are a range of ages for the Tharsis volcanic activity, and that the activity is largely from the Amazonian time period. These results are a key component to the second part of this project: estimating the amount of magma that has accumulated over time in the volcanoes using geophysical modeling techniques.

261. Assessing Climate Change's Impact on South Carolina Agriculture: A GIS Approach ♻️
Student Presenter: Sophia Mucci
Faculty Mentor(s): Norman Levine
Additional Authors: Professor Lancie Affonso - Department of Computer Science

Agriculture is one of the top three economic drivers of South Carolina's economy. Unfortunately, anthropogenic-induced climate change, with predicted increases in temperatures and occurrences of volatile weather events, poses a threat to global agriculture. Events stemming from climate change are likely to result in decreases in plant productivity and the profitability of agribusiness.
Using a Geographic Information System (GIS), we are modeling the potential changes to the types of plants and growing environments across the state. In our research, we uncovered a notable scarcity of high-resolution data pertinent to South Carolina's agricultural landscape. As we transition to the next phase of our research, we are integrating crop modeling software to account for a range of variables impacting crop health. Our research seeks to provide a more comprehensive understanding of how climate change will impact South Carolina agriculture and provide tools to help guide future agricultural decisions.

♻️ **Sustainability-related project**
***Graduate student**

262. A SLAMM Analysis of Marsh Response to Sea Level Rise in Beaufort County, SC ♻
Student Presenter: Angela Nganga
Faculty Mentor(s): Norman Levine

Salt marshes are dynamic ecosystems that provide ecological, water quality, recreational, and economic benefits. South Carolina has the greatest amount of salt marshes on the east coast with 344,500 acres making up 2/3 of the state's coastal wetlands and 30% of all salt marshes on the east coast. Understanding how marshes may respond to Sea Level Rise (SLR) will inform the potential need for proactive marsh conservation and/or land use management strategies.

The wetland changes within Hilton Head Island were assessed through the application of the Sea Level Affecting Marshes Model (SLAMM). SLAMM assumes that wetlands inhabit a range of vertical elevations that are a function of the tide range. SLAMM is a flexible decision tree model that incorporates geometric and quantitative relationships in understanding the changes in coastal land classes under changing SLR scenarios.

This study utilized high-resolution data sets that have been developed at the College of Charleston's Lowcountry Hazards Center. 30-meter, 10-meter, and 1-meter resolution GIS datasets were created, and a Python tool was created to move GIS layers to SLAMM-compatible layers. The output from SLAMM in GIS format provides insights into the location, magnitude, and type of marsh response that can be expected from increased sea levels. The results show a substantial loss in marshes as the rates of SLR increase where wetlands are unable to keep pace with SLR and/or migrate landward. SLAMM analyses will provide coastal counties with a more powerful tool to plan and make decisions about their marsh ecosystems.

263. Understanding Precipitation Trends for Developing a Forecast Model: A Case Study in South Carolina ♻
Student Presenter: Angela Nganga
Faculty Mentor(s): Norman Levine

The goal of this project is to develop observation-based precipitation models for climate adaptation action plans using National Aeronautics and Space Administration (NASA) Global Precipitation Measurement (GPM) mission data sets. This project seeks to analyze and model precipitation trends over time across SC. The College of Charleston Lowcountry Hazards Center will provide storage and computing capabilities for working with multi-year satellite precipitation imagery. ArcGIS Pro and Jupyter Notebook will be used to acquire
and build time series data from the precipitation distributions across SC in multiple time scales (3-hour, daily, weekly, monthly, and yearly). The project seeks to identify spatial patterns over time across the study area. The results of this study are expected to display changes in the duration, frequency, and distribution of precipitation with time. This study aims to enhance our understanding of the implications of climate change on extreme weather events, offering valuable insights for effective adaptation planning and decision-making at both local and state levels.

264. A New Lance Formation Florule with Evidence of Arthropod Herbivory
Student Presenter: Juliet Riddle
Faculty Mentor(s): Walter Persons
Additional Authors: Rebecca Starkey, Collections and Outreach Coordinator, Mace Brown Museum of Natural History

Located in central Wyoming, the Glenrock Exposure of the Lance Formation contains abundant vertebrate bonebeds and microvertebrate assemblages. However, aside from instances of silicified wood, the accompanying floral record of the exposure has been undocumented. Found in 2022, GPM-200 is the first fossil leaf site known from the Glenrock Exposure. More than 170 individual leaf-bearing specimens have been collected, with both angiosperms and gymnosperms represented. Of the former, identified taxa include two members of the family Platanaceae (Plane Trees), two members of Sapindales, and one member of both Trochodendraceae and Lauraceae. Of the latter, only one species of the family Cupressaceae is present. More than 10% of the preserved leaves show evidence of plant-arthropod interactions, including feeding damage and fecal pellets. Among these ichnofossils are specimens referable to gall mites (Eriophyidae), weevils (Curculionidae), and leaf beetles (Chrysomelidae). The faunal and floral composition of GPM-200 is consistent with that known from contemporaneous sites in the Hell Creek of Montana and the Frenchman Formation of Saskatchewan and indicate a mesothermal, subhumid climate with insignificantly variable seasonality.

♻ **Sustainability-related project**
*Graduate student

265. A Data Driven Approach to Studying the Amazon Rainforest of Brazil ♻
Student Presenter: Michael Seezen
Faculty Mentor(s): Vijay Vulava

Ever since the 1970s, deforestation in the Amazon Rainforest has been drastically increased to support massive expansions of agriculture and pasture farming. Brazil, which makes up about 60% of the Amazon Rainforest, leads in this expansion. While deforestation rates peaked in the 1990s, there has been a recent spike due to illegal deforestation of protected land. This destruction is harmful to the forest itself, but also influences the survival of wildlife and Indigenous inhabitants throughout the entire basin. Deforestation is bad for the world, as it has caused CO_2 emissions in the rainforest to skyrocket. In fact, parts of the Amazon have started to release carbon. The goal of this presentation is to portray the current wellbeing of the Amazon Rainforest and study the consequences of deforestation by exploring data ranging from 1970 to today, such as deforestation rates, increases in farmland, carbon emission/sequestration, habitat fragmentation, controlled burning, forest degradation, etc. The objective is then to explore the economic, social, and environmental impact of deforestation and how it will shape the future. This research features 3 predictions. Hypothesis 1: if all deforestation in the Amazon Rainforest were to stop immediately, then most of the destruction in the Amazon can be reversed over time. Hypothesis 2: if all deforestation in the Amazon were to stop gradually, then climate change will cause permanent damage to highly deforested areas of the rainforest. Hypothesis 3: if deforestation is never stopped, then the entire Amazon Rainforest could change from a rainforest to a savannah.

266. Testing the Spatial Coherence of the Waveform Template Matching Technique
Student Presenter: Grant Spraker
Faculty Mentor(s): Steven Jaume

There is a technique used in seismology that uses the seismograms of known earthquakes to interpret or discover other earthquakes. It is based upon an assumption that earthquakes originating near each other, with similar source mechanisms, should produce similar ground motion at a given location. However, the assumption of the technique does not have a specified limit to the maximum distance between the earthquakes or the degree of likeness between their fault sources. The goal of this research is to determine these limits. This will be accomplished by finding the degree of similarity between earthquakes using an ObsPy correlation detector with 97 well located earthquakes across the Summerville, SC, region. Our results should provide the conditions under which the technique will fail or succeed. A criteria exists that determines which signals are considered reliable data, as well as an order in which the signals will be correlated. A filtering process improves the conditions of the signals and allows more examinations. Initial results agree with the primary assumption that similar ground motion is produced by earthquakes within a close proximity of one another (~4 km). Further results of this experiment may allow the possibility of new applications for the method. For example, knowing that any earthquakes triggered within, say, 5 km of each other should produce very similar ground motion, if seismograms from sources within that distance are not similar, we know that the focal mechanisms of each occurrence must be different enough to an appropriate degree.

267. Andesite Lava Generation at the Axial Seamount Volcano: Geochemical Modelling with Magma Chamber Simulator
Student Presenter: Julia Sullivan
Faculty Mentor(s): John Chadwick
Additional Authors: Mia Bowersox, Adeleine Dibble, Ashley Grant, Dr. John Chadwick: Department of Geology and Environmental Geosciences.

Axial Seamount is an active underwater volcano located off the coast of Oregon in the northeast Pacific Ocean. Axial has erupted three times in the past 26 years, and is produced by the Cobb Hotspot, an active mantle plume similar the one that produced the Hawaiian Islands. The Juan de Fuca spreading center overlies the Cobb Hotspot, and this combination produces voluminous magmas. Typically, oceanic volcanoes produce low-silica basaltic magmas, and Axial is no exception. However, unusual high-silica andesite lavas have been produced in the North Rift Zone of Axial. Andesites are uncommon in oceanic crust because magma rarely has the opportunity for fractional crystallization and assimilation of crust. To determine the origin of the andesite lava erupted from Axial Seamount, our team utilizes preliminary geochemical data from a combination of previously gathered samples including those collected on a 1998-99 expedition to Axial. Processing the samples includes jaw crushing, acid cleaning, and dissolving the rocks to make beads for mass spectrometer analysis of trace elements and isotope ratios. Then we used Magma Chamber Simulator (MCS) software to model the evolution of the magma to gain insight into the volcanic processes that produced these unusual lavas. MCS uses data input by the user to replicate the evolutions of magma and computes the magmatic compositions produced under a certain set of conditions, including pressure and temperature. Our MCS preliminary modeling results show a combination of fractional crystallization and assimilation of altered crust is required to produce the andesites.

268. New Discoveries of a Cretaceous Turtle: Cedrobaena brinkman ♻
Student Presenter: Cole Thornsberry
Faculty Mentor(s): Scott Persons
Additional Authors: Glenrock Paleon Museum

GPM 342 is a baenid turtle shell recovered from the Glenrock Exposure of the Lance Formation. The medial portion of the carapace is not preserved, having been lost to erosion, however, the plastron is complete. GPM 342 suffers from dorsoventral compactions, but is circular, with a circumference of 64.5 cm, a plastron mediolateral width of 30 cm, and a plastron anteroposterior length of 26 cm. GPM 342 is identified as Plesiobaena antiquia based on the smooth texture of the shell, the lack of scalloping on the posterior carapace margin, and the proportions of the anterior and posterior plastron lobes. Near the right anterior plastron margin are two small, circular puncture holes. Consistent with the form of bite marks abundantly documented on extant and fossil turtle shells, these punctures were likely left by a crocodylomorph. No evidence of bone remodeling and healing is associated with the punctures, and the wound is, therefore, interpreted as having occurred near or after death. Found in close association are fragmentary remains of a Basilemys turtle and two Trionychidae turtles.

269. Utilizing Current Generation Satellites for Monitoring Water Quality in Caribbean Waters ♻
Student Presenter: Abigail Vohs
Faculty Mentor(s): Adam Ali

In the U.S. Virgin Islands, (USVI) coral reef ecosystem services account for approximately 70% of the USVI's gross domestic product (Oliver et al., 2018). Increased human activities in the area have resulted in deforestation and a higher volume of nutrient-rich runoff and sediment flux into the reef environments (Cohn, 2013). Because of this increased volume of runoff, coral communities are under higher levels of stress and algae is outcompeting the coral reefs for nutrients (Koop et al., 2001). Since water quality directly impacts coral reef stress rates, it is essential to effectively monitor water quality parameters impacting reef ecosystems to determine the preservation methods that will be most robust. By utilizing environmental observation satellites such as ESA's Sentinel 2 to perform optics-based characterization, various optically active water quality parameters such as chlorophyll, suspended sediment, and dissolved organic matter can be estimated and monitored on a much larger scale and temporally efficient frequency than traditional field methods (Pahlevan et al., 2017). The objective of this study is to accurately estimate chlorophyll and suspended sediments in water columns by developing regionally calibrated models. The performance of existing statistical-based band ratio models were evaluated in estimating chlorophyll levels in the USVI coastal waters. The best performing models (Rrs 430/Rrs 560) and ((Rrs 560 + Rrs 665)/2) yielded R2 values of 0.33 and 0.52 respectively, with RMSE values of 0.09 and 0.07. These results show promising potential of satellite applications for future monitoring of chlorophyll-a levels in the USVI.

270. Using Maps to Visualize Vulnerability of On-Site Wastewater Treatment Systems ♻
Student Presenter: Devon Friedman
Faculty Mentor(s): Timothy Callahan
Additional Authors: Shu-Mei Huang, Coastal GIS Specialist, College of Charleston

This project focuses on on-site wastewater treatment systems (septic tanks and leachate fields) in coastal South Carolina, with a focus on the Mount Pleasant area. Ecosystems and public health are at danger when septic system function is reduced, which may also occur from inadequate maintenance, aging, or improper design. Shallow water table conditions make it impractical for some design standards. Current regulations in South Carolina require at least a 15-com (6-inch) vertical separation between the bottom of the leachate trenches and the water table. There are further concerns this regulation is inadequate to allow for natural attenuation of the septic effluent though the sediments, which causes pollution of groundwater. We are partnering with Mount Pleasant Waterworks (MPW) and Clemson University to understand the regional vulnerabilities and will develop a Geographic Information System (GIS) tool to analyze the important site characteristics so homeowners and municipal officials can invest in infrastructure improvements. For this project we will also identify community engagement such as stakeholders' willingness to participate in septic system assessment and maintenance. A geographical information system (GIS) tool will be created to determine the vulnerable areas for septic systems and identify the community centers within these areas. These maps will include water table data, soil type, and MPW service boundary. I will also be setting up a study base, creating a story map to raise awareness of septic system and demonstrate the decision-making process of identifying septic vulnerable areas. These maps will decipher the data identify venerable areas for septic failure.

♻ Sustainability-related project
*Graduate student

271. Ciprofloxacin in the Environment: Geochemical Investigations and Public Health Implications ♻
Student Presenter: Luke Haenel
Faculty Mentor(s): Vijay Vulava

Ciprofloxacin is an antibiotic commonly used for treating bacterial infections in humans and livestock. First synthesized in the 1980s, this first-generation fluoroquinolone has become an emerging contaminant in recent years due to its accumulation in environmental settings. In its most abundant zwitterionic form, ciprofloxacin has a high binding affinity for target enzymes but a low aqueous degradation rate. Due to this chemical stability, the antibiotic seldom breaks down in natural settings and is widely considered among the most prevalent and potentially harmful pharmaceutical pollutants. Additionally, when ciprofloxacin is present in environmental settings, microorganisms readily transfer genes responsible for antibiotic resistance, leading to diminished effectiveness in combating subsequent infections. Since the implications of this antibiotic are well understood, it is essential to understand its geochemical behavior in aqueous and nearshore environments. Specifically, the antibiotic's affinity to soil organic matter, which has been linked to accelerated microbial growth, was investigated. Pristine soil samples collected from various locations in the Francis Marion National Forest were separated by their A, E, and B horizons. These soils contained varying levels of organic matter and/or clay mineral content. The soils were exposed to aqueous ciprofloxacin solutions and thoroughly mixed in a batch reactor. Ciprofloxacin solution concentration changes and relative fractionation were measured using spectrophotometry. Areas of similar soil character were then mapped to regionally extrapolate these findings. Moreover, such areas which are proximal to agricultural lands and feed lots were flagged for their increased risk of environmental contamination and public health concerns.

272. Substrate Characterization of Quinault & Nitinat Submarine Canyons of the Washington Continental Margin ♻
Student Presenter: Luke Haenel
Faculty Mentor(s): Leslie Sautter

Quinault and Nitinat Canyons, located approximately 75km offshore of Washington State, lie on the western edge of the North American tectonic plate along the Juan de Fuca convergent boundary, where depths range from 150-2000m. Multibeam sonar surveys were conducted here from May-June 2011 aboard the University of Washington R/V Thomas G. Thompson (TN265) and April 2023 aboard the NOAA Ship Okeanos Explorer (EX2301) as part of NOAA Ocean Exploration's 2023 Shakedown and EXPRESS West Coast Expedition. In addition to sonar, HD video footage of canyon features was collected in 2023 by NOAA's ROV Deep Discoverer. Their primary objective was to enhance geomorphologic understanding of deepwater areas off the U.S. West Coast. Sonar data were post-processed using CARIS HIPS and SIPS 11.4 software to generate bathymetry and slope surfaces. Classified backscatter intensity mosaics, and ROV dives, EX2301_Dive07, EX2301_Dive08, and EX2301_Dive09, were used to visualize and ground truth bathymetric data. Dives at both canyons encountered areas with semi-consolidated sandstone outcrops and unconsolidated clay and silt sediment floors. Additionally, Nitinat Canyon had evidence of glacial erratics and bioturbation, consistent with lower sea-level during Pleistocene glaciation. The role these canyons play as repositories for continental sediment transport is validated by the loosely consolidated sediments and slumped facies observed by the Deep Discoverer. These expeditions, in conjunction with the epicontinental sea tectonic setting, help illustrate the geologic history of the Pacific Northwest. Since seabed substrate and bathymetry are directly associated with marine habitat formation, biota and natural resource management can benefit greatly from this research.

273. Shoring Up Awareness: A Comprehensive Independent Study on Crafting a Public Service Announcement for Coastal Erosion at Folly Beach, SC
Student Presenter: Kate Leturgez
Faculty Mentor(s): Erin Beutel
Additional Authors: Miles Thompson, Geology

Folly beach, a popular coastal destination, faces imminent threats from rising sea levels and increasing erosion rates, jeopardizing its ecological integrity and socioeconomic fabric. The study delves into multiple aspects of coastal erosion, examining the environmental consequences, economic ramifications, and potential social disruptions facing Folly Beach. Coastal management strategies are explored to inform the creation of an effective PSA that not only educates the public about the issue but also inspires action and community involvement. This study employs a mixed-methods approach, combining qualitative interviews with local residents and other environmental experts to gain insights into the community's perceptions and priorities regarding coastal erosion. These findings are juxtaposed with quantitative data on erosion rates and sea level rise projections. One existing mitigation strategy on Folly is the emplacement of rock groins perpendicular to the beach in an attempt to capture sand moving parallel to the beach. Erosion rates relative to groins were taken via beach profiles and dune regression measurements near 13th Street on the North end of Folly Beach. Drone video and photos were used to visually document these changes and help create a PSA that people can relate to. The PSA developed in this study employs creative storytelling, visual elements, and compelling narratives to engage the target audience and convey the urgency of addressing coastal erosion at Folly Beach. By almagating scientific data with community perspectives.

♻ Sustainability-related project
*Graduate student

274. Culture: An Educational Oyster Experience ♻

Student Presenter: Camden Lutes
Faculty Mentor(s): Caitlyn Bierce

Culture: The Future of Local Aquaculture

Aquaculture, specifically shellfish farming, is a high potential industry whose growth has been stunted in South Carolina. New methods, and overall advancements in the industry have been recognized in many neighboring states. Many of South Carolina's limiting factors come from the public's view and mindset of aquaculture productions. The project seeks to shift and expand the perception of mariculture in South Carolina. As an extension of ENVT 460 Applied Aquaculture, the project will explore shellfish farming methods, the physiology of oysters, and sustainable entrepreneurship, with the goal to cultivate an aquaculture business model called Culture.

Culture is an educational oyster experience influenced by 1800's oyster carts. This oyster pop-up was developed through literature search and idea sessions with local industry leaders. The public will witness, taste, and truly experience what local aquaculture seeks to execute. Culture will utilize immersive experiences in research-based environments to navigate the complexities of real-world challenges in Lowcountry aquaculture. Culture will allow guests to experience merroir from around the world while being educated on the grounds of local aquaculture, sustainable practices, and how merroir is developed.

This independent study aims to empower the public to become adept practitioners and advocates for sustainable aquaculture practices, which will contribute to the broader discourse on environmental stewardship and economic viability in coastal communities.

275. Blue Line Project: A Visual Representation of Tidal Flooding and Sea Level Rise ♻

Student Presenter: Abigail Malloy
Faculty Mentor(s): Center for Sustainable Development
Additional Authors: Aubrey Anthony - SC Aquarium Resilience Coordinator

The Blue Line project aims to bring the reality of tidal flooding and sea level rise to a visible level where we can perceive the future of sea level rise in our communities and start solution-driven conversations.

The Blue Line Project seeks to draw attention to the threat that the climate crisis poses around the world in coastal communities through gorilla awareness campaigns. In our project, we are creating one of the first permanent installations, where we will be marking the height to which water levels are expected to rise. Charleston and the Lowcountry are increasingly impacted by sea level rise, ocean acidification, increased flooding, and storm surges, often disproportionately affecting those unable to rebuild or relocate in times of need.

The lines on the 114 Wentworth Building will mark the maximum storm surge's height if a hurricane equivalent to Hurricane Hugo were to make landfall in Charleston in 2020, 2050, and 2100. This project aims to expose more students and faculty to this project and allow them to familiarize themselves with the dangers of major flood events and join in the conversation surrounding sea-level rise in Charleston.

This project is a part of The Center for Sustainable Development's Living Labs Program, which was created to highlight opportunities for students to foster deeper connections with the Charleston community while providing much-needed services to local nonprofits.

Department of Mathematics

276. Interpretability, Adaptability and Scalability of Variable Neighborhood Search

Student Presenter: Aidan Riordan
Faculty Mentor(s): Dan Maroncelli
Additional Authors: Pierre Hansen - GERAD, and Ecole des Hautes Etudes Commerciales, Montreal

Variable Neighborhood Search (VNS) has reached its 25th anniversary as an effective and accessible metaheuristic for combinatorial optimization. This paper explores how VNS's ingenious method to escape local optima exhibits the properties of interpretability, adaptability and scalability, making it well-suited for tackling large and complex real-world problems. We first outline how the simple, modular design of VNS lends itself to insightful problem analysis and systematic formulation of the search space. We then discuss how VNS organically integrates with other methods as a hybrid and readily leverages parallelization and AI/ML capabilities for scalability. Finally, we propose recommendations to further advance VNS through establishing public code repositories and problem libraries, documenting challenges and successes with real-world implementations, actively engaging across metaheuristics, and popularizing VNS as an accessible optimization technique.

♻ Sustainability-related project
*Graduate student

277. Random Walks on Networks with Zero Entropy
Student Presenter: David Robinson
Faculty Mentor(s): Behrang Forghani

This project concerns studying the long-term behavior of random walks. For a given structure, a random walk models how an object moves from one state to another state of the structure where movements are determined by chance, a specific probability law. The theory of random walks originated in probability theory and lends itself to applications in different branches of science such as computer science, biology, and finance. We focus on random walks on mathematical structures known as nilpotent groups, which enjoy certain algebraic rules similar to numbers, lattices in planes, and higher-dimensional planes. We study the long-term behavior of random walks by employing entropy, which quantifies the amount of uncertainty in a random walk. When the entropy of the random walk is finite, it is known that the entropy of the random walk after moving finite steps grows subexponentially. In other words, the amount of uncertainty asymptotically approaches zero as the number of steps goes to infinity. The classical proof of this result relies on a deep connection between entropy and the boundary theory of random walks. Particularly, the proof relies on advanced mathematical results from ergodic theory, probability theory, and functional analysis. In this project, we provide a new direct proof using elementary probabilistic tools. Mathematically, suppose $H(n)$ is the entropy of the random walk after n steps. Let $H(1)$ be finite for a random walk on a finitely generated nilpotent group. Then, the quantity $H(n)/n$ goes to zero as n goes to infinity.

Department of Physics and Astronomy

278. Searching for Water on Cold Main Belt Asteroids
Student Presenter: Liam Brunson
Faculty Mentor(s): Sarah Sonnett
Additional Authors: Driss Takir, Lunar Planetary Institute

Main Belt asteroids comprise most of our Solar System's 1.3 million discovered asteroids. The most theoretically water-rich objects in the Main Belt are the Cybele and Hilda asteroids between 3.2 and 4.2 AU. Despite the importance they may carry regarding constraining the history of volatile transport in the Solar System, little is known about how much water (and in what form) Cybeles and Hildas harbor. Spectral analyses of these asteroids can provide more definitive characterizations for the chemical compositions of the Solar System as well as potential estimates for the sources of Earth's oceans. Prior studies have investigated the presence of water in nearer asteroids, but this outer region has not been as thoroughly analyzed. This project is devoted to investigating the 3.0 Œ°m infrared (IR) spectral hydration bands of three of these asteroids in order to quantify their water content toward better understanding their chemical and dynamical environments. IR analysis was performed on three targets, effectively increasing the sample size of Hildas and Cybeles with 3 Œ°m-band characterization by 25%. This will help determine the presence of hydrated silicates and permafrost in the outer belt to better define the chemical profile of the early Solar System.

279. Constraining the Properties of a Quasar's Accretion Disk Using Microlensing
Student Presenter: Madeline Davis
Faculty Mentor(s): George Chartas

Gravitational lensing is a natural phenomenon that acts as a magnifying glass for distant astrophysical objects. The magnifying lens is typically a galaxy located between us and the astrophysical object. We use gravitational lensing to study a distant object called SDSSJ1004+4112. This object is a quasar; a supermassive black hole surrounded by a luminous disk of hot gas (accretion disk). Gravitational lensing produces four magnified images of SDSSJ1004+4112. Lensing by individual stars in the lensing galaxy, referred to as microlensing, produces additional magnification on smaller scales. We use microlensing to probe material near the black hole, including the accretion disk and the hot corona, so we can constrain the size of the innermost stable circular orbit and the ionization of the disk, as well as the spin of the black hole. To do this we use the observed energy shifts of emission lines from the accretion disk. We report the detection in X-rays for the first time of a 5th central image in a lensed quasar. To confirm our detection we show that the X-rays from the 5th image originate from the same distance as SDSSJ1004+4112 and the flux of the 5th image is variable. The stacked image of SDSSJ1004+4112 forms a ring near the central image that is likely the result of microlensing. We predict that microlensing is frequent in the 5th image since X-rays from the 5th image travel close to the center of the lensing galaxy where the density of stars is large.

280. Simulating Strong Magnetic Fields onto Ultraluminous X-ray Sources ‚Äã‚Äã
Student Presenter: Joel Diamond
Faculty Mentor(s): Chris Fragile

During this project, we looked for magnetically arrested disks (MADs) in ultraluminous x-ray sources (ULXs). This would mean multiple forces act against the gravity of the black hole which creates two questions. What can this be used for and how can it be tested? We used a general relativistic magnetohydrodynamic code to simulate ultra-luminous x-ray sources which surpass the Eddington limit for accretion on a black hole x-ray binary system (BHXRB). These ULXs were then subjected to stronger magnetic fields in an attempt to force it to become MAD. A disk becomes magnetically arrested when the accretion disk has accumulated so much magnetic flux that it starts to actively push back against the gravity of the black hole. This was tested by slowly increasing the magnetic field strength over the course of the project to see if it is possible for the disk to become MAD.

281. An Observational Investigation of the Stellar Activity of AT Mic: Monitoring with Optical Spectroscopy and U-Band Photometry over Several Tens of Nights
Student Presenter: James Dockery
Faculty Mentor(s): Joe Carson
Additional Authors: Jake Frederick, Dr. Joe Carson, Dr. Max Moyano, Dr. Giovanni Pinz√≥n, Joanne Rojas, Aly Nida, Paula Rojas, Dr. Matias Jones, Dr. Ashley Pagnotta, and Brianna Joyner

To better understand the impact of episodic (week-long and month-long) stellar activity on planet atmosphere loss, our team monitored the young (12 Myr), nearby (10.2 pc), M-type star AT Microscopii with ultraviolet photometry and optical spectroscopy. Between 2020 and the present, we performed 38 nights of U-band photometry with the SINISTRO instrument of the Las Cumbres Observatory Global Telescope network and 23 optical spectroscopy observations using the high-resolution (R~45,000) Fiber Dual Echelle Optical Spectrograph (FIDEOS) on the La Silla One Meter telescope. With FIDEOS, we monitored Balmer alpha emission (656 nm) and tracked the chromospheric activity indicator R'HŒ±. We found that AT Mic exhibits U-band variability of 0.2-1.3 magnitudes (30%-80% flux change) during most 40-minute observing windows, with a maximum detected brightness change of 2 magnitudes, or 650% flux change. Such activity is accompanied by variability in the Balmer alpha emission and has not previously been reported. Our observational results are serving as inputs into hydrodynamic simulations of how episodic stellar activity may strip away the atmosphere of a hypothetical orbiting planet. Such characterizations may serve as a benchmark for the type of stellar activity that could impact the development of young planets around other stars of similar spectral type. This is especially important since the majority of known, potentially habitable planets, including those discovered by TESS and other state-of-the-art surveys, are around M-type stars.

282. Microgravity Stressor's Effect on Time Perception - A Numerical Investigation
Student Presenter: Jason Fitzgerald
Faculty Mentor(s): Sorinel Oprisan
Additional Authors: Dr. Catalin V. Buhusi

The Striatal Beat Frequency (SBF) model of interval timing is a computational model that mimics the activity of neural oscillations, primarily located in the frontal cortex (FC), to produce beats at a specific criterion time Tc. The coincidence detection produces these beats in the basal ganglia (BG) spiny neurons by comparing the current state of the FC neural oscillators against the long-term memory values stored at reinforcement time Tc. The neurobiologically realistic SBF model has been previously used to demonstrate precise and accurate scalar timing in the presence of biological noise. We explored the effect of additive Gaussian noise on neural oscillations and long-term memory. We hypothesize that the two subnetworks process noise differently. Using abstract sine-wave neural oscillators in the SBF-sin model, we found that interval-timing accuracy was proportional to the amount of noise set in the long-term memory. On the other hand, altering the noise in the frontal cortex displayed no fundamental distinctions in the accuracy of interval timing.

283. The Nanomechanical Properties of Transition Metal Dichalcogenides
Student Presenter: Noah Kern
Faculty Mentor(s): Alem Teklu

The reduced elastic modulus and stiffness of four two-dimensional transition metal dichalcogenides (TMDCs) namely molybdenum disulfide (MoS_2), rhenium disulfide (ReS_2), rhenium diselenide ($ReSe_2$), and tungsten diselenide (WSe_2) were studied through nanoindentation. An atomic force microscope (AFM) capable of nanoindentation was used to produce force-distance curves for analysis. A Python code was developed that employed the Oliver-Pharr method to analyze these force-distance curves resulting in more accurate values of the reduced elastic modulus and stiffness of each of these 2D materials as compared to existing nanoindentation analysis software. The reduced elastic moduli of MoS_2, ReS_2, $ReSe_2$, and WSe_2 were 143.93 GPa, 78.57 GPa, 37.06 GPa, and 37.94 GPa respectively. Among the samples, the TMDCs containing sulfides led to significantly higher values than those containing selenides. Our values are closer to theoretical calculations of the elastic moduli of these compounds than the results produced by other nanoindentation analysis software.

♻ **Sustainability-related project**
*Graduate student

284. Using Convolutional Neural Networks to Map Subvocal Brain-Computer Interface Inputs to Arbitrary Outputs ♻
Student Presenter: Christian Kohnle
Faculty Mentor(s): Sorinel Oprisan

This research project, conducted at the College of Charleston's Computational Neuroscience lab, focuses on the automatic detection and classification of subvocalized words (words thought of but not said, like during reading) using an electroencephalogram (EEG)-based Brain-Computer Interface (BCI). An EEG is a device that records measurement of electrical brain activity non-invasively. A BCI is a device which allows a brain to communicate with a computer.
By leveraging artificial intelligence (AI) deep learning neural networks, the project aims to assign subjects words to subvocalize during EEG monitoring, and use our AI network to determine which word is being subvocalized solely from the EEG data. Preliminary results indicate exceptional accuracy with a small group, prompting exploration into expanded word sets and more subjects.
Experimentally, subjects are instructed to subvocalize without muscle movement, wherein offline data processing will clean the data using various existing mathematical methods, and then prompt the AI network for a response.

Expected outcomes involve creating an extensive EEG record database and optimizing the AI network for accurate word prediction. Long-term goals involve designing automated EEG AI protocols for multiple users in subvocalized conversations.
The significance of the project lies in advancing Brain-Computer Interface technology, which currently aids individuals with motor disabilities. The EEG, a noninvasive and cost-effective method with high temporal resolution, holds promise in allowing the mapping of subvocal inputs from a user into arbitrary outputs. In theory, this could be used one day to help paraplegics walk and the mute talk.

285. Design, Assembly, and In-lab Testing of a CubeSat for Ultraviolet Stellar Observation
Student Presenter: Christopher Lesoine
Faculty Mentor(s): Joe Carson

I present here a status update on efforts to develop two scientific payloads to be considered for a future CubeSat mission. As leader of the day-to-day design, assembly, and testing of one of the two payloads, an ultraviolet camera to monitor stellar activity among young, low-mass stars (M-type ; 0.1-0.5 solar mass), I have been building in the lab a prototype payload, chassis, and peripherals, including a Raspberry Pi computer and ultraviolet imaging system with integrated software. Since observational signatures of stellar activity occur primarily at ultraviolet wavelengths, and such wavelengths are inaccessible to ground-based telescopes due to Earthís atmosphere, a space-based system with adequate observing time to monitor month-long phenomenon is ideal for such an investigation. In addition to the scientific goal, the project is meant to lay the foundation for follow-up†efforts†to create the actual flight-ready payload, pending final approval. It would also demonstrate a viable pathway for College of Charleston to develop additional future small-sat payloads. Successfully achieving a CubeSat mission would mark a historical milestone as the first time that College of Charleston or the state of†South Carolina has ever taken a leadership role in developing and operating a space mission.

286. Modification of Brain Waves Via Auditory Stimuli
Student Presenter: Maximus London-Kolb
Faculty Mentor(s): Sorinel Oprisan

Music is known to have a strong impact on emotions. Further study of music has found that music can even facilitate memories or enhance focus. The intention of this study is to explore the effect of music on the human brain, and observe how the presence and genre of music influences the frequencies of brain waves. After conducting trials with four volunteers, it was found that music has a definite, measurable effect on the human brain. Classical music generally put subjects in a calmer state of mind and increased the activity of alpha and theta waves, while rock music elevated subjects' mental state and increased activity in the beta frequency range. The application of this research could potentially be useful for mitigating symptoms of neurological disorders or enhancing cognitive function as a non-invasive method of modulating brain activity.

287. Universality laws in pure fluids and critical point experiments under density gradient
Student Presenter: Lili Ross
Faculty Mentor(s): Ana Oprisan
Additional Authors: Yves Garrabos - University of Bordeaux, ICMCB
Gurunath Gandikota- UMR-E CEA/UJF-Grenoble
Denis Chatain - UMR-E CEA/UJF-Grenoble
Daniel Beysens - CNRS-ESPCI Paris, PSL Research University

Recent studies have utilized methods involving video images to better understand the behavior of fluids near criticality. This study measured the intensity of transmitted light through image analysis to determine the light turbidity caused by density-induced refractive index fluctuations. Using a theoretical expression, the turbidity data from O2 can be fitted to determine the critical amplitudes of isothermal compressibility and fluctuation correlation length, which are compared against literature values. For critical SF6, the data is processed using Dynamic Differential Microscopy (DDM) to determine the structure factor, correlation time, and background at different focal planes of the sample cell unit (SCU). Our results show that these methods can experimentally determine these constants with minimal error.

288. Using IR Photometry to Determine Physical Changes in Asteroid Families
Student Presenter: Caleb Ussery
Faculty Mentor(s): Sarah Sonnett

Due to their small sizes and lack of atmospheric weathering, asteroids offer insights into the formation of planetary systems. Asteroids may experience collisions ranging from catastrophic disruption to micro-impacts that change their shape. Using IR photometry of different Main Belt asteroid families from the NEOWISE space mission in combination with previously published properties, we will perform a statistical analysis to search for changes in the surface properties of individual asteroids within these families, then evaluate overall surface heterogeneity within a family. We will use photometric data sets for families of age ranges from 0.1- 3 billion years old, with statistically viable sample sizes. We will statistically constrain the IR color variation of asteroids as they rotate for each family. We predict that surface variation within asteroid families will vary; however, we hypothesize that a summation of these individual asteroids within their respective families should display a heterogeneous surface composition.

Neuroscience Program

289. Neuronal Activity in Prefrontal Cortex Underlying Relapse in Substance Use Disorder
Student Presenter: Aryan Parmar
Faculty Mentor(s): Elizabeth Doncheck
Additional Authors: Ian R. Grant, Jade Baek, Josh Boquiren, Elizaveta V. Romanova, James M. Otis

In substance use disorders, relapse to drug use emerges in a manner coinciding with dysregulated activity in the prefrontal cortex (PFC), the executive reasoning center of the brain. This has been modeled in preclinical research using the drug self-administration assay in rodents, which has confirmed that activity within a PFC subregion, the prelimbic cortex (PrL-PFC), is necessary for relapse. However, the PrL-PFC is a highly heterogeneous region comprised of diverse ensembles of neurons that can govern behavior, and the precise ensemble activity that modulates relapse is currently unknown. Moreover, whether different relapse triggers (i.e., drug-associated cues, stressors, the drug itself) provoke drug seeking through distinct or overlapping ensemble activity dynamics is also unknown. Here, we paired drug self-administration with simultaneous two-photon calcium imaging of PrL-PFC neurons to dissect ensemble activity during relapse. This approach allows for visualization of neuronal activity with single-cell, sub-second resolution while animals choose to seek drugs of their own volition. Analyses reveal unique excitatory and inhibitory ensemble dynamics differentially encode distinct behavioral components of relapse. Moreover, only a select few neurons within each ensemble exhibit the same stable activity during relapse regardless of trigger. Using single-cell optogenetics to control neuronal activity during behavior, we are currently investigating how these ensembles and individual stable neurons may functionally regulate relapse to drug seeking. While these studies will resolve the discrete PrL-PFC activity that regulates relapse in substance use disorders, the findings may have more widespread implications for neuropsychiatric disorders characterized by dysregulated PFC activity and executive reasoning.

Master of Science in Computer and Information Science

290. Clementine: An Innovative Smartphone-Based Musical Instrument
Student Presenter: Drew Smuniewski*
Faculty Mentor(s): Bill Manaris
Additional Authors: Dr. Bill Manaris

Smartphones have become an omnipresent fixture in our lives. We present a new musical instrument, Clementine, for exploring and expressing musical ideas, through an easily accessible and learnable smartphone-based interface. Clementine supports simple and intuitive gestures and movements, which allow users to manipulate and control different musical aspects and sound generation. This makes it suitable for a wide audience, and especially for younger users, where it may be used as a tool for music pedagogy. It also may serve users with motor impairments, who may have difficulty with more traditional instruments.
The system is accessible through clicking a URL or scanning a QR, without any software installation. It has been implemented in JavaScript and HTML, together with p5.js, for displaying graphical elements, and our custom software for generating music, based on Howler.js. Using the smartphone allows us to take advantage of the sensors and actuators present in most devices, such as the accelerometer and gyroscope. These sensors prove to be vital to the overall functionality of the instrument with its kinetic and gestural input. We also explore the possibility of peer-to-peer connections as a means of enhancing the collaborative potential of Clementine. We believe Clementine may be very useful in music education, as well as music therapy, and rehabilitation settings, since it requires very little training, and opens the world of music creation and performance to a wider audience.

Master of Science in Data Science and Analytics

291. When a Robot Looks at Your Face: Using Machine Learning to Classify Sex Based on Face Photos of College Students
Student Presenter: David Clark*
Faculty Mentor(s): Navid Hashemi

Convolutional Neural Networks (CNNs) are machine learning models widely used for image classification. In this study, a CNN will classify face photos by the sex of the person depicted. The model will be trained on a unique private dataset of approximately 25,000 professional bust photographs of individual college fraternity and sorority members. The photographs were taken by the author for Greek chapter composites over eight years, and use consistent poses, studio lighting, and backdrop. Each image is labeled male or female. Through training using part of the dataset, the CNN will detect features and patterns indicative of a particular sex, such as facial features, hairstyles, or clothing patterns. CNN convolution and pooling layers will extract features from the input images, then feed them into fully connected layers to make predictions. After training, the model will make predictions on the dataset's previously unseen images. The model will output its predicted label for each new image, classifying the previously unseen person therein as male or female. Accuracy statistics will assess performance. As time permits, potential additional research questions are whether the CNN can predict sex based on only a portion of the face, whether it can predict fraternity/sorority chapter affiliation and college attended based on face, and whether it can classify the subject as wearing a face mask. In conclusion, the study will show whether a CNN can classify face photos by sex with statistically significant accuracy. This study has potential applications in fields such as security, marketing, and social media analysis.

292. Harnessing the Power of AI for Effective Lead Conversion Prediction in General Sales and Marketing
Student Presenter: Toni Davis*
Faculty Mentor(s): Navid Hashemi

The manual categorization method used by businesses today in the sales pipeline is time-consuming, often inefficient, and can contribute to lost sales. My project aims to address this by building and testing different machine learning models on a combination of two different datasets to develop an effective yet automated approach to lead categorization. My project has three main goals: to identify key features of leads that contribute to lead conversion, to build and test various machine learning models to develop an accurate predictive model for if a lead converts or not, and to further develop and test machine learning models to accurately determine a lead status to further automate the lead categorization system. The two data sets consist of online product sales lead data and the other contains data on leads with an online learning provider. The first data set consisting of online product sales data has 19 different features exploring different lead features, and the data set has over 126,000 records. The second data set consisting of online learning lead data is made up of 37 different features that are like the first data set but also includes features like last activity, occupation, activity score, and various indicator features for if a customer interacted with a particular method of advertisement. This second data set only contains 9420 rows. I plan on combining these data sets on like features to create a more generalized data set as to address the goal of generalized lead conversion prediction.

293. Unravelling Breast Cancer Diagnosis: A journey through machine learning
Student Presenter: Kajal Karmur*
Faculty Mentor(s): Navid Hashemi

Abstract:
In my quest to advance breast cancer diagnosis, I delve into machine learning, utilizing numerical features computed from digitized fine needle aspirate (FNA) images of breast masses. Sourced from the UCI Machine Learning Repository and UW CS ftp server, the dataset comprises 30 real-valued features characterizing cell nuclei attributes, each annotated with a diagnosis of malignant (M) or benign (B). It includes records from 569 patients, with 357 benign cases and 212 malignant cases.
My objective is clear: to develop a robust classification model accurately distinguishing between malignant and benign cases. With various machine learning algorithms, including support vector machines, decision trees, and random forests, I explore feature engineering and selection to uncover hidden insights.
I hypothesize that pivotal clues for distinguishing between malignant and benign breast masses lie within these numerical features. I aim to validate this hypothesis, striving for models excelling in predictive accuracy and generalization performance.
Beyond methodologies lies a deeper purpose: revolutionizing early detection and diagnosis of breast cancer. By providing clinicians with decision support tools, my research aims to improve patient care and outcomes. Unlike traditional methods, my approach integrates numerical features from medical images, offering a unique perspective in breast cancer diagnosis. This research presents a novel approach to leveraging machine learning for medical decision support, ultimately impacting patient well-being.

294. Unveiling Urban Parking: Enhanced Image Analysis for Vacant Space Detection
Student Presenter: Ethan Lewis*
Faculty Mentor(s): Navid Hashemi

Within modern urban environments, live parking lot occupancy detection can provide valuable driver navigation information, collect individual lot data and enforce restrictions, advise urban planning decisions, and more.
The Action Camera Parking Dataset (ACPDS) is comprised of 293 images containing over 11,000 parking spaces and offers several unique advantages to help improve the accuracy of these object detection systems...
Firstly, the ACPDS images are captured from a security camera perspective rather than a drone viewpoint, thereby offering a more realistic model training environment consistent with its intended real-world application.
While other datasets certainly meet the previous criteria, they typically contain images of a single parking lot from multiple angles. ACPDS, however, is comprised of multiple different lots to combat these previous datasets' difficulties evaluating never-before-seen parking lots.
Finally, ACPDS defines each bounding box (an imaginary rectangle that serves as a point of reference for object detection) as an individual parking space, rather than a car. Although this is the preferred approach, the original ACPDS research noted their models' struggles to correctly classify vacant parking spaces occluded by trees in the image. Specifically, this weak point is attributed to the lack of images featuring tree occlusions in the dataset.
This research focuses on randomly augmenting ACPDS with tree PNG files overlaid onto the original images to synthetically create tree occlusions and boost model accuracy in these edge cases.
Benchmarks for model performance may include comparing the accuracies of models trained on the original and augmented ACPDS, respectively.

295. Sentiment Analysis in Open-Source Developer Communications using NLP and Machine Learning
Student Presenter: Richard (Yi Hui) Liu*
Faculty Mentor(s): Kris Ghosh

In the current information age, machine learning plays a tremendous role in reshaping the way humanity views the world. Everything is being evolved through AI through a diverse application of methods. My project will investigate one of these methods that are currently impacting modern technology. Natural Language Processing is one of the most dynamic and versatile fields in machine learning. The amount of textual data that gets generated each day amounts to around 2.5 quintillion bytes, and being able to analyze and extract meaningful insights from this data is what allows us to evolve.
My project focuses mainly on the different features of text analysis using NLP, aiming to explore its capabilities in many dimensions. Leveraging tools such as the Natural Language Toolkit (NLTK), spaCy, and specialized sentiment analysis packages, the research aims to calculate sentiment values and reveal underlying patterns in developer communications
The chosen datasets for this investigation will be a dataset of open-source developer communications from Gittercom. By narrowing the focus to sentiment analysis in this domain, the project aims to better understand the emotional tone of developer communications and potentially identify areas for improvement. This project is unique in the way that it dives into the emotional dynamics in the open-source developer community. By delving into sentiment analysis, this project will provide interesting insights into the emotional dynamics of the community.

296. A Better Coding Assistant Tool: Enhancing Accuracy and Dependability with Retrieval Augmented Generation (RAG) on an Open-Source Generative Large Language Model.
Student Presenter: Guiu Puigcercos i Vilar*
Faculty Mentor(s): Navid Hashemi

In the dynamic landscape of AI, Large Language Models (LLMs) have emerged as pivotal players. As these models become increasingly prevalent, their benefits but also their challenges have come into sharper focus. Text generation's tendency to produce hallucinations poses a particular challenge, especially in applications that demand precise question answering.
Addressing this issue, this project will introduce a solution centered around Retrieval-Augmented Generation (RAG), an AI framework designed to enhance the quality of LLM-generated responses. By feeding the model additional coding specific knowledge sources, RAG aims to mitigate the pitfalls associated with hallucinations in that area. The project's focus will be on applying RAG to Meta's open-source LLM, LLaMA2, to develop a specialized coding assistant. This tailored model will cater specifically to programming students, aiming for more reliable and accurate answers to coding queries. The focus will be on tackling programming languages that are used for learning to code, like Python and Java, thus assisting students as they learn programming.
To bolster the model's capabilities, coding best practices along with code examples will be leveraged, enriching its responses with valuable insights. The model's success will be benchmarked using the extensive CodeNet dataset, comprising millions of code samples addressing a diverse set of 4000 coding problems. Through this approach, the project will aim to create a coding assistant that not only navigates the challenges posed by hallucinations but also significantly enhances accuracy and dependability in addressing coding queries.

297. Eyes in the Sky: Harnessing Drone Capabilities for Mapping and Predicting Temperature Variations in Urban Setting ♻
Student Presenter: Zach Shunnarah*
Faculty Mentor(s): Navid Hashemi

With the many ways that technology has improved over recent years, unique methods have allowed researchers to examine people, places, and objects like never before. The question then becomes: how can these newfound technologies benefit society? This research plans to answer that question, specifically through the understanding of temporal thermal behavior in urban cities. Cities have recently experienced record high temperatures, and this has undoubtedly affected our everyday lives. By utilizing the capabilities of drones, warming trends can be studied. Due to a drone's ability to capture views that humans have more difficulty reaching, research has become more extensive, specifically through infrared thermal imaging. In this research, from 2021-2024, thermal images were gathered of buildings, water, and other objects that encompass the Harbor Walk area in the City of Charleston. Through a comprehensive process, a mosaic of Harbor Walk was mapped with temperatures available for data analysis. These mosaics allowed for pixels to be matched with specific locations, which were accompanied by a temperature reading. Employing machine learning techniques train regression models allowed for predictions of temperatures in the future. This is important because predicting temperatures can be scaled to much larger and more populated urban environments. Further, trends from this data could provide input for future infrastructure and landscape that combat the increasing temperatures of today. The potential recommendations that could arise would allow for urban cities to plan, prepare, and predict for successes and failures regarding how temperature affects its citizens, groundwork, and lifestyle.

298. A Machine Learning Approach for Identification of Network Intrusions and Anomalies
Student Presenter: George Smith*
Faculty Mentor(s): Navid Hashemi

As computer networks grow in complexity, detecting disruptions that impact network integrity and service quality becomes increasingly challenging. This project addresses these issues by leveraging machine learning techniques to identify anomalies within network traffic, aiming to preemptively highlight potential inefficiencies, attacks, or bottlenecks that could impair network performance, data integrity, and overall reliability. Unique to our approach is the focus on underrepresented network anomalies and attacks, including subtle, network-specific issues alongside more commonly addressed threats like malware. This nuanced perspective allows for a broader detection scope, enhancing network security measures against a wider array of vulnerabilities. Central to our methodology is a comprehensive preprocessing phase and deploying unsupervised learning algorithms adept at navigating network traffic data's intricate, high-dimensional nature. A crucial aspect of this project are the datasets utilized, comprising diverse network traffic data collected from multiple sources, including public datasets of hundreds of thousands of PCAP files. This collection strategy ensures a rich, varied dataset that enhances the model's ability to generalize across different network types and traffic patterns. By incorporating a wide array of network traffic characteristics and employing unsupervised learning techniques, this project not only advances the field of network management but also underscores the transformative potential of machine learning in optimizing network operational efficiency and service quality. This initiative aims to refine the anomaly detection model further by integrating more granular features that reflect the dynamic nature of network traffic, thereby paving the way for a holistic solution to network traffic optimization.

299. Pictures of the Past: Using Machine Learning to Estimate Quasar Redshift from Color
Student Presenter: Jenna Snead*
Faculty Mentor(s): Navid Hashemi

When objects in space move away from Earth, the wavelength of their emitted light stretches, known as redshift. This value can provide information about the distance, speed, and age of an object. Quasars are super massive black holes that are actively consuming nearby matter and are the brightest objects in the universe. Calculating the redshift of quasars allows astronomers to understand the dynamics of not only the objects themselves, but also the greater evolution of the early universe. Estimation of redshift from spectra is the more robust method, but it can also be derived from image data, namely the distribution of colors near the visible wavelength ranges. Given the abundance of quasars in the Sloan Digital Sky Survey (SDSS), there are many quasars that have images, but no spectra, creating the need for effective redshift classification based on color. As future sky surveys increasingly target quasars and other active galactic nuclei (AGNs), accurate estimation of redshift across multiple sources is paramount. The dataset of interest comprises over 50,000 quasars as present in the August 2023 SDSS DR18 release, and includes their magnitudes in the near-UV, visible, and near-IR wavelength ranges as well as their redshifts. This research study proposes a supervised machine learning approach to estimate redshift values of quasars based on the contrasts between image color intensities. Further evolutions of the model include the identification of non-quasar sources (such as stars or galaxies) as extraneous inputs and the expansion of input capabilities to include stellar and galactic objects.

Master of Science in Environmental and Sustainability Studies

300. THE LAND THAT WATER WON'T FORGET: ATTAINING A RESILIENT COMMUNITY FROM FLOODING ♻
Student Presenter: Reagen Desilets*
Faculty Mentor(s): Timothy Callahan

Why do so many Charleston, South Carolina communities flood so easily and what can be done to make these communities more resilient and safe for the people they serve? One area of Charleston County that sees a number of drainage complaints is the Dupont-Wappoo (DuWap) drainage basin west of the Ashley River near US 17 (Savannah Highway). This area is characterized by aging infrastructure, dense development, and little places for stormwater to go to. Analysis of existing conditions has been completed by a consulting firm working with Charleston County (AECOM, 2019) and this research will use computer simulations to predict how various green infrastructure methods could improve overall drainage and reduce flooding in the DuWap basin. Low Impact Development methods such as rain gardens, rainwater collection, and green roofs can be added to rain event simulations, to see how the identified problem areas will improve. The expected results should show better ways that property owners and local governments can tackle issues of flooding due to stormwater runoff, making the Charleston area more resilient to flooding. One of the seventeen goals for sustainable development outlined by the United Nations is resilient communities and being able to implement green infrastructure to assist existing gray infrastructure is key to creating a more resilient Charleston.

301. From Their Home Country University to a US University: A Comparative Study of the Sustainability Behavior of International Students ♻
Student Presenter: Badriyeh Diab*
Faculty Mentor(s): Dr. William Veal

Previous research has documented the lack of studies centered around students' sustainability behavior at higher education institutions as well as the gap of studying international students' behavior change once they start their education at US institutions. This study evaluates how the sustainability behavior of international students changes when they do an exchange program at College of Charleston. By applying the Social Cognitive Theory; this research studied the change of the self-efficacy, attitude, interest, and motivation of international students while engaged in sustainability actions. Three sustainability behaviors were addressed: recycling, reusing, and composting. Leadership, importance of resource to users, and collective-choice rules variables from the Social-Ecological Systems framework were also applied to understand how sustainability on-campus is implemented and how people of leadership impact the self-efficacy, attitude, interest, and motivation of international students to be engaged in sustainability. A mixed methods approach was followed to collect data. For students, methods included: an initial and final survey using Likert scale, interviews, focus group discussions, and observations of participation in recycling activities. Moreover, staff from the Center for Sustainable Development and International Education were interviewed. The goals of this study are to fill in previous research gaps and examine the willingness of international students to transfer and/or improve their sustainability behavior when they study at new campuses. The last section of this project suggested applicable recommendations for enhancing the sustainability behavior of Lebanese students at higher education institutions in Lebanon.

♻ **Sustainability-related project**
*Graduate student

302. Impacts of Drought on Water Quality: A Case Study on the Edisto River at Givhans Ferry State Park in southeast South Carolina
Student Presenter: Nolan Irey*
Faculty Mentor(s): Tim Callahan
Additional Authors: Other committe members: Kathyrn Ellis, McCormick Taylor Inc., Allan Strand, Dept of Biology College of Charleston, Jason Thompson, Charleston Water Systems

Drought has increased worldwide in severity, frequency, and intensity due to a changing climate and an increase demand for water supply. There are many studies evaluating how drought affects the volume of water, few studies have been conducted to understand the impacts of drought on water quality. Besides low water levels, what are the other signs of drought? Decision-makers and scientists struggle identifying a drought because of its slow onset nature; much easier is to look back at past drought conditions to determine the start and end points. However, there is no one best method to identify drought timelines. This study employs multiple drought identification methods using discharge and weather data to identify drought in the Edisto River watershed near Givhans Ferry State Park in South Carolina. In this study, known drought periods are compared to normal streamflow periods to understand how water quality may change during a drought period. Water quality parameters collected for this study are turbidity, total organic carbons, color, and bacteria concentrations. Continuous data over a 22-year period (2001-2023) have been obtained through the Charleston Water System's monitoring of their Edisto River source near Givhans Ferry State Park. The main goal of this research is to determine if drought impacts water quality and in what ways. A secondary goal of this research is to identify if post- and pre- drought conditions can impact water quality. Results are intended to assist water resource management and treatment in South Carolina and other similar regions identified in the study.

303. Local Spat Collection for the Single Oyster Market ♻
Student Presenter: Mikayla Milford*
Faculty Mentor(s): Caitlyn Bierce

In South Carolina, oyster farmers are challenged with a lack of consistent access to oyster seed and are facing crop losses due to unexpected mortality events which can have economic effects on the industry and lessen ecosystem benefits. South Carolina has an oyster population capable of supporting local oyster farmers in their times of need due to long oyster breeding seasons with high recruitment rates. Young oysters, also known as spat, can be collected and raised for the single oyster market but local techniques have not been previously explored. Local spat collection devices are commonly used to cultivate oyster beds for the cluster market or for restoration purposes, but farmers lack techniques for collecting oysters for the single market. In this study, three local spat collection devices for the single oyster market were compared: CPVC piping, Chinese hats (an industry standard), and corrugated plastic roofing. The devices remained in the field for three durations of time: two weeks, four weeks, and nine weeks. The feasibility of each device was determined by the number of oysters collected, the size of the oysters, the survivability upon removal from devices, and the associated costs. The results show differences among these factors for either the device types or for the varying time durations the devices were in the field or both. This study provides practical solutions for South Carolina oyster farmers and also has the potential to contribute to the growth of the single-oyster industry and benefit our local ecosystems.

304. Rain and Tide: Assessing Coastal Streamflow and Compound Flooding Risk ♻
Student Presenter: Hannah Quast*
Faculty Mentor(s): Timothy Callahan
Additional Authors: Joshua Robinson (Robinson Design Engineers), Nolan Williams (Robinson Design Engineers), and Nicole Weirich (College of Charleston)

Over the past decade, compound flooding events have increased in coastal watersheds. Compounding effects of high-intensity stormwater runoff during high tide conditions can be especially destructive in low-lying urban areas where land use change has reduced groundwater infiltration capacity. Coastal watersheds such as the U.S. Atlantic coastal regions of New York and New Jersey, Norfolk, VA, Charleston, SC, and South Florida have experienced increased flooding events in recent years. Specific to coastal watersheds, compound flooding generally occurs when tidal overflow coincides in space and time with storm-event runoff. Drainage structures in coastal communities can exacerbate compound flooding by connecting stormwater management structures to the coastal ocean, allowing tide waters to reach areas inaccessible during pre-development conditions. Due to the complex nature of tides, it is difficult to accurately predict regions vulnerable to compound flooding without gathering site-specific data. We hypothesize that existing stormwater runoff models can be used with tidal creek streamflow data, thus providing better predictions of compound flooding risk. One of the goals of this project is to provide guidance for flood mitigation decision-making for the local community.

♻ **Sustainability-related project**
***Graduate student**

305. An Evaluation of the Sustainability Internship Program at the College of Charleston ♻️
Student Presenter: Sarah Haslinger*
Faculty Mentor(s): Tracy Burkett

While both academic and practitioner sustainability programs, such as student internships, are commonly utilized across colleges and universities to help increase student engagement and elicit more interest in understanding sustainability science, little research exists on how these programs may affect individuals' post-graduation. While organizations such as the Association for the Advancement of Sustainability in Higher Education Education (AASHE) have collected and analyzed data regarding programs and perceived impact, few case studies have delved deeper into the true impact of programs, such as internships related to sustainability, on student development. While previous studies have evaluated the effectiveness of sustainability internships on college campuses, this literature has not addressed specific benefits and skills gained from these programs. By examining longitudinal data about participants in an internship program and surveying "where are they now", this project provides an opportunity to explore the strengths and weaknesses of sustainability internship programs. This case study, anchored at the Center for Sustainable Development (CSD) at the College of Charleston (CofC), seeks to assess how the skills gained from the program are utilized post-graduation. This survey of program graduates explores their perceptions of the internship experience. It also examines the costs and benefits of the program, providing a blueprint for successful implementation of education through practitioner experiences. Decision-makers in higher education may benefit from the research and develop a deeper understanding of on-the-ground student experiences and how these experiences influence educational and career trajectories.

306. A Program Evaluation of the Edible Garden Series: A program to mitigate food apartheid locations in Charleston, South Carolina ♻️
Student Presenter: Aly Petruch*
Faculty Mentor(s): Dr. Kendra Stewart
Additional Authors: The Center for Sustainable Development

Food apartheid areas are areas where many individuals face discrimination with little to no access to proper food. This research looks at a mitigation strategy for food-insecure individuals living in food apartheid areas in Charleston County, South Carolina. The Edible Garden Series, a program hosted by Clemson Extension, focuses on empowering and providing educational resources on food systems and agriculture to communities in the Lowcountry. The program evaluation of the Edible Garden Series will assess the effectiveness of the program in engaging with the target audience, increasing community resilience, and spreading agricultural resources to participants so they can grow their own fresh produce. The primary research method is a survey after each workshop over a year to evaluate trends. This is the first evaluation of the Edible Garden Series, therefore highly beneficial to Charleston county residents and can create a foundation for further studies in food security and justice.

Master of Science in Marine Biology

307. SPATIOTEMPORAL CHARACTERIZATION OF NITROGEN SOURCES AND BACTERIAL ABUNDANCE ON NATIVE MACROALGAE IN CHARLESTON HARBOR, SC, USA
Student Presenter: Christopher Carbon*
Faculty Mentor(s): Heather Spalding
Additional Authors: Dr. Heather Fullerton, Department of Biology

Charleston Harbor is a dynamic tidal estuary that is important for Charleston County's economy, culture, and ecology. However, past data collected by Charleston Waterkeeper demonstrates that the Harbor occasionally experiences periods of deteriorated water quality due to the presence of elevated fecal indicator bacteria. While discreet water sampling can provide an instantaneous snapshot of water quality, macroalgae are effective bioindicators of nutrient-based water quality parameters, such as Œ¥15N. Additionally, environmental monitoring efforts conducted by Charleston Waterkeeper and the South Carolina Department of Health and Environmental Control have shown that Vibrio spp. abundance in Charleston Harbor occasionally warrants the closure of regions of Charleston Harbor to shellfish harvest. To characterize the spatial and temporal variation of fecal coliforms, Vibrio spp. bacteria, and macroalgal tissue nutrients, monthly sampling of Ulva spp. and Gracilaria tikvahiae occurred at three field sites within Charleston Harbor from September 2023 to February 2024. Bacterial abundances on both macroalgal species and site water samples were assessed via the membrane filtration method and the use of differential and selective growing media. The elevated Œ¥15N and % nitrogen of macroalgal tissue coupled with the bacterial data suggest that an enriched nitrogen source, such as sewage, may be influencing these sites. This study illustrates the use of macroalgae as a novel biomonitoring tool in Charleston Harbor, and provides a seasonal baseline of Œ¥15N that can be used for the improvement of water quality in this region.

308. Ecophysiology of Chondria tumulosa mats: a new cryptogenic macroalga in the Papahānaumokuākea Marine National Monument, Hawai'i
Student Presenter: Abigail Davis*
Faculty Mentor(s): Heather Spalding
Additional Authors: Dr. Andrea Kealoha - University of Hawai'i at Mānoa

Chondria tumulosa is a new cryptogenic macroalga that recently invaded the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands. This mat-forming species overgrows and smothers native algae and corals and is hypothesized to be spreading rapidly via fragmentation. However, little is known about its ecophysiological traits and the mechanism(s) contributing towards its high abundance. The goal of this study was to examine the influence of abiotic factors (in situ nutrients and irradiance) on the photosynthetic efficiency of dense mats at 11 sites at Manawai (Pearl and Hermes Atoll). At each site, three Chondria samples were collected along a 25 meter transect at 1.5 to 12 m depths. Three replicates of photosynthetic efficiency were measured from the top and bottom of each mat sample. Water samples from within and directly above the mats were collected for nutrient analyses of nitrogen and phosphate. Light (lux) was measured above and below Chondria mats ranging from 3 to 11 cm in height. Water nutrients were significantly greater from within as compared to above the mats, suggesting that mat formation increases the microscale nutrient environment in otherwise oligotrophic water. Chondria mats absorbed over 99% of light and the lower mat portions were still photosynthetic, showing that Chondria is capable of growing in low-light environments, such as deeper water. Chondria mat formation may be a key factor to its physiological success and provides a competitive advantage over other photosynthetic benthic organisms via the absorption of almost all available light and the possible generation of nutrients.

309. Temporal characterization of intertidal macroalgal microbiomes at 'Ewa Beach, O'ahu, Hawai'i ♻
Student Presenter: Evan Dunn*
Faculty Mentor(s): Heather Fullerton
Additional Authors: Heather Spalding (Department of Biology), Kristina Hill-Spanik (Grice Marine Lab Genomics Lab Manager)

Macroalgae are primary producers and ecosystem engineers that are food sources and create habitats for other organisms. Each macroalga's microbiome influences its development and health. Macroalgae and their microbiomes usually experience higher light intensities and temperatures at low tide in tropical habitats, which may alter microbial community structure. Changes in the macroalgal bacterial community composition due to abiotic factors (e.g., high temperature, high irradiance) can negatively affect the host organism. This study aims to characterize the microbiome of five species of native and two species of invasive macroalgae during a series of consecutive low-tide events. Algal samples from the phyla Chlorophyta, Rhodophyta, and the Phaeophyceae were collected from an intertidal bench at 'Ewa Beach, O'ahu, Hawai'i over five days at low tide in May 2021. Total DNA was extracted and was amplified via PCR methods with Illumina primers targeting the V3V4 region of the 16S rRNA gene. Light and temperature data collected in May 2023 during low tide from the same site at 'Ewa Beach was used to characterize variability across the sampled intertidal bench and serve as a representative dataset of abiotic conditions. These data provide insight into the stability of the macroalgal microbiome over short temporal scales and will determine if invasive algae have a more resilient microbiome than the native flora. These data will be used in conjunction with future climate change scenarios of increasing temperature to predict possible competitive interactions in the algal flora due to variable responses in the algal microbiome.

310. Application of a New Method for Detecting and Quantifying Phthalate Exposure Using Blubber from Bottlenose Dolphins (Tursiops truncatus) ♻
Student Presenter: Maggie Knight*
Faculty Mentor(s): Leslie Hart
Additional Authors: Miranda K. Dziobak (Department of Health and Human Performance), Emily C. Pisarski (NOAA National Centers for Coastal Ocean Science, Hollings Marine Laboratory), Edward F. Wirth (NOAA National Centers for Coastal Ocean Science, Hollings Marine Laboratory)

Phthalates, plasticizing chemicals found in various consumer products, are known endocrine disruptors with potential adverse effects on mammalian development, reproduction, and metabolism. Phthalates are easily leached from the plastic products to which they are added, leading to environmental exposure for both humans and wildlife. Recent studies on bottlenose dolphins (Tursiops truncatus) revealed significant exposure to phthalates, however, existing detection methods rely on urine samples obtained during logistically complicated and expensive catch-and-release health assessments. This study developed a protocol for detecting 12 phthalate ester metabolites (mPAEs) in bottlenose dolphin blubber, a sample that can be collected remotely via biopsy dart sampling. Using solid-phase extraction and liquid chromatography-tandem mass spectrometry, we analyzed blubber samples (n=27) from health assessments in Sarasota Bay, FL, USA, conducted in 2016, 2017, 2022, and 2023. Detectable concentrations of at least one mPAE were observed in 37% of sampled dolphins. Mono-2-ethylhexyl phthalate (MEHP) was most common (n=6; geometric mean: 4.57 ng/g wet weight; range: 5.2 to 12.4 ng/g wet weight (ww)), followed by monoethyl phthalate (MEP; n=2; geometric mean: 44.9 ng/g ww; range: 39.7 to 50.1 ng/g ww), and monoisodecyl phthalate (MIDP; n=3; range: 26.0-27.4 ng/g ww). Blubber findings align with observations from urine in which MEHP and MEP were also most common. Blubber analysis may provide an additional surveillance tool without the limitations of catch-and-release health assessments and facilitate exposure assessments in less accessible at-risk populations.

311. Longitudinal Comparison of Macroalgal Biomass and Diversity in Waikīkī, Hawaiʻi, USA ♻
Student Presenter: Elle Pestorius*
Faculty Mentor(s): Heather Spalding
Additional Authors: Dr. Joanna Philippoff, University of Hawaiʻi at Mānoa

Long-term, species-specific quantitative datasets in marine tropical areas are rare, yet needed for comparisons to present community states to identify temporal patterns and inform management about the status of culturally and ecologically important species. M. Doty and colleagues intensively surveyed the biomass and species composition of macroalgae in 12 plots from 0 to 230 m offshore of the Waikīkī Natatorium War Memorial, south Oʻahu in 1969. In 2018-2019, the OPIHI program (University of Hawaiʻi at Mānoa) and College of Charleston resurveyed three of these plots (10, 110, and 210 m from shore) using the same methodology to identify changes in the species composition and abundance of macroalgae. Since 1969, the species composition and biomass of macroalgae dramatically changed with a decrease in large, fleshy brown algae and an increase in invasive species and turf algae. Surprisingly, biodiversity has increased, but this is due to an increase in the species number of small, turf algae and invasive species. Additional studies are needed to determine if recent urchin releases and fishery management efforts in this area are mitigating the impact of invasive algal species, and if other invasive algae, such as Avrainvillea spp., have increased in abundance.

Master of Science in Mathematics

312. How Graphic Design Can Facilitate Learning in Calculus Textbooks
Student Presenter: Alex Baham*
Faculty Mentor(s): Amy Langville
Additional Authors: Kathryn Pedings-Behlings, Department of Mathematics

Over the past two years, I've had the opportunity to work on the Deconstruct Calculus Journals: self-contained calculus textbooks that highlight active learning for students. A large part of my responsibility with these books has been to edit and contribute to the graphic design in ways that are not only sound design choices but also helpful to students using the books. Some of these include, but are not limited to, modifying color schemes of journals to be consistent and eye-catching, editing fractions to be easier to read and more clear to students, and checking math work and answers to ensure they are all correct and easy to follow. I have also been able to act in the capacity of a co-author creating new pages of algorithms that include step-by-step instructions on how to solve different calculus problems, designing new activities to break down concepts further, and writing more review questions for students to complete at the end of each chapter. I also contributed to the rearranging of content to better flow for students as well as suggesting pages to split into larger spreads for more ease of understanding. My work on these journals has opened my eyes to ways in which graphic design can not only enhance the visuals of a textbook but also enhance learning for students.