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2025
Research & Exhibition Day

A Celebration of Student Scholarship Across Disciplines

ABSTRACT BOOK

Friday, April 18th, 2024
10:30 – 3:30 PM
Honors Center

#1 – An Exploration into the Stability of A15 Alloys
Student Presenter: Samuel Pressley Reeder
Advisor: Hunter Sims (Physics & Engineering)
Presentation Time: 10:30-11:30

Abstract: Medium entropy alloys (MEAs) are a class of materials consisting of three to five elements in near equimolar proportions, leading to a higher entropy of mixing. Additionally, some MEAs and alloys of higher entropy have demonstrated improved and desirable properties - such as hardness, corrosion resistance, and even elevated superconducting transition temperatures. One structure that has been recently investigated is the A15 structure due to its historical significance in the science of superconductivity. Our research goal is to compute and analyze stable ternary alloys in the A15 structure to discover the effect of alloying on the properties of the material with hopes of eventually finding a stable, higher entropy alloy, such as an MEA, to explore its properties. This research includes using a combination of quantum mechanical first principles calculations and software that constructs alloys of random compositions of the constituent elements and to find the stability of the configurations.

#2 – Orton-Gillingham in the General Education Classroom*
Student Presenter: Michelle Whelchel
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30

Abstract: According to the South Carolina Department of Education, the most recent data shows that about 50% of students in grades 3-8 are reading on grade level. Cherokee County School District (CCSD) faces the challenge, with only 63.8% of students grades 3-8 reading on grade level. The Orton-Gillingham (OG) Curriculum has been used in Special Education classrooms in CCSD for almost 10 years, with much success. This study compared i-Ready Fall and Winter scores of first and second grade students at an elementary school in CCSD, in classes with OG-trained teachers versus those without. The findings supported the hypothesis that classes with teachers who had been trained on OG would have higher average percentile rankings on the Winter i-Ready testing. However, the study did not support the hypothesis that classes with teachers who had been trained on OG would show more growth between Fall to Winter i-ready percentile rankings than those without OG training.

#3 – Pee Dee Region Residents' Knowledge of Stroke*
Student Presenters: McKenna Snow, Caroline Walpole, Payton Russo, Kaitlyn Freeman, Audree Huggins, Carrigan Spearman, Skylar Sanders, Olivia Smith, Asia Thomas
Advisor: Michele Norman (Speech Language Pathology)
Presentation Time: 12:30-1:30

Abstract: Strokes occur when a blood vessel in the brain bursts or becomes blocked, leading to severe health consequences. South Carolina has the fifth-highest stroke-related death rate in the United States, with the Pee Dee region having one of the lowest numbers of acute or comprehensive stroke centers in the state. This study examines Pee Dee residents' knowledge of stroke signs, symptoms, prevention, and intervention.

*Graduate Student Project

#4 – A Book Website for an Author
Student Presenters: A'Laya Scott & Kobe George
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 1:30-2:30
Abstract: Being tasked with developing a website from the ground up involves enduring technological and non-technological challenges that teaches the importance of prioritization, communication, making adjustments, and time management. This website has been created and designed to fulfill the needs of a writer who is launching her first fantasy novel. It has been designed to grasp the attention of her target audience and to be a space where website users can interact with the author, sign up for free copies of her novella, and become more informed about the author and her writings.

#5 – Fish guts! Determining the Invasiveness of Pee Dee Buffalo fish via genetic testing their stomach contents
Student Presenters: Brycelyn Berry & Sean Johansen
Advisors: Jeremy Rentsch (Biology) & Jason Doll (Biology)
Presentation Time: 2:30-3:30
Abstract: The goal of this research is to prove the invasive status of Buffalo fish within the Pee Dee River. *Ictiobus*, common name: Buffalo fish, make up a significant part of the mass of the Pee Dee, but they are not native to the river. To determine what these fish are eating and how their consumption habits affect other, native fish species, we are analyzing their stomach contents. However, before analysis can be done, a DNA isolation protocol must be performed to obtain DNA samples with high yield, high purity, and low degradation to then be sent off for genetic testing. Through trial and error of this protocol, we have determined that the fish stomachs must be gathered recently, within a month to two months before, for the contents to yield an ideal DNA sample without high levels of degradation.

#6 – Stanley Bail Bond Website LLC
Student Presenters: Tre' Stanley & Thomas Dooley
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 10:30-11:30
Abstract: Stanley Bail Bonds LLC is a reliable and professional bail bond service dedicated to helping individuals secure a swift and hassle-free release from custody. Our website provides essential resources for those in need, including an easy-to-use online bail payment system, detailed information about the bail process, and 24/7 support from experienced agents. Clients can quickly find answers to common questions, locate necessary forms, and connect with our team for personalized assistance. With a commitment to confidentiality and efficiency, Stanley Bail Bonds LLC ensures that you or your loved one can navigate the legal system with confidence and peace of mind.

*Graduate Student Project

#7 – Medium-to-large bodied mammal diversity at Carolina Wildlands Foundation: Three years of Snapshot USA data compared to national trends
Student Presenter: April Wooten
Advisors: Travis Knowles & Jason Doll (Biology)
Presentation Time: 11:30-12:30

Abstract: Snapshot USA is an ongoing nationwide camera trapping project designed to monitor the status and spatiotemporal patterns of medium-to-large-bodied mammals in the USA. Recently, a 5-year summary of data was submitted for publication. The Carolina Wildlands Foundation (CWF) manages a large, private conservation property in Chesterfield County, SC, and is one of the subproject sites for Snapshot. This poster summarizes trends in the most captured mammal species at CWF over a 3-year period (2021-2023). Additionally, we discuss intrasite trends at CWF and compare the results to the nationwide 5-year summary. We also explore implications for continued monitoring and conservation efforts.

#8 – Comparing Deep Learning and Stochastic Model Approaches for Musical Chord Recognition
Student Presenter: Jacob Reeder
Advisor: Daniel Scofield (Mathematics)
Presentation Time: 12:30-1:30

Abstract: This project compares two approaches to musical chord recognition: a stochastic model based on a Hidden Markov Model (HMM) with Gaussian Discriminant Analysis (GDA) and a deep learning approach using a Convolutional Neural Network (CNN). To train both models, we programmatically generated musical chord audio and extracted relevant features for input. We then evaluated their performance on training and testing data to determine which approach is better suited for real-time chord recognition.

#9 – How Do Investments in Labor and Capital Affect Employment and Industrial Production?
Student Presenter: Joshua McDaniel
Advisor: Caroline Padgett (Economics)
Presentation Time: 1:30-2:30

Abstract: Three synthetic techniques have been used to obtain three different series of extended lanthanide structures. These series ranged from extended lanthanide fluorides ($NaLnF_4$) and fluoride carbonates ($NaLn(CO_3)F_2$) to silicates ($K_3LnSi_2O_7$). They were synthesized using mild hydrothermal, flux, and or solid-state reactions. These compounds were characterized with Powder X-Ray diffraction to confirm the existence of the target phase. After confirmation of desired phases, Single-crystal X-ray diffraction was used to determine the unit cell of crystals and its parameters.

*Graduate Student Project

#10 – Florence Flamingos
Student Presenters: Hilary Williams & Austin Boatwright
Advisor: Jody Lipford (Economics)
Presentation Time: 2:30 - 3:30
Abstract: Analysis of how game attendance and days of the week correlate with each other. We broke down how the days of the week affect game attendance for the Florence flamingos. We used a t- test to determine if our hypothesis about weekday vs weekend end attendance was correct.

#11 – HSP101 Dynamics in Arabidopsis thaliana: Stress Memory and Developmental Regulation
Student Presenters: Teil Fuller & Jared Ivey
Advisor: Jeremy Rentsch (Biology)
Presentation Time: 10:30-11:30
Abstract: Arabidopsis thaliana exhibits a dynamic response to heat stress through the regulation of HSP101 (ClpB), a molecular chaperone critical for protein disaggregation and refolding. While the rapid upregulation of HSP101 is well-documented during acute heat stress, we have identified an anomalous late-life cycle spike in HSP101 expression, even in the absence of proximal stress events. To investigate the temporal dynamics of HSP101 regulation, plants were subjected to a heat pretreatment (38C°) followed by exposure to otherwise fatal heat stress (45°C). Preliminary data suggest a pronounced modulation of HSP101 expression over time, with distinct peaks correlating to specific developmental stages and stress conditions. This study aims to further describe the interplay between developmental cues and stress memory in the regulation of HSP101, providing new insights into plant resilience under fluctuating temperatures.

#12 – Burnout Buffer: The Intersection of Evaluation Practices*
Student Presenter: Madison Spring
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30
Abstract: In recent years, after becoming a school psychologist and evaluator, it has become apparent during that time how both veteran school psychologists and evaluators as well as those new to the job and bordering on novice in experience are struggling to stay in the field due to what is frequently termed within the community, professional burnout. Both understanding how to help these colleagues as well as wanting to secure a sense of safety for anyone involved in the field, especially someone unaware at what point in the job they might become burnout themselves.

#13 – Do MLB teams who pay more to player salaries win more games?
Student Presenter: Brennan Smith
Advisor: Caroline Padgett (Economics)
Presentation Time: 12:30-1:30
Abstract: I am trying to find if MLB teams who pay more to player salaries actually win more baseball games and win more championships. In the MLB there are teams that have the ability and do pay far more than other teams, does this affect those team's ability to compete and win championships.

*Graduate Student Project

#14 – Alternative Probability Density Estimators for Navies Bayes Nearest Neighbor Machine Learning Method for Accuracy and Explainability in Wound Image Classification
Student Presenter: Lanorah Hobbs
Advisor: Ivan Dungan (Mathematics)
Presentation Time: 1:30-2:30

Abstract: We investigate classifying the stages of wounds from a dietetic wound imaging dataset with alternative machine learning algorithms to the standard approaches like Convolutional Neural Networks (CNN) and Support Vector Machines (SVM). Although these methods usually classify with high accuracy, we search for more explainable methods for clinician and patient interpretability. One approach previously studied in the literature is using a Bayesian Network model, specifically Naive Bayes Nearest Neighbor (NBNN). The goal of the authors was to make a computationally simple method while being competitive in image classification. We make some alterations to their method by trying alternative estimates of the probabilities in NBNN to improve the model's performance and equally important, its explainability. In particular, we consider K-Nearest Neighbor (KNN) for probability density estimation without using a kernel and then compare their classic NBNN to our approach using k-fold cross-validation. Ultimately, we address whether Bayesian Networks can be competitive in performance but also provide explainable wound imaging predictions.

#15 – Chambers and Crops
Student Presenters: Hujinnan Ren & Chandler Ward
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 2:30-3:30

Abstract: Chamber & Crops is a pixel style game that combines the charm of cozy farming and fishing with the combat-driven aspects of a dungeon crawler in a light sandbox world. Players can enjoy material gathering, farming, and fishing in the Aboveground environment, fight through Dungeon levels, and engage in a horde mode variant of the Dungeon. The game provides both a relaxing and engaging option for the player, taking inspirations from titles like Moonlighter, Enter the Gungeon, Soul Knight, Forager, and Stardew Valley.

#16 – Day by Day: Customizable Task and Event Managing Application
Student Presenter: Timia Mitchell
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 10:30-11:30

Abstract: Day by Day is an application designed to help with managing and keeping up with tasks and events, whether daily, weekly, or monthly. The user can create tasks, assign tasks to created events, and add extra text entries to events that may have passed or are upcoming. The application could be used both professionally and personally. The app is also customizable and can be tailored to the user's desires based on app theme, notification frequency, and deadline indicators.

*Graduate Student Project

#17 – The Impact of a Student's Residence at an International Boarding School on MAP Score Growth*
Student Presenter: JD Lovell
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30

Abstract: This study investigates the effects on individual student Northwest Evaluation Association Measures of Academic Progress (NWEA MAP) score growth in the areas of mathematics, reading, language usage, and science for students that are attending the International Christian Day/Boarding school in Kandern, Germany. The scores attained between the period, Fall/Spring 2021–2025, were analyzed between students that are classified as either day attendees or residential/boarding. The Fall and Spring MAP scores of 570 students were examined based on variables of residency status, study hall participation, and ethnicity classification. Results indicated that day attendees demonstrated greater growth when compared to residential, yet the value yielded no significance ($p<0.005$). Furthermore, demonstrating that both classification of students, day attendees and residential/boarding are determined to have similar rates of growth.

#18 – A Review of Suicide: Risk Factors, Warning Signs, Treatment Approaches (CAMS and C-SSRS), and Prevention*
Student Presenter: Carolyn Haylie Zeigler
Advisor: Anna Caroline Chinnes (Psychology)
Presentation Time: 12:30-1:30

Abstract: Suicide is often defined as an individual using means to end their own life, while suicidal ideation is the thoughts of wanting to commit suicide (Langhinrichsen-Rohling et al., 2009). Risk factors, warning signs, and protective factors are all taken into consideration when determining an individual's likelihood of committing suicide. The Columbia Suicide Severity Rating Scale (C-SSRS) and the Collaborative Assessment and Management of Suicidality (CAMS) are both staples of suicide prevention techniques. Brodsky et al. (2018) identified a 10-step model for suicide treatment and prevention. Each of the areas mentioned will be discussed and presented upon within this extensive literature review project.

#19 – The Relationship Between Healthcare Spending and Life Expectancies in OECD Countries
Student Presenter: Mikaela Norris
Advisor: Caroline Padgett (Economics)
Presentation Time: 1:30-2:30

Abstract: Spending on healthcare is a significant element of national budgets in many nations, especially in more developed ones. The correlation is not so straightforward, though, with socioeconomic factors, geographical location, preventative interventions, and efficiency of the healthcare system all having a major influence on results. Through an examination of statistics for OECD countries, an analysis of inefficiency in high-spender countries, and an uncovering of important drivers outside of fiscal spending, this study will attempt to look further into the life expectancy and healthcare spending relationship.

*Graduate Student Project

#20 – Larval Fish Community in the Great Pee Dee River
Student Presenter: Caroline Lucas
Advisors: Jason Doll & Timothy Shannon (Biology)
Presentation Time: 2:30-3:30

Abstract: Understanding larval fish (ichthyoplankton) dynamics is important to describe community structures, diversity, and to identify population viability. The goal of this project is to describe the ichthyoplankton community in the Great Pee Dee River. This was the first such assessment in this system. Larvae were identified to family using morphological characteristics and DNA barcoding. DNA barcoding includes the alignment and comparison of DNA from specimens for proper identification. This process includes the extraction and PCR amplification of DNA from individual larval fish which will be sequenced. These sequences were compared to already sequenced COI gene from known species using BLAST at NCBI. Ichthyoplankton were sampled a total of 11 days and yielded 399 larvae and eggs. Species sampled include Ictiobus sp., American Shad (*Alosa sapidissima*), Spotted Sucker (*Minytrema melanops*), Shorthead Redhorse (*Moxostoma macrolepidotum*), Common Carp (*Cyprinus carpio*), and the Tessellated Darter (*Etheostoma olmstedi*). Species in the genus *Ictiobus* could not be separated due to the similarities in their COI gene.

#21 – Income's Effect on Education; COVID-19
Student Presenter: JG Garon
Advisor: Caroline Padgett (Economics)
Presentation Time: 10:30-11:30

Abstract: I compared household income alongside education outcomes for 4th and 8th-grade students in the years pre-COVID-19 compared to years post-COVID-19. In doing so, I was able to measure how household income has possibly played a role in these education outcomes. To measure education outcomes, I used NAEP reading and mathematics average test scores for both 4th and 8th-grade cohorts. I evaluated the years 2015, 2017, 2019, and 2022 to provide a broad range of dates across the pandemic timeline.

#22 – Evaluating the Effectiveness of a Structured Support Program - Pre and post comparison*
Student Presenter: Daniela Balan
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30

Abstract: This research project aimed to examine the effectiveness of a structured support program in improving academic performance in the 7th and 8th grade students. A pre and post comparison was conducted by using the Quarter 1 grades in English Language Arts and Mathematics from the 2023–2024 school year and the 2024–2025 school year. Standardized residuals indicate that a significant proportion of students earning an A in 2023-2024 also earned an A in 2024-2025. A significant proportion of the students earning a D in 2024-2025, earned an F in 2023-2024. These findings provide valuable insights into the effectiveness of a structured support program implementation in middle school settings and highlight the potential benefits especially for the at-risk students.

*Graduate Student Project

#23 – Speech Sound Disorders and Socio-pragmatic Deficits in South Carolina Elementary-Aged Children*
Student Presenters: Lindsey Plunkett, Brittany Moore, Leah Stevens, Annabelle Tedder, Michael Frye
Advisor: Rebekah Wada (Speech Language Pathology)
Presentation Time: 12:30-1:30

Abstract: Speech sound disorders (SSDs) are defined as any difficulty in the perception, motor production, or phonological representation of speech sounds (American Speech-Language-Hearing Association, 2024). Children with an SSD have intelligibility levels and speech patterns that may interfere with successful communication when compared to their typically developing peers. Numerous studies have found that if a child has an SSD disorder, they may experience social, emotional, and/or academic interference. This research study will explore the link between SSD and socio-pragmatic deficits in South Carolina elementary-aged children.

#24 – ChordWiz: A Mobile App for Discovering Musical Chords in Real Time
Student Presenter: Jacob Reeder
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 1:30-2:30

Abstract: This application is designed as an educational tool to help musicians learn new chords while experimenting with chordal instruments like the piano or guitar. It utilizes an AI model, specifically a Convolutional Neural Network (CNN), to recognize musical chords in real-time as musicians play. The app also includes an instrument tuner, enabling users to ensure their instrument is tuned and ready for play.

#25 – Evidence-Based Practices and Core Competencies for Mental Health Practitioners Related to Suicide Prevention*
Student Presenter: Kelsey Harris
Advisor: Anna Caroline Chinnes (Psychology)
Presentation Time: 2:30-3:30

Abstract: Suicide prevention remains an important topic within the mental health field due to the growing number of suicides and attempts. It is estimated that each year around 700,000 people die by suicide around the world and more attempt (Cramer et al., 2024). Several theories of therapy have been identified as evidence-based practices for suicide. These include but are not limited to cognitive behavioral therapy, dialectical behavior therapy, group brief cognitive behavioral therapy, and the holistic prevention and intervention model. Additionally, a list of core competencies for practitioners working with clients struggling with suicide have been identified. The goal of this review is to inform future practitioners on strategies for working with suicide as this is a common issue seen in practice.

*Graduate Student Project

#26 – Suicide: A Focus on Prevention Methods, Health, and Mental Health
Student Presenter: Logan Hanna
Advisor: Anna Caroline Chinnes (Psychology)
Presentation Time: 10:30-11:30

Abstract: In the US, one person loses their life due to suicide every 11 minutes; that is about 49,000 people every year, according to the Centers for Disease Control and Prevention (2022). Men are more susceptible to suicide, especially by firearms, with about 80% of suicide victims being males. More prevention is needed to save lives because this is a curable disease. Oftentimes, suicide is like an invisible sickness that has taken a toll on people. However, appointments with medical providers are so fast that a person may not get the help they really need. Major impacts on lessening the effects of suicide can be made by medical personnel asking the necessary questions as a tool to aid in saving lives both medically and mentally.

#27 – The Relationship between Weather and Baseball Attendance
Student Presenters: Z'Nyah Witherspoon, Daniel Miranda, & Rayth Peterson
Advisor: Jody Lipford (Economics)
Presentation Time: 11:30-12:30

Abstract: This presentation explores the impact of weather conditions on attendance at Summer League baseball games, focusing on the Florence Flamingos. Using quantitative analysis, we examine how the heat index influences spectator turnout. Identifying thresholds where weather deters or encourages attendance can help the team develop strategies to mitigate adverse effects. Ultimately, this study provides insights to fan engagement and game-day experiences despite unpredictable summer weather conditions.

#28 – The Gay Liberation Movement from the Black Perspective, 1950s-1970s
Student Presenter: James Parker
Advisor: Erica Johnson (History)
Presentation Time: 12:30-1:30

Abstract: The Stonewall Riots of 1969 is marked a major turning point for Gay Liberation. Groups such as the Mattachine Society latched onto that night as a make or break moment and worked hard to commemorate the event in June 1970. However, those that had the means to commemorate the event and those that actually participated in the event existed in different social spheres, skewing the memory of the event into a White, homosexual perspective rather than a perspective by the participants–Black homosexuals and drag queens. This dynamic between the White and Black homosexual experience shapes the Gay Liberation movement throughout the 1960s and 1970s as one that attempts to break down the barriers between White and Black while still fighting for gay rights. Their friction was well documented in a number of gay and Black newspapers, zines, and magazines circulated via mailing lists and at events. Ultimately, as double minority members, Black homosexuals existed in a world that not only ostracized them from the mainstream, White, heterosexual world, but often times barred them from Black communities as well, making their perspective on Gay Liberation complex and unique to their double minority status.

*Graduate Student Project

#29 – An Overview of Internship Experience with the Utilities Department of Florence, SC
Student Presenter: Stephen Black
Advisor: Jason Doll (Biology)
Presentation Time: 1:30-2:30
Abstract: The process of compliance with environmental codes is an extremely important, often unseen sector of public works in many cities. During this internship I shadowed the Compliance department for the city of Florence and have seen firsthand the processes and procedures that it takes for the operations wherein to be compliant with Construction Site Stormwater Runoff, Fats Oil & Grease (FOG) control, Illicit Discharge management, and Backflow prevention. During this presentation, I plan to explain each of these topics and their processes in further detail accompanied by images that I have taken during my internship experience.

#30 – Crystal Growth of New Transition Metal Borate by Mild Hydrothermal Synthesis
Student Presenters: Patrick Belt & Nilah Whitfield
Advisor: Jennifer Kelley (Chemistry)
Presentation Time: 2:30-3:30
Abstract: Metal borates are promising candidates in the field of new non-linear materials due to the possible polar orientation of BO_3 groups, combined with a good transparency in the ultraviolet region and high polarizability. Transition metal borates are also attractive due to their ferroelectric, electrochemical, optical and magnetic properties. Metal borates commonly grown through flux method, high temperature solid state or supercritical hydrothermal synthesis. Here, we explore a mild hydrothermal synthesis for crystal growth of transition metal borates using boric acid. New transition metal borate $Co_6(H_6B_{24}O_{45})(H_2O)_6 \cdot 2.21H_2O$ was synthesized with the mild hydrothermal technique using KNO_3, $Co(NO_3)_2 \cdot 6H_2O$, and H_3BO_3 as the reactants. Powder x-ray diffraction was used to confirm the purity of the crystalline product, while single crystal x-ray diffraction was used to analyze the structure. UV-visible and infrared spectroscopy, magnetization measurements and thermal analysis were carried out to explore properties.

#31 – The economic impact of tourism during the Olympics
Student Presenter: Ryan Hunter
Advisor: Caroline Padgett (Economics)
Presentation Time: 10:30-11:30
Abstract: In this study, I'll answer the question, "How does the Summer Olympics influence the host country's tourism industry both before, during, and after the event?". I will attempt to answer this question by looking at data from the 2008, 2012, and 2016 Olympic host countries. I plan to use graphs to show the trends between the three events and create a visual representation to support my conclusion. I will be looking at Gross Domestic Product, number of Overseas visitors to host, and total tourism spending.

*Graduate Student Project

#32 – Synthesis of mixed-anion rare earth sulfate fluorides KLnSO4F2
Student Presenters: Nilah Whitfield & Patrick Belt
Advisor: Hans-Conrad zur Loye (USC - Chemistry)
Presentation Time: 11:30-12:30

Abstract: Mild hydrothermal synthesis is commonly employed to produce kinetically stable phases and has been promising for creating numerous complex fluorides. A novel series of mixed-anion rare earth sulfate fluoride KLnSO4F2 (Ln = Eu, Gd, Tb, Ho, and Tm) has been synthesized via the mild hydrothermal route. In this series of reactions, KF and KBF4 serve as the fluorinating agents. All the sulfate fluorides crystallized in the monoclinic system, space group P21/m. The purity of the phases was confirmed using powder X-ray diffraction, while crystal composition and structures were determined using single-crystal X-ray diffraction. The presence of sulfate groups was verified through infrared Spectroscopy. The luminescence of KEuSO4F2 and KTbSO4F2 were investigated under ultraviolet and X-ray excitation for the first time.

#33 – SEC Graduation rates vs football win %
Student Presenter: Evan Platt
Advisor: Caroline Padgett (Economics)
Presentation Time: 12:30-1:30

Abstract: This is a research paper done for my economics class with the purpose of finding out if there is correlation between a school's graduation rate and their football win percentage. I chose to do the SEC due to the good selection of schools that are very football focused with very high academic recognition as well.

#34 – The Impact of Automation on Employment Levels and Wage Distribution in the Service Industry
Student Presenter: Luis Lopez
Advisor: Caroline Padgett (Economics)
Presentation Time: 1:30-2:30

Abstract: This research examines the impact of automation on employment levels and wage distribution in the service industry. With the rise of AI, robotics, and automated systems, labor markets are rapidly evolving, raising concerns about job displacement and income inequality. Using a mixed-method approach, this study analyzes statistical employment and wage trends while interpreting the socioeconomic effects of automation. Key data sources include unionization rates, employment shifts, and wage growth disparities from Germany, Japan, and the U.S. Findings will clarify whether automation primarily displaces low-skill workers, benefits high-skill employees, or leads to overall job creation. The research aims to inform policymakers on the need for retraining programs, wage policies, and labor market regulations to ensure equitable outcomes in an automated economy.

*Graduate Student Project

#35 – Stickier Than Expected: An Optimized Approach to DNA Extraction in Southeastern *Drosera* Species
Student Presenters: Laci Coker & Niklas Plath
Advisor: Jeremy Rentsch (Biology)
Presentation Time: 2:30-3:30

Abstract: Several species of *Drosera*, or sundews, inhabit the wetlands of the southeastern United States. These species rely on botanical carnivory to attain nutrients such as nitrogen, potassium, phosphorus, and other high-quality elements that cannot be found in the poor quality, acidic soils where they normally grow. The chemistry of these species makes isolating high-quality DNA and performing downstream enzymatic applications, such as PCR, quite challenging. To address this, we screen, troubleshoot, and refine several methods of DNA isolation of varying efficacy to create an optimized protocol with a focus on temperate *Drosera* species native to the southeastern United States, such as *D. capillaris* and *D. filiformis*. The ultimate goal of this work is to formulate an optimized approach that consistently and reliably produces a pure, high yield of genomic DNA that can be used for downstream molecular analysis.

#36 – Collecting field data using BEAM Preliminary Construction of Deployable Nodes
Student Presenters: Vien Trieu & Raiz Mohammed
Advisor: Paul Zwiers (Biology)
Presentation Time: 10:30-11:30

Abstract: Remote data recorders are an excellent way to collect data while limiting human interference, and at times or locations where continuous observation is difficult. The BEAM (Biodiversity and Environmental Automated Monitoring) system is comprised of individually deployable, solar-powered nodes, each of which can collect a variety of data using camera modules, high quality sound cards, and terrestrial and aquatic environmental sensors. Nodes are connected wirelessly to a central data acquisition and storage system which acquires data from each node utilizing an automated call/response request. Based on the Raspberry Pi computational platform and running Python, these nodes are inexpensive to produce allowing researchers to blanket a study area, allowing for data to be collected at the micro-habitat level.

#37 – Heggerty-A phonemic awareness evidence-based approach*
Student Presenter: April Lynch
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30

Abstract: My research was based on the Heggerty program. This program was implemented into general education classrooms during the 2023-2024 school year. During the 2024-2025 school year, the school introduced the Heggerty Bridge the Gap program, which is in an intervention program that focus on foundational reading skills. One of the primary focuses is Phonemic Awareness. In my research, I followed five students who were receiving the intervention. The students are given the iReady Diagnostic three times a year. I will compare their overall reading score, as well as growth in the phonological awareness and phonics domain.

*Graduate Student Project

#38 – Suicide Prevention Research in Clinical Counseling: Narrative Crisis Model and Cognitive Behavioral Therapy
Student Presenter: Xavier Stagg
Advisor: Anna Caroline Chinnes (Psychology)
Presentation Time: 12:30-1:30

Abstract: Crisis management interventions provide both the patient and the practitioner with a therapeutic environment that is extremely important. Both the Narrative Crisis Model and Cognitive-Behavioral Therapy for Suicide Prevention have shown effectiveness in preventing suicide and working with the patient to establish trust, empathy, and understanding. This project focuses on providing awareness and educating on the risk factors involved, warning signs, and protective factors. Finally, this paper discusses both the crisis intervention models and examines their overall effectiveness as well as presenting evidence-based research articles that carefully assess both interventions and studies through an advanced literature review.

#39 – Evidence-Based Practices for Suicide Prevention with a Focus on Firearm Safety
Student Presenter: Ruby Ray-Idiaghe
Advisor: Anna Caroline Chinnes (Psychology)
Presentation Time: 1:30-2:30

Abstract: This project focused on suicide prevalence in the US, and how that rate is observed with regard to age, race, and gender. There was a special focus on the role of firearm access in suicide events, and the prevalence of this suicide rate in the United States. Risks and factors that increase the likelihood of committing suicide along with comorbidities associated with suicidal ideation were reviewed in this project. Evidence-based practices for suicide prevention, safety practices for firearm storage, and education for safe gun handling were also emphasized.

#40 – VR Mock Interviews
Student Presenters: Cannon Miles, Prakhar Rampalli, & Jacob McVickers
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 2:30-3:30

Abstract: VR Mock Interviews is a program designed to help students at smaller universities prepare for job interviews. Using virtual reality (VR), VRMI offers a dynamic, 360-degree 3D simulation, where a generative AI-powered interviewer poses real-time, varied questions in response to user speech. A locally-run Large Language Model (LLM) ensures that responses are fast and unique to each user. At the end of each session, a transcript is automatically recorded and emailed, allowing for valuable feedback and reflection. This tool provides an immersive, accessible way for students to practice interviews, with the potential to bridge the gap in career preparation resources for universities with limited funding.

*Graduate Student Project

#41 – The Relationship Between Universal Preschool Funding and Student Test Scores
Student Presenter: Jamison Kirby
Advisor: Caroline Padgett (Economics)
Presentation Time: 10:30-11:30

Abstract: This presentation investigates the relationship between funding for state preschool programs and student test scores in the United States. The relationship between funding for state preschool programs per child and test scores is small, but statistically significant, with larger effects on reading scores than math. The findings show that state funded preschool programs are beneficial as a part of the nation's larger education policy framework.

#42 – Comparison of Tier Two Reading Interventions at an Elementary School*
Student Presenter: Alexandra Frye
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30

Abstract: Public Schools across the US have been implementing Response to Intervention (RTI) or Multi-Tiered Systems of Support (MTSS) frameworks for many years. At the elementary level, intervention can be important for student success and can help identify students that need additional or more intensive support. Reading interventions are important for students that need help building foundational literacy skills, reading fluency, or reading comprehension if they have fallen behind their same-aged peers. Tier two support provides more intensive support than tier one support. Progress monitoring is completed to monitor student progress in all tiers of support. The progress monitoring data for students in tier two intervention were reviewed in an elementary school. For the 2023-2024 school year, the school implemented Voyager Passport for tier two reading intervention. For the 2024-2025 school year, the school implemented the UFLI Foundations reading intervention. Rates of improvement were compared across both interventions.

#43 – Does Investing in Renewable Energy Increase GDP Growth in Countries?
Student Presenter: Tyson Jackson
Advisor: Caroline Padgett (Economics)
Presentation Time: 12:30-1:30

Abstract: Does investing in renewable energy increase GDP growth in countries? This question is important because it could show us how renewable energy can not only help the environment but also help a country's economy. If investing in renewables also helps GDP grow, then it's a win-win situation. This could mean more countries would be willing to take that leap and invest in cleaner sources of energy. It's also important because reducing pollution and toxic waste matters, and if we can do that while also making economies stronger, then that's something worth looking into. Higher GDP often means a better standard of living, more jobs, and just a better economy overall.

*Graduate Student Project

#44 – Atoms-in-Molecules Investigation of the Nature of Bonding in Some Homoleptic Transition Metal Methyl Molecules
Student Presenter: Jacob Reeder
Advisor: D. Allen Clabo (Chemistry)
Presentation Time: 1:30-2:30

Abstract: The nature of the bonding of homoleptic transition metal methyl molecules has been analyzed using the quantum theory of atoms-in-molecules methodology (QTAIM). Methylated post-transition metals, metalloids, and non-metals are also considered for comparison. The nature of M-C bonding is described by the electron density (ρ), Laplacian of the electron density ($\nabla 2\rho$), electron kinetic energy density $K(\rho)$, and delocalization index (DI) at bond critical points. These data suggest that transition, post-transition, and metalloid elements have charge-shift bonding to C, with some exceptions. Clear differences are seen in the bonding of s-block metals, transition metals, and non-metals. This work is ongoing, and additional computational methods, valence bond theory in particular, will be used to confirm the charge-shift nature of some molecules.

#45 – Experimental Determination of Learning Rate Schedule for OOP Perceptron Class
Student Presenter: Tytrez Dixon
Advisor: Daniel Scofield (Mathematics)
Presentation Time: 2:30-3:30

Abstract: A perceptron performs binary classification using a linear decision boundary. It is essentially a neural network with a single neuron. Our goal for this project was to create a program which takes a dataset and draws a linear decision boundary that correctly distinguishes target classes in the dataset. Using OOP (object-oriented programming) in Python, we created a Perceptron class with attributes and functions that represent the characteristics and behavior of the algorithm. We first tested our program on a small, two-dimensional dataset in which there are two linearly separable classes of points. We found that the value of the decay parameter along with the number of epochs played the most significant role in the performance of the program on this small dataset. Using this knowledge, we experiment with different learning rate schedules and describe the algorithm's performance on the Heart Disease dataset from the UCI Machine Learning Repository.

#46 – Analyzing Salary Disparities in The Roles of Gender, Education Level, and Race
Student Presenter: Rasheeda Borrillo
Advisor: Jordan Kirby (Mathematics)
Presentation Time: 10:30-11:30

Abstract: We will discuss previously found research by analyzing persistent data of race, education, gender, and salary, putting particular attention to biases and stereotypes. Finally, we will present current statistics on solutions we could possibly consider on closing this wage gap by discussing the knowledge of current interventions that have affected the change toward this pay gap, including the culture and issues surrounding the importance of closing the pay gap.

*Graduate Student Project

#47 – Water quality of Black Creek
Student Presenter: Emily Buddin
Advisor: Jeff Steinmetz (Biology)
Presentation Time: 11:30-12:30
Abstract: Water quality is crucial for human and environmental well-being. Our study investigates the water quality of Black Creek in Darlington and Florence Counties, SC, a source of recreational activities and ecosystem services. This research is prompted by an article reporting potential 1,4-dioxane contamination into the river. For E. coli, most sites had levels below the daily maximum, but some were over the monthly average. Further sampling will show if any site is consistently high. For organic contaminants, we found no traces of 1,4-dioxane, but we found other contaminants such as undecanone, naphthalene and toluene. The health of local waterways are important, and we hope continued monitoring will ensure Black Creek's health into the future.

#48 – Levels of Preparedness, Confidence, and Support of SLPs in SC in Assessing Bilingual/Multilingual Children from 0-7*
Student Presenters: Tyler Louise Brown, Caroline Robinson, Kristine Griffith-Bell, Emery McCutcheon, & Niki Patel
Advisor: Frances Burns (Speech Language Pathology)
Presentation Time: 12:30-1:30
Abstract: Speech Language Pathologists (SLPs) find assessing bilingual/multilingual children challenging. Research shows that SLPs have low confidence in their ability to assess the language skills of bilingual/bicultural individuals due to a lack of resources including appropriate assessment tools, trained interpreters, and limited exposure to multicultural/multilingual courses or continuing education (Williams & McLeod, 2012). This study examines the correlations between the levels of preparedness, confidence, and support of SLPs in South Carolina in assessing bilingual/multilingual children ages birth to seven. Participants (N=21) were randomly selected to complete the 20-minute survey via a link provided through Facebook, Instagram, and e-mail.

#49 – Bias and Precision of Scales and Dorsal Spines to Age Coastal Striped Bass
Student Presenters: De'Asia Hill & Autumn Morin
Advisor: Jason Doll (Biology)
Presentation Time: 1:30-2:30
Abstract: The age structure of Striped Bass in the GPDR is still uncertain and only known from a small sample size of otoliths. The goal of this project is to determine the accuracy and precision of the scales and dorsal spines to age Striped Bass in the GPDR. In 2022, otoliths and scales were taken from 19 fish, and in 2023-2024, scales and dorsal spines were taken from 77 fish. Each of these structures will be read and aged by three readers, consisting of two experienced and one novice reader. Otoliths will be aged whole, scales will be pressed on acetate slides, and the spines will be sectioned with a low-speed diamond-blade saw and read under a microscope. Accuracy of scales will be assessed by using percent agreement between scales and otoliths (true age) from 2022 samples. Precision of scales and dorsal spines will be assessed by using the coefficient of variation from 2023-2024 samples.

*Graduate Student Project

#50 – Modeling Granular Flow Dynamics Using the Discrete Element Method
Student Presenter: Jeremiah Luke Poston
Advisor: Daniel Brauss (Mathematics)
Presentation Time: 2:30-3:30
Abstract: The Discrete Element Method (DEM) is a numerical technique used to model interactions between discrete particles. DEM simulates the behavior of granular materials by calculating the forces and motions resulting from particle collisions, friction, and cohesion. Newton's second law of motion, combined with force-displacement laws, maintains a crucial role in enabling accurate simulation of particle interactions in DEM. Applications of DEM encompass various fields including civil engineering for simulating soil mechanics, pharmaceuticals for optimizing powder mixing processes, and geophysics for studying natural phenomena like landslides and earthquakes. Building on these diverse applications, this research seeks to enhance the understanding of granular flow dynamics by leveraging DEM to analyze the interactions within granular materials. A series of simulations were conducted by using Python to explore how particle shape, size distribution, and contact properties influence flow behavior.

#51 – Decoder Performance Does Not Predict Memory Advantage For Symmetrical Patterns
Student Presenter: Matthew Behling, Katie Hunter, Kayla Allen, Jaila Davis, Samantha Trammel
Advisor: Jesse Sargent (Psychology)
Presentation Time: 10:30-11:30
Abstract: We hypothesized that same mechanisms play a role in memory advantage for symmetrical patterns. Symmetry perception is associated with ERP or sustained posterior negativity that is thought to be associate with Gestalt's theory.

#52 – The Impact of Collectivism on the Social-Emotional Subtest of the Transdisciplinary Play-Based Assessment- Second Edition (TPBA-2)*
Student Presenter: Stephanie Long
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30
Abstract: School psychologists face challenges in selecting unbiased assessments for multilingual learners (MLLs), as standardized tests often overlook cultural and linguistic diversity. Authentic assessments like the Transdisciplinary Play-Based Assessment-Second Edition (TPBA-2) offer a contextual approach but lack sufficient research on their applicability to MLLs. This study examines whether play-based assessments impact the identification of social-emotional delays in children from collectivist versus individualistic cultures and whether daycare or preschool participation improves socio-emotional readiness for MLLs. Analyzing 149 preschool TPBA-2 social-emotional scores from a South Carolina school district, the study compared individualistic and collectivist ethnic groups while assessing the impact of structured early education. Results revealed significant differences in social-emotional delays between cultural backgrounds, with Black and Asian preschoolers experiencing higher delays than White and Hispanic peers. Future exploration is necessary to ensure equitable and accurate special education placements for diverse preschool populations.

*Graduate Student Project

#53 – A Mysterious Green By-Product: Synthesis and Characterization of Tetraaqua-Bis(Saccharinato) Cobalt (II) Dihydrate
Student Presenters: Patrick Belt, Logan Dowdell, Michael Evers, Jamison Lynch, & Nilah Whitfield
Advisor: Pete Peterson (Chemistry)
Presentation Time: 12:30-1:30
Abstract: The coordination compound Tetraaqua-Bis(Saccharinato) Cobalt (II) Dihydrate, [Co(Sacch)2(H2O)4] • 2H2O, was synthesized by a traditional method employing the sodium salt of saccharin (NaSacch), and it was also synthesized by a nontraditional method starting with the molecular form of saccharin (SacchH). The traditional method produced the desired [Co(Sacch)2(H2O)4] • 2H2O as the only product. The nontraditional method also produced [Co(Sacch)2(H2O)4] • 2H2O as the major product, but it also produced a solid green byproduct as a minor component. This presentation we will report the synthesis and characterization of [Co(Sacch)2(H2O)4] • 2H2O by both methods, and our attempt at identifying the unknown green byproduct.

#54 – Computational Investigations of the phosphine-catalyzed isomerization of enones by a Morita-Baylis-Hillman mechanism
Student Presenter: Logan Dowdell
Advisor: D. Allen Clabo (Chemistry)
Presentation Time: 1:30-2:30
Abstract: The Morita-Baylis-Hillman (MBH) reaction of α,β-unsaturated enals with aldehydes to produce α-hydroxymethyl enals is catalyzed by amines and phosphines. We have extended previous computational investigations of the addition of phosphines and arsines to a variety of α,β-unsaturated carbonyls. We have investigated conformations of the zwitterionic intermediate that leads to E/Z isomerization of the organic substrate. We have surveyed the potential energy surfaces, including intermediates and transition states for the reactions and rotational barriers of the intermediates, at the B3LYP/6-311+G(d,p) level of theory.

#55 – Decreasing the Stigma Around Mental Health
Student Presenter: Makayla Cuthbertson
Advisors: Anna Caroline Chinnes (Psychology) & Julie Mixon (Fine Art)
Presentation Time: 2:30-3:30
Abstract: This presentation dives into the intersection of art and psychology, focusing on how both can work together to decrease the stigma around mental health. The concept of mental health is explored and analyzed through research with the purpose of bringing awareness to identify symptoms and outlets to help individuals who may be struggling. Creative expression will also be examined and how it serves as a therapeutic tool; we explore how art provides a unique platform for individuals to process and communicate their mental health experiences, more specifically visual art, such as photography and painting. Art, when combined with psychological principles, can effectively foster empathy, promote healing, and challenge harmful stereotypes, creating a more supportive environment for mental health conversations. Through this discussion, we aim to demonstrate how art and psychology together can facilitate a broader understanding and acceptance of mental health issues in society.

*Graduate Student Project

#56 – Economic and environmental trade-offs of transitioning to renewable energy in the United States
Student Presenter: Clint Baker
Advisor: Caroline Padgett (Economics)
Presentation Time: 10:30-11:30
Abstract: The transition to renewable energy in the United States provides a challenge in balance of both environmental and economic trade-offs. While renewable energy creates jobs it also has a high initial cost, affects the current fossil fuels industries, and requires government subsidies. It also led to a significant reduction in greenhouse gases and decreased the usage of limited natural resources. It still requires land usage and resource extraction for the renewables. I will examine the trade-offs and go over the long-term implications of economic growth and environmental sustainability in the United States.

#57 – Evaluating the Impact of the UFLI Program on Phonological Awareness Skills*
Student Presenter: Sabrina McNeil
Advisor: Antonio Cooper (School Psychology)
Presentation Time: 11:30-12:30
Abstract: Research shows that phonological awareness is key to the foundations of reading. Phonological awareness skills acquisition is a strong indicator that students will be proficient readers. The purpose of my project is to examine if the implementation of the UFLI program would have a positive effect on the phonological awareness skills of students in primary school grades K-2.

#58 – Effects of Artificial Nails on Bacterial Growth
Student Presenter: Elaina Ponder
Advisor: Ednaliz Rodriguez (Biology)
Presentation Time: 12:30-1:30
Abstract: To determine the effect artificial nail use has on the growth of bacteria, an experiment was conducted on Francis Marion University students. A survey was first conducted to gain an understanding of hygiene of the participants and regularity of artificial nail use. Using a cotton swab, a bacterial sample was collected from the cuticles and nail bed of 20 Francis Marion University students and placed in LB broth for further testing. The bacteria from these samples were then observed for bacterial morphology, form, color, gram stain reaction, and amount of colonies to identify the type of bacteria present. Petri plates with Nutrient agar, MacConkey Agar, and Starch agar were also utilized to aid in the identification of gram negative bacteria based on starch hydrolysis, moisture, and lactose fermentation.

*Graduate Student Project

#59 – Cue-Driven Digestion: Molecular Insights into Prey Recognition in *Dionaea muscipula*
Student Presenter: Niklas Plath
Advisor: Jeremy Rentsch (Biology)
Presentation Time: 1:30-2:30

Abstract: *Dionaea muscipula*, the Venus flytrap, is capable of distinguishing between suitable prey and non-prey within 60 minutes of trap closure, initiating a complex digestive response dependent on mechanical and chemical cues. To investigate the molecular mechanisms underlying this decision-making process, we examined the expression profiles of AKINß, a gene underlying nutrient uptake activity, and Dionin, a gene linked to digestion, under various feeding treatments. Traps were stimulated with four different treatments: falsely-triggered trap (mechanical stimulation only), plastic beads, powdered chitin, and live prey. Using real-time PCR, we quantified gene expression to determine the role of chemical cues in the digestive process. This study aims to provide insight into how the Venus flytrap responds to mechanical and chemical cues and the molecular mechanisms in prey recognition and digestion.

#60 – VR Mock Interviews
Student Presenters: CaloNavo
Advisor: Padmaja Rao (Computer Science)
Presentation Time: 2:30-3:30

Abstract: The main purpose of this project is to create a cross-platform mobile application that assists users in tracking their dietary intake and other health-related information. This includes tracking macronutrient consumption, calorie intake and expenditure, and providing users with reports to track their health and fitness goals. The app will enable users to log their food and water consumption. Additionally, it will incorporate features to calculate and monitor calorie expenditure from physical activity. It will also generate a shopping list with personalized recommendations to help users maintain a balanced diet and achieve their health goals.

#61 – The Effect of Cellular Differentiation on Adeno-Associated Viral Vector Genome Status
Student Presenters: Jacob Reeder & Farouk Chatila
Advisor: Jennifer Lyles (Biology)
Presentation Time: 12:30-1:30

Abstract: *Dionaea muscipula*, the Venus flytrap, is capable of distinguishing between suitable prey and non-prey within 60 minutes of trap closure, initiating a complex digestive response dependent on mechanical and chemical cues. To investigate the molecular mechanisms underlying this decision-making process, we examined the expression profiles of AKINß, a gene underlying nutrient uptake activity, and Dionin, a gene linked to digestion, under various feeding treatments. Traps were stimulated with four different treatments: falsely-triggered trap (mechanical stimulation only), plastic beads, powdered chitin, and live prey. Using real-time PCR, we quantified gene expression to determine the role of chemical cues in the digestive process. This study aims to provide insight into how the Venus flytrap responds to mechanical and chemical cues and the molecular mechanisms in prey recognition and digestion.

*Graduate Student Project

#62 – Step-Level Learning in Manual Assembly: Analyzing Skill Progression and Complexity
Student Presenters: Leigh Detalo, Lydia Hyman, & Zachary Smith
Advisor: Michael Potter (Physics & Engineering)
Presentation Time: 10:30-11:30
Abstract: This study explores how learning rates vary across individual steps in a multi-step assembly task, addressing the gap in understanding step-level learning rather than treating tasks as a whole. As the demand for manual assembly skills continues, understanding skill progression is important in creating methods to develop manual assembly skill. Analyzing skill progression in the individual steps can help identify areas of difficulty in a complete manual assembly. Three participants were recorded completing a five-step assembly task 30 times over two days. Following the learning curve model and analyzing the learning curves of each step separately, results revealed that completion rates varied between steps, with some steps showing faster improvements than others. Since there is a variety of step complexity in the assembly, the difference in completion rates is likely associated with the complexity of the steps. These results demonstrate variability in learning across steps and suggest that certain steps may take longer to learn based on its complexity. Understanding and identifying these difficulties can help improve methods for training manual assembly workers.

#63 – Sickle Cell Disease: Ongoing Efforts Toward Improved Treatment and a Cure
Student Presenters: Jameel Montgomery & Nilah Whitfield
Advisor: Pete Peterson (Chemistry)
Presentation Time: 1:30-2:30
Abstract: Sickle cell disease is a group of inherited blood disorders that is characterized by the formation of sickle shaped red blood cells that reduce the oxygen-carrying capacity of the cells, which results in severe and life-threatening health complications. The disease affects people of African and Asian Indian, and Latin descent in disproportionate percentages compared to the overall world population. This presentation will include background information, genetics, current treatment, testing, and a quest for a cure for this debilitating disease.

*Graduate Student Project