



**A Celebration of Student Scholarship Across Disciplines**

**ABSTRACT BOOK**

**Friday, April 19<sup>th</sup>, 2024**

**10:30 – 3:30 PM**

**Honors Center**

### **#1 – Speech Language Pathologists' Perception of Neuromuscular Electrical Stimulation for Post-Stroke Dysphagia Treatment\***

Student Presenters: Katie S. Rogers, Madison Nabholz, Erin Eulitz, Ansley McElveen, Dayle McEwen, & Chynna McLendon

Advisor: Michele Norman (Speech-Language Pathology)

Presentation Time: 10:30-11:30

Abstract: The “Speech Language Pathologist’s (SLP) Perception of Neuromuscular Electrical Stimulation (NMES) for Post-Stroke Dysphagia Treatment” survey was conducted and aimed to provide insight into South Carolina speech-language pathologists’ experience with NMES when treating dysphagia post-stroke patients. The majority of participants disagree with NMES being a beneficial tool when implemented independently to treat dysphagia post-stroke. When NMES is implemented with other swallowing treatments, the majority of participants agreed that it is beneficial. The majority of participants agreed that NMES should be used on dysphagia post-stroke patients.

### **#2 – Evaluating the Effectiveness of Language Essentials for Teachers of Reading and Spelling (LETRS) Professional Development on Reading Scores of 1st Grade Students\***

Student Presenter: Brandon Kyle Jacobs

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The debate over how to teach children to read has been ongoing for many decades, and diverse research findings and politics have left school districts across the nation puzzled about how to teach children to read. Specifically, the current debate between structured literacy and balanced literacy approaches is prevalent in the field of education. In this study, I will compare first grade classrooms from two elementary schools. Teachers at one of the elementary schools completed the two-year Language Essentials for Teachers of Reading and Spelling (LETRS) professional development training which instructs educators in research-based, structured literacy practices. Teachers at the other elementary school did not participate in the training.

### **#3 – Visualizing the Total Solar Eclipse on 8 April 2024**

Student Presenters: Sydney Isenbarg, Samuel Cathcart, Darren Welter, Nina Tisseyre, Niclas Giessler, & Tyree Davis

Advisor: Jeannette Myers (Physics & Engineering)

Presentation Time: 12:30-1:30

Abstract: We present a visual record of the total solar eclipse on 8 April 2024. These images were acquired using the ZWO SeeStar S50, an Insta360 One X camera, cell phones, and a sun funnel on a 5-inch refracting telescope. The solar images show the changes in the Sun’s appearance during the eclipse event. Additionally, we show images of the environment taken during the event.

#### **#4 – Run the Peedee**

Student Presenters: Angelo Smith & Ronnie Floyd

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 1:30-2:30

Abstract: We created an application that uses a GPS to track and guide users through selected trails for the purpose of physical activity. We used .NET Maui, which is a framework that builds native cross-platform applications. With in .NET Maui, there is a markup language called XAML that defines the user interface. With C# the main functionalities were coded. These functions are how the user is able to select any trail from the list and is prompted to the GPS page which guides the user to the starting point of the trail, along with being guided throughout the trail in its entirety. While on trail, the user's distance, time and speed will all be recorded and saved to the SQL database.

#### **#5 – How Mortgage Rates Affect Housing Demand**

Student Presenter: Jacob Cannon

Advisor: Caroline Padgett (Economics)

Presentation Time: 10:30-11:30

Abstract: This paper aims to show how changes in mortgage rates affect the demand for residential properties. This is accomplished by employing regressions to analyze how shifts in 15 and 30-year fixed-rate mortgages cause both the number of homes sold and dollars of new mortgages to change, as well as what impact (if any) interest rates have on the number of cash buyers in the market. This paper also examines how the Covid-19 pandemic impacted the housing market as a whole. The conclusion made through this research is that there is a significant relationship between mortgage rates and housing demand, however, rates do not tell the entire story.

#### **#6 – Does Lack of Early Childhood Education and Early Interventions Increase Kindergartners Likelihood for Special Education Referrals?\***

Student Presenter: Tara Adams

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: School readiness is much more than children having early literacy and numeracy skills. School readiness encompasses a child's ability to acquire learning-related skills, express thoughts, adapt behaviors to situational demands, control impulsivity, show curiosity, remain concentrated, and be socially competent. Early childhood educational programs play critical roles in children's development and school readiness, especially for those in disadvantaged groups. Psychologists from a rural school district were polled to obtain the number of kindergarten students referred for psychoeducational evaluations. In addition, the psychologists were asked to document if the student participated in an early childhood program or received early intervention services. The results were analyzed for a significance between kindergarten referrals and early childhood/intervention participation. Results show there was very weak or no relationship or statistical difference (0.000) between the number of students referred for psychoeducational evaluations and early childhood educational experiences or interventions.

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### **#7 – How Do Fluctuations in Mortgage Rates Impact the Performance and Returns of Real Estate Investments?**

Student Presenter: Leonel Gonzalez Hernandez

Advisor: Caroline Padgett (Economics)

Presentation Time: 12:30-1:30

Abstract: In this poster I am going to explain how fluctuations in mortgage rates can impact real estate investments, I will be comparing different countries to the United States, using different data from OECD, such as percentages of people within the country that own properties outright or with mortgage, average time of maturity with their mortgages. And when we compare this data from country to country, we will have a conclusion and hopefully we find some correlations with some countries to see if they are using the same tactics and that it is having the same result within their countries, an important factor to take into consideration is the specific situation of some countries and also the laws that we could find from a certain country.

### **#8 – Modeling Hydrogen-Like Defects Using MuSR and Python**

Student Presenter: Samuel Johnson Cathcart

Advisor: Brittany Baker (Physics & Engineering)

Presentation Time: 1:30-2:30

Abstract: Muon Spin Relaxation (MuSR) is an experimental technique which can be used in studying the physicality of Transparent Conducting Oxides (TCOs). TCOs are used in opto-electrical devices such as solar panels and LEDs. Using this technique helps in finding and characterizing hydrogen-like defects within TCOs. Understanding these defects can help in alleviating the defects in efforts to make opto-electrical devices more efficient. In order to analyze MuSR data a program known as WiMDa is utilized. WiMDa, however, is not easily customizable by the user. In order to work towards a more customizable program this project has sought to begin preliminary work on recoding WiMDa in Python to allow for easier customization for the user.

### **#9 – Extended Structure Lanthanide Fluoride/Silicates Prepared Using Different Synthetic Routes**

Student Presenters: Cyrus T. Ingram, Alexander Smith, & Haizley Herndon

Advisor: Jennifer Kelley (Chemistry)

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 ( $\text{NaLnF}_4$ ) and fluoride carbonates ( $\text{NaLn}(\text{CO}_3)\text{F}_2$ ) to silicates ( $\text{K}_3\text{LnSi}_2\text{O}_7$ ). 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.

## **#10 – Migration Matters**

Student Presenter: Juan Caballe

Advisor: Caroline Padgett (Economics)

Presentation Time: 10:30-11:30

Abstract: Migration has always had a huge impact in the United States. For this reason, this project seeks to analyze how legal migration has had a great impact on the states with the highest migration tendency, such as California, New York, Texas, and Florida. Knowing this trend, it seeks to draw conclusions through estimates of illegal migration and how these impacts could vary, focusing on the unemployment rate and gross domestic product (GDP) as key indicators.

## **#11 – Bridges Intervention Curriculum: Correlation to SC Math Standards & Indications of SLD in Math\***

Student Presenter: Hannah Medlin

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: Through my research I have correlated this curriculum with South Carolina's State Math Standards to consider whether it meets state requirements. I have also considered current student evaluation cases completed during the 2023-2024 school year in which students received math intervention using this curriculum. When considering these evaluations, I determined whether the student was eligible for a specific learning disability (SLD) in math according to the South Carolina Standards for Evaluation and Eligibility Determination based on a pattern of strengths and weaknesses within their cognitive and academic profile and/or whether the student was eligible for SLD based on their lack of response to intervention (RTI). If students were found eligible for SLD due to their lack of RTI, I hypothesized that our district may have an over-identification of SLD math students due to Bridges Intervention Curriculum being a remedial-type curriculum/program rather than a true, skill specific research-based intervention targeting the student's deficit/area of need.

## **#12 – Relationship Between Macro Economic Indicators and Stock Market Volatility**

Student Presenter: Tibalt Nguyen

Advisor: Caroline Padgett (Economics)

Presentation Time: 2:30-3:30

Abstract: This research investigates the relationship between macroeconomic indicators, particularly GDP, and stock market volatility, focusing on major indexes such as NASDAQ, the Dow, and the S&P 500. Understanding this relationship is crucial for investors and policymakers to navigate market fluctuations effectively. The study aims to contribute to existing knowledge by uncovering patterns and correlations between these indicators and stock market behavior. Additionally, the analysis tracks market fluctuations until the subsequent GDP release to understand reactions to economic data releases. Results aim to unveil correlations between GDP and major stock indices, providing insights for investment strategies and economic policies. This study lays the groundwork for future research to explore additional factors influencing stock market volatility and refine predictive models in this area.

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### **#13 – Visual Interference with Symmetry in VWM**

Student Presenters: Kayla Allen, Jaila Davis, Katie Hunter, & Samantha Trammel

Advisor: Jesse Sargent (Psychology)

Presentation Time: 12:30-1:30

Abstract: Memory is better for symmetrical than for non symmetrical patterns (the symmetry effect). Here we probed the mechanism of this benefit by comparing the effects of visual and spatial interference tasks. Participants viewed a pattern of squares that was symmetrical or not, then after a brief delay, they had to recall the locations of the squares. We included a secondary visual or spatial MEMORY task during the delay between encoding and retrieval. Compared to spatial or no interference conditions, visual interference reduced the symmetry effect, suggesting the effect accrues in the visual buffer.

### **#14 – The Shape of HSP101 Gene Regulation Over Time in *Arabidopsis thaliana* Subject to Heat Stress**

Student Presenter: Rikhya Ford & Jared Ivey

Advisor: Jeremy Rentsch (Biology)

Presentation Time: 1:30-2:30

Abstract: Studying plant responses and adaptations to heat stress is an important endeavor on a warming planet. HSP101 (ClpB) is a protein involved in protein disaggregation and refolding under heat stress conditions. The upregulation of these genes allows plants to adapt to changing conditions. It would be expensive for the plant to produce these proteins under all conditions, so plants respond more successfully when provided a warm pretreatment prior to otherwise fatal heat stress. Here, we show preliminary data describing how the regulation of HSP101 changes over time in plants exposed to a heat pretreatment followed by otherwise fatal heat exposure.

### **#15 – Impacts of COVID on the Golf Industry**

Student Presenter: Mitchell Vance

Advisor: Caroline Padgett (Economics)

Presentation Time: 10:30-11:30

Abstract: My question is, how did COVID-19 impact the golf industry? I will attempt to answer this question by researching the different aspects that are included in daily operations such as club manufacturing, price changes, supply and demand of items, number of rounds, etc. This question is relevant or important because this game is one of the most played in the entire world and a pandemic could have multiple different effects on how the game can be played or approached. It is important for me too because I am interested to see how different parts of the U.S. or other countries were affected because, though people were out of work, some climates are different than others and that can impact numbers in some way.

### **#16 – Intervention Services as a Predictor of Student Success\***

Student Presenter: Ashley Merritt Floyd

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: My research focuses on the role that intervention can play as a predictor of future student success. The academic progress of thirteen students who were retained in the 2022-2023 school year from Oakland primary school were examined to determine the effectiveness of intervention services. Of these thirteen students, ten are presently receiving intervention services in the 2023-24 school year. Of those ten presently receiving intervention, five received no intervention the previous year. The other five students did receive intervention services the previous year. The focus of this study is on the five students who did receive intervention and the impact it played in their academic progress.

### **#17 – Use of a Nickel Catalyst to Perform an Environmentally Friendly Suzuki Cross Coupling**

Student Presenters: Logan Dowdell, Alexander Smith, & Haizley Herndon

Advisor: Enoch Adogla (Chemistry)

Presentation Time: 12:30-1:30

Abstract: A nickel catalyst was used to perform a Suzuki–Miyaura cross-coupling in tert-amyl alcohol. This reaction usually involves the use of palladium in environmentally unfriendly solvents, but nickel and tert-amyl alcohol do not pose the same risk to the environment as the other catalysts and solvents used in Suzuki-Miyaura reactions. Analysis was performed using H-NMR to ensure the purity of our reaction products. In our reactions, we employed heterocyclic compounds, which are core building blocks of pharmaceutically useful compounds, to establish the utility of our reactions.

### **#18 – Changes in Mortality, Heart Rate, and Gene Expression in *Daphnia Magna* Exposed to Concentrated and Homeopathic *Kalmia Latifolia* Distillates**

Student Presenter: Cody B. Collier

Advisor: Jeremy Rentsch (Biology)

Presentation Time: 1:30-2:30

Abstract: *Kalmia latifolia*, the mountain laurel, contains dangerous diterpene grayanotoxins, which make all parts of the plant toxic. Despite this, homeopathic *Kalmia latifolia* tincture is available for purchase online. Here, we test a concentrated *Kalmia latifolia* tincture produced in the laboratory against a commercially available homeopathic *Kalmia latifolia* tincture. To evaluate outcomes, we treat *Daphnia magna* with these tinctures and evaluate changes to mortality, heart rate, and the differential expression of several genes related to detoxification and stress response. We find that the concentrated *Kalmia latifolia* tincture contains cytotoxic compounds beyond the ethanol solvent alone. This is evidenced by lower heart rates in daphnids 24 hours after treatment, and by the upregulation of Hsp90, a stress response gene, when compared to other treatment types. However, ethanol alone was found to cause higher mortality at both 24 and 48 hours than either *Kalmia*-based tincture. We find relatively little evidence for acute cytotoxicity in daphnids exposed to a concentrated *Kalmia latifolia* tincture.

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### **#19 – Bossy Books**

Student Presenters: BriAnna Carmichael & Campbell Frost

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 2:30-3:30

Abstract: Bossy Books is an accounting application created to help small business owners organize and manage their business in an affordable way. This application consists of a user interface, which allows the user to log in and perform a series of tasks. These tasks include creating invoices, recording customer information, reviewing of expenses, and management of daily activities. This application aims to motivate business owners to maintain and continue to grow their business. Positive daily affirmations are displayed in effort to help improve self-esteem and confidence levels of business owners.

### **#20 – Impact of Active and Passive Screen Time on Early Childhood Language Development\***

Student Presenters: Allison Sutherland, Mary Chandler, Mary Alyce Williams, Emilee Hooper, & Leighton Cuthbert

Advisor: Frances Burns (Speech-Language Pathology)

Presentation Time: 10:30-11:30

Abstract: This study set out to look at the relationships between active and passive screen time and children's language development within the ages of 12 and 30 months. The study defined active screen time as shows that are educational and involve the child cognitively. Passive screen time includes shows that include no educational or cognitive involvement from the screen or child. The study also looked at caregiver's perceptions of screen time, and the impact on their child's language development. Our findings indicated that overall, caregivers perceive screen time to be beneficial to their child's language development. In addition, the study found that in general, more words are learned through active screen time than passive screen time. The results also indicated that as the number of hours of screen time increases, the average number of words spoken and understood decreases.

### **#21 – The Social Emotional Health of Students at the Elementary Level with IEPs: What Resources Do We Have to Support them and What Are Our Next Steps?\***

Student Presenter: Courtney Brian

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: Social-emotional health refers to one's ability to understand their own emotions and be able to manage them in an appropriate manner. Children with disabilities and those suspected of having a disability are at a greater risk for having poor social emotional health currently or in the future. This study looks at a population of children with disabilities or suspected of having a disability and their social-emotional health located in Spartanburg County School District Two. The findings from this study supported my hypothesis that children who fall within this population group are at a higher risk for poor social emotional health. The study's findings also revealed that this population group responds positively towards social-emotional interventions that are implemented with efficacy.

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## **#22 – How Inflation Affects GDP Growth and Unemployment Rates in Industrialized Countries**

Student Presenter: Joshua Bruce Barefoot

Advisor: Caroline Padgett (Economics)

Presentation Time: 2:30-3:30

Abstract: This project seeks to answer how inflation rates affect both GDP growth and unemployment rates within industrialized nations, such as the United States of America, China, Germany, and Japan. I plan to use graphs that show the trends created within each of the four countries I am talking about to be a visual representation of my conclusion. This will be done for each variable I will address. These variables include GDP annual growth percentages, unemployment rates, and inflation rates.

## **#23 – Fluorescence Quenching of Dansyl-Triazole**

Student Presenters: Haizley Herndon, Alexander Smith, Logan Dowdell, & Dani Conti

Advisor: Enoch Adogla (Chemistry)

Presentation Time: 12:30-1:30

Abstract: The synthesis of dansyl-triazole results in a compound that is a fluorescent pH indicator. There exists a noticeable difference in color when added to different pH solutions. A fluorometer was used to demonstrate the quenching effect higher pH values have on the fluorescence of the compound, as higher pH values result in lower fluorescence intensity.

## **#24 – Does Group Counseling Affect 6th Grade Middle School Girls Overall Self-Esteem and Mental Health?\***

Student Presenter: Madisyn Hughes

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: This study investigates the impact of group counseling on the overall self-esteem and mental health of sixth-grade middle school girls. A sample group of 6, sixth-grade girls at a rural middle school participated in group counseling sessions designed to address various aspects of self-esteem. Pre- and post- counseling assessments were conducted using standardized measures to evaluate changes in self-esteem. The results of this study indicate that group counseling had a significant positive effect on the overall self-esteem and mental health of participants. The findings of this study suggest that group counseling can be an effective means of promoting positive psychological well-being among sixth grade middle school girls.

### **#25 – Kicking it with Concussions: A Survey of College-level Athletes' Experience with mTBI\***

Student Presenters: Sydney Scripp, Lindsey Fleming, Savannah Tyler, Kierstin Godfrey, Kaitlyn Clark, & Malaika Kiongo

Advisor: Afua Agyapong (Speech-Language Pathology)

Presentation Time: 10:30-11:30

Abstract: The "Concussions in Soccer" survey sheds light on gender-specific concussion prevalence and the issue of underreporting among collegiate soccer players. This study underscores the importance of integrating concussion knowledge and protocols into clinical practice, particularly in managing post-concussion communication and cognitive-linguistic issues. The findings advocate for an expanded role for speech-language pathologists within concussion treatment teams for college soccer players, facilitating improved management and the development of tailored assessment and intervention approaches. This ensures comprehensive care addressing both communication and cognitive aspects.

### **#26 – i-Ready Phonics Interventions: Do they Work?\***

Student Presenter: Ashley Eller

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The number of students who are reading below grade level continues to rise despite receiving whole-group instruction in the general education classroom. Reading interventions are a critical component of elementary education for students to learn to read and comprehend texts. This study examined the effects of i-Ready reading interventions implemented with first-grade students and compared the results of their beginning-of-the-year phonics domain score to middle-of-the-year phonics domain score on the i-Ready reading diagnostic assessment.

### **#27 – LazyPepper Designs**

Student Presenters: James Allen Moore & Johnathon Keller

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 12:30-1:30

Abstract: The LazyPepper Designs website is an online storefront for a local woodworker to sell his products on. It allows him to store images and details about the items and display them for customers to purchase the desired pieces. If there are no items in stock that fill the need of the customer, they have the ability to make custom orders by filling out a form. This alerts the woodworker and allows him to follow up on additional information. The site also showcases previous events he has attended, as well as favorite items that advertise his craftsmanship. This project was done using Scrum methodology and a UML (Unified Modeling Language) documentation model. The backend was created using a MySQL database and PHP to connect it, while the frontend was HTML, CSS, and JavaScript.

### **#28 – Hannah and Clark Cemetery Excavations**

Student Presenters: Wesley Townsend, Logan Browning, Christian Stevens, Jake Lee, & Red Worthington

Advisor: Christopher Barton (History)

Presentation Time: 1:30-2:30

Abstract: The observation and excavation of Hannah cemetery and Clark cemetery is a deep dive into the awareness of these cemeteries. We then analyze the artifacts from said cemeteries. This will give everyone an overview of how much these cemeteries mean to people and the awareness we must give it.

### **#29 – Mammal Daily Activity at a South Carolina Conservation Property Using R- Package Analysis of Camera Trap Photos**

Student Presenters: Clayton Tiller & Stephanie Wallace

Advisor: Travis Knowles (Biology)

Presentation Time: 2:30-3:30

Abstract: In this study, medium- to large-bodied mammal ( $\geq 200$  g adult body mass) activity patterns were monitored over a period of two months, from October 01 to 30 November 2023 at Southern 8ths Farm in Chesterfield County, SC. Data for all species were collected using Reconyx trail cameras, following protocols established in the Snapshot USA 2023 nationwide mammal survey project. After identifying all mammal species captured, uploading, and tagging the image sequences by species to the Wildlife Insights server, the metadata were downloaded and analyzed using an R package designed to show daily individual species activity on a 24-hour clock. The results were analyzed for species differences, and to test for effects of some environmental factors such as barometric pressure and moon phase. Graphs from the R Code are presented in this poster as an initial survey of the data set. The results allow comparison of different species and species groups, the impact of moon phase and barometric pressure on activity patterns, and other selected patterns we discuss.

### **#30 – Studying the Total Solar Eclipse on 8 April 2024**

Student Presenters: Ryan Johnson, Eli Hellmig, Ian Simpson, Kara Greer, Austin Coleman, Isaac McMillan, & Sabastian Harding

Advisor: Jeanette Myers (Physics & Engineering)

Presentation Time: 10:30-11:30

Abstract: We present data collected during the total solar eclipse on 8 April 2024 through a variety of instrumentation packages. The first is an Eagle Flight Computer from High Altitude Science that provides data on the temperature and pressure changes of the viewing location. A second instrument package contains state-of-the-art sensors, including an ultraviolet light sensor and an array of meteorological sensors. A third is the H3-VR Handy Recorder which records 360° audio of the surrounding wildlife. Finally, a fourth device called a LightSound converts sunlight into an audible sound and will track the changing intensity of the Sun.

### **#31 – Efficacy and Effectiveness of Lexia LETRS Interventions and Supports for Tier 2 and 3 students at Scranton Elementary School\***

Student Presenter: Diana DeCamps

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: This research project investigates the impact of Lexia LETRS (Language Essentials for Teachers of Reading and Spelling) Reading Interventions implementation on Tier 2 and Tier 3 students in an elementary school setting within the Florence School District 3 (FSD3) over two consecutive school years. According to the statistical tests, there was not a statistically significant difference in students referred for evaluation between the academic years 2022-2023 and 2023 -2024 or 2021-2023 and 2023-2024. The statistical tests also showed that there was a significant decrease in the proportion of students progressing with the new intervention compared to the previous academic years. The stability in referral rates suggests that the new intervention did not lead to a noticeable increase or decrease in the number of students being referred for evaluation.

### **#32 – The Guide to Success\***

Student Presenter: Brianna Bradley

Advisor: Minerva Brauss (Mathematics)

Presentation Time: 2:30-3:30

Abstract: Self-efficacy is the intrinsic motivation a person possesses to succeed and can be related to academic achievement such as retention and graduation rates at the post-secondary level. Factors such as gender, race, finances, and first-generation status contribute to the enrollment and retention of college students. A college degree has been shown to benefit people by creating job opportunities. It is important to provide students with the appropriate resources and opportunities to pursue and achieve their goals. Thus, this study will use national data statistics and surveys to determine if a strong sense of self-efficacy contributes to the retention of students by examining factors such as ethnicity/race, first-generation status, gender, and socioeconomic status.

### **#33 – CheckMate**

Student Presenters: Shakira Eaddy & Tyler Ard

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 12:30-1:30

Abstract: CheckMate is a user-friendly task management application created for students and anyone seeking an organized approach to handle their responsibilities. CheckMate enables users to effortlessly organize, prioritize, and track tasks. With features like completion time/date, time required, priority settings and progress tracking, it caters to diverse needs, making it an ideal tool for students or anyone seeking a simple yet powerful task-handling solution. CheckMate empowers users to stay on top of their tasks, making it an essential tool for maintaining workload efficiently.

### **#34 – Effects of Hypoxia on Cancer Cells**

Student Presenter: Grace Trautman

Advisor: Lorianne Turner (Biology)

Presentation Time: 1:30-2:30

Abstract: Cells found in the center of large tumors lack sufficient oxygen to undergo normal metabolism. The upregulation of genes associated with oxygen deprivation results in a change in the cells' metabolic pathways. We hypothesized that the increased expression of stress response factors would make them more resistant to chemotherapy treatments. To examine the effect of hypoxia on the cancer cells' ability to withstand chemotherapy we looked at four different cancer cell lines: breast, cervical, prostate, and adrenal carcinoma. We incubated our samples in hypoxic or normoxic environments, then treated them with one of three chemotherapy agents (Cisplatin, Taxol, or Doxorubicin), and ran a survival assay after 48 hours. We observed that all cell types incubated under hypoxic conditions had a survival advantage when treated with cisplatin, but there was no difference observed when treated with Taxol or Doxorubicin. From these results we can conclude that hypoxia increases resistance of cancer cells to specific concentrations of Cisplatin.

### **#35 – Exploring the Relationship Between Curiosity and Engineering Design Space Exploration**

Student Presenter: Andrew Lance

Advisor: Rahul Renu (Physics & Engineering)

Presentation Time: 10:30-11:30

Abstract: When solving a problem, individuals or a team of engineers must explore a vast set of ideas. This set is referred to as the Design Space and the process of developing the set is called Design Space Exploration (DSE). The objective of this research is to investigate the relationship between DSE and an individual's curiosity. Based on the literature, a matrix relating the five dimensions of curiosity and the four metrics of DSE was developed. Additionally, further research was conducted to create a survey that can serve as a self-reported assessment of DSE. To efficiently explore the correlation between an individual's DSE and their curiosity, the newly constructed survey, along with a survey from the literature addressing the five dimensions of curiosity, will test the hypotheses outlined in the matrix.

### **#36 – The Impact of i-Ready Implementation\***

Student Presenter: Rachael Coker

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: i-Ready utilizes combined high-quality instructional resources to promote student growth through grade-level materials. I-Ready is a Curriculum-Based Measurement (CBM) that offers data-based guidance that contributes to informed educational decision-making. CBM allows educators to assess student success rates in brief or ongoing time periods. Progress monitoring is essential, particularly in the Multi-Tiered Systems of Support (MTSS) framework. CBM progress monitoring is an empirically evidence-based strategy that is valid and reliable in upholding diagnostic accuracy in identifying struggling students and their response to instructional strategies.

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### **#37 – Synthesis of Silver Nanoparticles and their Optical Properties**

Student Presenters: Alexander Smith, Haizley Herndon, Dani Conti, & Logan Dowdell

Advisor: Enoch Adogla (Chemistry)

Presentation Time: 12:30-1:30

Abstract: Nanoparticles are solid particles on the nanometer scale. Their size allows for special interactions with visible light that are not observed in bulk materials. In this study, silver nanoparticles of varying sizes were assembled using several methods, and their wavelength of maximum absorbance was observed. Additionally, for one sample, the molar extinction coefficient was calculated from Beer's Law by varying the concentration and measuring absorbance.

### **#38 – Computational Analysis of the Morita-Baylis-Hillman (MBH) Reaction and Investigation of Transition State Isomerization**

Student Presenter: Logan Dowdell

Advisor: Allen Clabo (Chemistry)

Presentation Time: 1:30-2:30

Abstract: The Morita-Baylis-Hillman (MBH) reaction of  $\alpha,\beta$ -unsaturated carbonyls is catalyzed by amines and phosphines. We used the Gaussian 16 computational chemistry program to extend upon previous computational investigations of the addition of phosphines and arsines to  $\alpha,\beta$ -unsaturated carbonyls. Our goal was to investigate the conformations of the intermediate structures responsible for E/Z isomerization of the organic substrate produced by the reaction. The Patriot super-computing cluster was used with the B3LYP/6-311+G(d,p) level of theory to calculate the reaction and rotational barriers of the reaction.

### **#39 – Similarities and Differences in Mammal Species Diversity for Two FMU Sites**

Student Presenters: Reese Inabinet & Cyrus Ingram

Advisor: Jeff Steinmetz (Biology)

Presentation Time: 2:30-3:30

Abstract: The purpose of this study was to compare and contrast the mammal species diversity between two different ecosystems. One study site is a southern hardwood mixed forest on the Francis Marion University campus. The other, the Francis Marion Ecology Center (FEC), is a more secluded site with hilly topography from an old river bluff that supports a hardwood forest, and the terrain is more similar to that of the Piedmont ecoregion. Two grid replicates were sampled on different dates at each location for three consecutive nights each. Each trap capture was recorded including species, sex, age class and location (GPS). For camera traps, we visually identified each species. Bat species identification was done with Wildlife Acoustics Kaleidoscope Pro software. We discuss possible explanations for the similarities and differences between the mammal populations of these sites, including habitat differences, population cycles, and predation, including the large free-ranging house cat colony on the main FMU campus.

#### **#40 – Sign - Me - In**

Student Presenters: Bhakti Patel & Campbell Frost

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 10:30-11:30

Abstract: The application seeks to optimize the Math Hub's operations at Florence Darlington Technical College by replacing the current Excel-based student sign-in system with a user-friendly interface and quick student search features. Additionally, it introduces a specialized manager's dashboard, offering a comprehensive overview of key metrics like student visits and operational hours.

#### **#41 – How Extrinsic Motivation in Teachers Increases the Work Performance of Their Students in the Classroom\***

Student Presenter: Haley Clark

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The purpose of this study was to how the second-grade teachers at Pate Elementary are extrinsically motivated by positive “staff shout outs” and how they conduct their classrooms as a result. I examined if those who have more positive shout outs from other school staff in the school have better work performance in their classrooms. I only examined the five second grade teachers/classrooms for this project. I conducted this research independently, getting information from these five teachers using a teacher questionnaire and keeping up with the staff shout out board in the teacher work room. I looked at grades, discipline, evaluation referrals, and classroom environment as well to determine all aspects of the teacher and her classroom.

#### **#42 – Development of Experiments for the Environmental Chemistry Laboratory**

Student Presenter: Jacob Edwards

Advisor: Kris Varazo (Chemistry)

Presentation Time: 2:30-3:30

Abstract: This project involves developing a series of experiments for the environmental chemistry laboratory. Experiments chosen include topics based on current environmental chemistry issues, such as the clean-up of chemical spills using metal-organic frameworks, exploring the fate of insecticides as a function of pH in the environment, and determining the presence of microplastics in soil samples. The other set of experiments are based on the instrumental analysis laboratory, utilizing the chemistry department's new gas chromatograph with a flame ionization detector (GC-FID) and new ultra-high performance liquid chromatograph (UHPLC). The cyclodextrin metal-organic frameworks were used to remove methylene blue from solution, which was monitored using UV-visible spectrophotometry. We also used UV-vis spectrophotometry to determine the kinetics of the decomposition of the pesticide carbaryl. The microplastics will be isolated from soil samples and any vegetable matter will be digested using Fenton's reagent. The microplastics will also be stained from Nile red and imaged via microscopy. Chromatography is an important part of quantitative environmental chemistry, and these experiments prepare students for future work in an environmental chemistry laboratory at DHEC or the USDA, which have laboratories in the Pee Dee region.

\*Graduate Student Project

### **#43 – Macroeconomic Indicators & Crime Rates: A County-Level Analysis**

Student Presenter: Luke Godbold

Advisor: Caroline Padgett (Economics)

Presentation Time: 12:30-1:30

Abstract: This research examines the correlation between macroeconomic indicators such as real average annual wage, labor force participation rate, and unemployment rate with crime rates in fifty of the largest counties in the United States. Using data from 2019, including population, labor force, unemployed population, average annual wage, regional price parities, total violent crime, and total property crime, I was able to calculate the labor force participation rate, unemployment rate, real average annual wage, violent crime rate, and property crime rate. Once these figures were calculated, correlation tests were conducted to determine the relationships between these macroeconomic variables. Surprising findings include a positive correlation between labor force participation rate and both violent and property crime rates, and a negative correlation between unemployment rate and property crime rate.

### **#44 – The Impact of an Educational Intervention on Nurses' Comfort with End-of-Life Care and Communication\***

Student Presenter: Tracie M. Jacobs

Advisor: Deborah Hopla (Nursing)

Presentation Time: 1:30-2:30

Abstract: Developing appropriate communication skills is essential for nursing staff and has special significance in the critical care setting. Nurses are the stable presence in critical care as they provide continuity and consistency of care. As grief and loss accumulate over time, this can cause moral injury, compassion fatigue and burnout if unacknowledged. Healthcare professionals have a unique role in providing end-of-life care to patients as well as effectively communicating to family members. A quality improvement project aimed to educate healthcare professionals on assessing their comfort levels with end-of-life care and communication with family members in the acute care setting. This education will identify the important elements of effective communication and discuss the importance of interprofessional communication to effectively offer family and friends a more compassionate transition to grief.

### **#45 – Oreo Smartseal Product**

Student Presenter: Elyanna Bauer

Advisor: Hari Rajagopalan (Business)

Presentation Time: 10:30-11:30

Abstract: My project discusses the supply chain strategy for the production of Sonoco's Oreo Smartseal product in their flexibles division. Using sales data from the past 8 years, I developed two forecasts for what sales for 2023 should be. From those two forecasts I chose to use the one with the least error in developing various aggregate plans. These aggregate plans show how areas of production can be changed (such as workforce, capacity, etc.) to have the most efficient and effective production plan.



#### **#46 – Do Intersession and Remedial Days Positively Impact the State and District Level Test Scores for Elementary Aged Students?\***

Student Presenter: Ferrol Forrester

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The purpose of this study is to examine the impact of intersession and remediation days on the test score results for students (grade level averages) within the elementary setting in Greenwood School District 50. The research questions and corresponding hypotheses are as follows: Will the implementation of the remediation days have an impact on the testing performance of elementary students? In elementary schools implementing the remediation days within intersession, there will be an increase in district MAP and state SC READY testing, as compared to the years prior to implementing the remediation day schedule. Will the implementation of the modified school year intersession schedule have an impact on the testing performance of elementary students? With the implementation of the modified school year intersession days, there will be an increase in district MAP and state SC READY testing, as compared to the years prior to implementing the modified school year schedule.

#### **#47 – A Comparison of LiveSchool Program vs Super Student Program on Behavior\***

Student Presenter: Kristen Chestnut

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The principal investigator is attempting to research which behavior program is more effective, LiveSchool Program or Super Student Program and the investigator plans to determine this by conducting research on the programs and comparing quantitative information from the number of discipline reports reported from PowerSchool during the implementation of these programs as well as analyzing qualitative information obtained through interviews with administration.

#### **#48 – IWoRC in SC: Quantifying Assembly Complexity**

Student Presenters: Kirk Johnson, Nathan Smith, & Jerel Dawkins

Advisor: Rahul Renu (Physics & Engineering)

Presentation Time: 10:30-11:30

Abstract: Despite the maturation of robotics throughout industry, manual assembly operations are predominant. According to a study performed by Kearney, a manufacturing advising and analysis firm, 72% of tasks in factories are performed by humans. Many efforts have been made to categorize complexity in assembly processes. Each of these approaches propose unique approaches to quantifying or otherwise assessing the level of complexity of manual assembly processes, with each using different criteria and assumptions. The absence of a clear solution to objectively assessing complexity creates a need for a simpler approach. The objective of this group's work is to design a more versatile, streamlined approach to quantifying the complexity of a manual assembly. This will define and combine three elements of assembly complexity: product, process, and environment.

### **#49 – An Investigation into Bacteria on Grocery Store Cart Handles**

Student Presenter: Bailey Mitchell

Advisor: Greg Pryor (Biology)

Presentation Time: 12:30-1:30

Abstract: The purpose of this thesis is to compare general bacteria counts, fecal coliforms, and (possibility of) Salmonella on cart handles of 5 local, anonymous stores. Both Salmonella and fecal coliforms can cause foodborne illnesses in humans, and depending on symptoms and severity, lead to death. While numbers of reported cases of foodborne illnesses are relatively low, this is most likely because many people do not report their symptoms. Many cart handles can carry traces of Salmonella or fecal coliforms from customers picking up leaky or poorly packaged meats, eggs, or even vegetables, then touching their cart again. Analysis compared bacteria counts and fecal coliform counts to see if there is any danger of contracting a foodborne illness from cart handles. Analysis also looked at the average household income of the zip codes that each store was located, to determine if there was a correlation.

### **#50 – An Analysis of Water Quality by Evaluating Concentrations of Microcystins and Coliforms in Local Florence Area**

Student Presenter: Emily N. Llewellyn

Advisor: Jeremy Rentsch (Biology)

Presentation Time: 2:30-3:30

Abstract: Water quality is used to describe the condition of water, usually including biological, chemical, and physical qualities of a particular body of water. Disturbances in water quality can lead to a variety of consequences, like the accumulation of microcystins. Microcystin toxins can cause a variety of issues in humans, which include gastrointestinal issues, headaches, liver and kidney damage. These factors have caused HABs to gain attention from scientists. The documentation of the presence of these contaminants has seen an increase over the past decade, as global temperatures continue to rise. This study analyzes three local bodies of freshwater: Goodson Pond, Lee Nursing Building Pond at Francis Marion, and Lynches River county park, to determine if they are at risk of HABs in Florence County.

### **#51 – Evaluating Classroom Presentations' Impact on Mental Health Awareness and Stigma\***

Student Presenter: Hollis Kimbrell Duncan

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: This study investigated the efficacy of classroom-based mental health awareness presentations in enhancing students' knowledge of mental health resources, understanding associated risks and symptoms, and reducing stigma. Conducted in collaboration with NAMI SC, the presentations aimed to educate students across diverse academic levels and included informative sessions and personal narratives from individuals with lived experiences of mental health conditions. Employing a pre-test post-test design, the study administered anonymous surveys to high school students before and after a one-time mental health presentation. Implications for increasing mental health awareness and decreasing stigma are discussed.

\*Graduate Student Project

### **#52 – Is There a Correlation Between Real Median Household Income and High School Graduation Rates?**

Student Presenter: Bailey McGee

Advisor: Caroline Padgett (Economics)

Presentation Time: 2:30-3:30

Abstract: This research paper examines the relationship between real median household income and high school graduation rates in the United States from the academic years 2014-15 to 2019-20. Using publicly available data sources, including census data and education statistics, I conducted a comprehensive analysis to investigate the presumed correlation between these two variables. Contrary to common expectations, my results indicate little to no correlation between real median household income and high school graduation rates during the specified time frame. Despite prevailing beliefs suggesting a positive relationship between household income levels and educational attainment, my findings challenge this assumption.

### **#53 – Does Policy affect CO<sup>2</sup> Emissions?**

Student Presenter: Camryn Cassetori

Advisor: Caroline Padgett (Economics)

Presentation Time: 12:30-1:30

Abstract: Does policy really affect CO<sup>2</sup> emissions? To answer this, I will be conducting a correlation coefficient analysis. A correlation coefficient analysis will show me the statistical relationship between my variables. From this analysis, I will be able to make my conclusions. The variables I will be studying are a country's environmental stringency index (ESI), total CO<sup>2</sup> emissions, and total energy emissions. I will be studying these variables over a 20-year time period: 1999-2019. I will be looking at 5 industrialized countries: The United States, Australia, Japan, Switzerland, and the United Kingdom. My data is from the Organization of Economic Cooperation and Development website.

### **#54 – Elder Economic Security: Has Social Security Been Successful and Will it in the Future?**

Student Presenter: John Stephen Payne

Advisor: Caroline Padgett (Economics)

Presentation Time: 1:30-2:30

Abstract: Most people work for decades to make a living for themselves and their family, but many do not think about how they will survive financially when they retire. Has the Social Security program succeeded in providing elder economic security and can it do so in the future? The study examines poverty levels, determines if elderly beneficiary's income has been above the poverty level, inflation, national demographics, historic and projected Social Security Trust Fund reserves, and program income and costs, and the ratio of workers to beneficiaries. This data provides a complete report of the program's historical results as well as intermediate actuarial projections through the year 2095. Finally, the project addresses issues that federal policymakers will have to address to reform the program, like lifting earnings caps, making more types of (passive) income subject to the tax, increasing tax rates, and at what ages people can take early and full retirement.

**#55 – How Caring for an Autistic Child Affects the Mental Health of Maternal Versus Non-Maternal Primary Caregivers Residing in North Carolina and South Carolina\***

Student Presenters: Courtney Sealey, Macey Shelley, Jenna Cottingham, Breana Ard, Amber McKenzie, Nicole Barber, Clara Dash, & Emilee Dollard

Advisor: Rebekah Wada (Speech-Language Pathology)

Presentation Time: 10:30-11:30

Abstract: Caregivers of autistic children can experience negative aspects of mental health, such as stress, anxiety, depression, and denial. To address this issue, a study focused on how caring for an autistic child in North and South Carolina affects aspects of caregiver mental health was conducted. Results indicated that the majority of both maternal and non-maternal caregivers reported their anxiety, stress, and depression levels increased following their child's diagnosis with autism spectrum disorder (ASD). Caregivers reported the most common reason for increased anxiety and depression was fear of the future. The most common reasons reported for increased stress were financial difficulties and caring for multiple children.

**#56 – How are MTSS, Teacher Understanding of the Evaluation Process, and Actual Referral Percentage Linked?\***

Student Presenter: Ginna Weatherford Campbell

Advisor: Antonio Cooper (School Psychology)

Presentation Time: 11:30-12:30

Abstract: The purpose of this study is to examine, after a diagnostic is complete (iReady), how many students should be considered for tiered interventions from the data collected through the MTSS process. Teachers will be given a list of students that fall one or more grade levels behind, and then decide which if of those students should be included in the tier 2 and 3 process. Then they will be asked how many suspects that the students chosen will meet criteria for a disability therefore qualifying for special education right now? In addition, toward the end of the year, I will measure percentage of students who actually go through the referral process and qualify under an IDEA disability classification.

**#57 – Raising a Helping Hand: Webpages for the South Carolina Cancer Alliance Pediatrics Initiative**

Student Presenters: Ronisha Genwright & J. Alan Wallace

Advisor: Padmaja Rao (Computer Science)

Presentation Time: 12:30-1:30

Abstract: Pediatric cancer patients often face difficulties reintegrating into the education system during or after treatment. Guardians of these children rarely have the information they need to make informed decisions about their child's educational journey. Several resource guides were developed along with the South Carolina Cancer Alliance to ameliorate this problem. These resource guides were then translated to the highly accessible medium of HTML5 web pages with CSS styling, and hosted on the South Carolina Cancer Alliance's main website. In addition, a small, browser-based JavaScript application was developed to allow users to personalize a "Get To Know My Child" flyer.

### **#58 – Forensic Discrimination of EDTA in Dried Bloodstains**

Student Presenters: Haizley Herndon & Anna Howell

Advisor: Jessica McCutcheon (Chemistry)

Presentation Time: 1:30-2:30

Abstract: It is important to be able to discriminate the presence of EDTA in bloodstains found on crime scenes. EDTA is a preservative added to blood that has been stored in vacutainer tubes for some period of time. EDTA prevents the blood from clotting as it normally would. EDTA found in blood stains calls into question the credibility of the crime scene. Due to the amount of evidence on crime scenes often being small, it is also important to develop nondestructive methods for discriminating EDTA doped blood from neat blood.

### **#59 – Does GDP Affect Environment Degradation?**

Student Presenter: Tondi'a Rahneiquah Evans

Advisor: Caroline Padgett (Economics)

Presentation Time: 10:30-11:30

Abstract: My research is based on finding a pattern in which GDP per capita can cause environmental degradation. We look into CO<sup>2</sup> emissions and greenhouse gases to (additionally) find a trend.