

# 14th Annual Undergraduate Research Symposium

*April 5, 2024*



FLORIDA ATLANTIC UNIVERSITY

Undergraduate  
Research and Inquiry



# Welcome

**Welcome to the 14th Annual Undergraduate Research Symposium**, which showcases undergraduate students at FAU who are engaged in research, scholarship and creative activities. Students present their findings through poster or visual and oral or performing arts presentations, and represent all disciplines, all colleges, and all campuses of FAU.

Few activities are as rewarding intellectually as research and inquiry. In addition to the acquisition of invaluable research skills, students learn how knowledge is created and how that knowledge can be overturned with new evidence or new perspectives. Such scholarly activities engage students in working independently, overcoming obstacles, and learning the importance of ethics and personal conduct in the research process.

Again this year we are pleased to offer cash awards for first place oral winners in all categories, thanks to the generous donation of Dr. Eric H. Shaw, Emeritus Professor, College of Business. We are grateful to Dr. Shaw's support of the Undergraduate research initiative and our student scholars.

The Office of Undergraduate Research and Inquiry (OURI) serves as a centralized support office of faculty and students who are engaged in undergraduate research and inquiry across all colleges and campuses. We offer and support university wide programs such as undergraduate research grants, annual undergraduate research symposia, undergraduate research journals, LEARN, prestigious fellowships and scholarships, and the undergraduate research certificate, to name a few.

For more information on how OURI can help you, please visit our website at [www.fau.edu/our\\_i](http://www.fau.edu/our_i).

# Special Thanks To:

Dr. Eric H. Shaw, Emeritus Professor, College of Business  
College of Business  
Council for Scholarship and Inquiry (CSI)  
Division of Research  
Division of Student Affairs  
Faculty Judges  
Faculty Mentors/Advisors  
Graduate and Professional Student Association (GPSA)  
Graduate College  
OURI Faculty Liaisons & Peer Mentors  
Staff and Student Volunteers  
Undergraduate Studies  
University Communications - Marketing and Creative Services  
University Libraries

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# Agenda



FLORIDA ATLANTIC UNIVERSITY

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## Undergraduate Research Symposium Friday April 5th, 2024

Time	Event	Location
8:00 am – 4:00 pm	On-going Registration	Schmidt Family Complex Lobby
8:00 am – 10:00 am	Refreshments available (coffee)	Schmidt Family Complex Hallway
8:30 am – 8:45 am	Welcome Message	SFC 107
8:45 am – 10:00 am	Poster Session I (morning)	Schmidt Family Complex Lobby/Hallway
10:15 am – 11:45 am	Oral Sessions (5 x 8 rooms = 40)	SFC 109, 112, 114, 116, 118, 122, 127
11:45 am – 12:15 pm	Lunch	Schmidt Family Complex Lobby
12:30 pm – 1:30 pm	Keynote Panel: <i>Best Practices in Undergraduate Research Mentoring</i>	SFC 107
1:30 pm – 2:00 pm	<i>Oral Presentation Winners announced by Dr. Eric H. Shaw</i>	SFC 107
2:15 pm – 3:30 pm	Poster Session II (afternoon)	Schmidt Family Complex Lobby/Hallway
3:45 pm – 5:00 pm	Poster Session III (late afternoon)	Schmidt Family Complex Lobby/Hallway

# Lunch Panel

## *Best Practices in Undergraduate Research Mentoring*

Effective mentoring is a cornerstone to the success of faculty mentored undergraduate research experiences. FAU's Office of Undergraduate Research and Inquiry is committed to helping foster healthy and productive mentor and student relationships across campus. Please join us for an interactive discussion on best practices in undergraduate research mentoring. The panel will include faculty and student recipients of the Distinguished Mentor of the Year (DMOY) and Undergraduate Researcher of the Year (UROY) awards.

### **Moderator:**

Dr. Daniel De Lill, Wilkes Honors College, DMOY 2016

### **Panelists:**

Dr. Maré Cudic, College of Science, DMOY 2023

Dr. James VanZwieten, College of Engineering and Computer Science, DMOY 2021

Dr. Monica Escaleras, College of Business, DMOY 2020

Jaimie Yap, College of Arts and Letters, UROY 2022

Lusnel Ferdinand, College of Engineering and Computer Science, UROY 2023

# Awardees

## 2023-24 Distinguished Mentor of the Year

Faculty who serve as model mentors to their undergraduate research students are eligible to receive the Distinguished Mentor of the Year: Excellence in Undergraduate Research and Inquiry award. Each year, one university-wide award will be given based on the undergraduate research engagement in the previous year. The Distinguished Mentor of the Year will be recognized with a \$2,500 award at the annual Honors Convocation.

**Dr. Mahyar Nouri-Shirazi**  
Professor of Immunology  
Charles E. Schmidt College of Medicine

Dr. Nouri-Shirazi is an immunologist with an interest in immunotherapy and vaccines. He has made significant contributions to the field of cancer immunotherapy by designing dendritic cell (DC)-based vaccines for patients with cancer. His lab has also explored the possibility of refining current and future vaccines using Toll-like receptor (TLR) agonists to enhance humoral and cellular immune responses. Currently, Dr. Nouri-Shirazi's research program focuses on enhancing vaccine efficacy by addressing the herd effect and reducing vaccine failure rates, particularly among individuals with compromised immune systems. Recently, his team has developed methodologies to investigate alterations in the quality and quantity of preexisting immunity to childhood vaccinations and new vaccines in immunocompromised individuals, paving the way for tailored vaccination strategies.

Since joining FAU, Dr. Nouri-Shirazi has actively involved undergraduate students in research and inquiry at FAU and played a key role in inspiring undergraduate students to explore the realms of discovery and innovation. By imparting knowledge, guidance, and support, Dr. Nouri-Shirazi has been a catalyst in the success of undergraduate students as they transition to the subsequent phases of their careers. Notably, his undergraduate mentees have received OURI Undergraduate Research grants, OURI-SURF grant, and travel grants. They have also played integral roles in authoring and co-authoring numerous abstracts, publishing papers, and showcasing their research at various local, national, and international conferences, earning many awards, including an NPR radio interview.

Dr. Nouri-Shirazi expresses gratitude to the Office of Undergraduate Research and Inquiry for consistently providing opportunities that empower undergraduate students and faculty mentors to achieve their academic and professional goals.

# 2023-24 Undergraduate Researchers of the Year

Each year the Office of Undergraduate Research and Inquiry (OURI) invites nominations for the Annual Undergraduate Researcher of the Year awards. One student from every college is selected for this award and is recognized at the annual Honors Convocation with an “Undergraduate Research Scholar” stole to wear during their graduation ceremony. These selected students are in good academic standing, have participated in at least two semesters of documented faculty-mentored undergraduate research and inquiry at FAU, and often have presented at multiple conferences and symposia, engaged in additional research activities, and even published their research as an undergraduate!

## The 2023-24 Awardees:

<b>Undergraduate Researcher of the Year</b>	<b>College</b>	<b>Faculty Mentor</b>
August Stone	Dorothy F. Schmidt College of Arts & Letters	Meredith Ellis
Emily Siegelman	College of Business <i>Allen E. Smith Awardee</i>	Neeraj Puro
Alexis Crowder	College of Education	Michael DeDonno
Ayush Gowda	College of Engineering & Computer Science	Daniel Raviv
Camila Rimoldi Ibanez	Harriet L. Wilkes Honors College	Andia Chaves Fonnegra
Adrianna Tran	Charles E. Schmidt College of Medicine	Ceylan Isgor
Asia Starling	Christine E. Lynn College of Nursing	Tarsha Jones
Joseph Swaress	Charles E Schmidt College of Science	Rindy Anderson
Colette Content	College of Social Work and Criminal Justice	Seth Fallik



# Prestigious Fellowships

Florida Atlantic University supports students and recent alumni in pursuing prestigious fellowships, which are nationally competitive, merit-based awards. Prestigious fellowships offer many opportunities to develop and connect your academic and personal interests. They provide funding to help you conduct research, study abroad, pursue public service and social justice work, attend graduate school, and much more. Florida Atlantic's fellowship advisors work with undergraduates, graduates, and recent alumni. We help you determine which opportunities align with your goals and assess your eligibility, and once you identify the right fellowship, we support you through the application process. We are proud to celebrate the following students for being nominated during the 2023-2024 application year.

## 2023-24 Prestigious Fellowship Nominees

### **Fulbright U.S. Student Scholarship**

Marissa Lippinkhof, *Semi-Finalist\**  
Arismendis Altagracia, *Nominee*  
Amalee Badreddine, *Nominee*  
Bethany Champlin, *Nominee*  
Megan Chin Cheong, *Nominee*

### **Goldwater Scholarship**

Natasha Mayorga, *Awardee*  
Cristian Pena, *Awardee*  
Dana Smith, *Awardee*

### **Marshall Scholarship**

Adam Zaidan, *Nominee*

### **Truman Scholarship**

David Baldwin, *Nominee*

### **Udall Scholarship**

David Baldwin, *Nominee\**  
Yashwin Adusumilli, *Nominee\**

*\*Pending national award decision.*

For more information, please visit our website ([www.fau.edu/fellowships](http://www.fau.edu/fellowships)):



For questions, please contact: Jessica Cornely, *Associate Director for Prestigious Fellowships*

Email: [jcornely@fau.edu](mailto:jcornely@fau.edu)

Phone: 561-297-4161

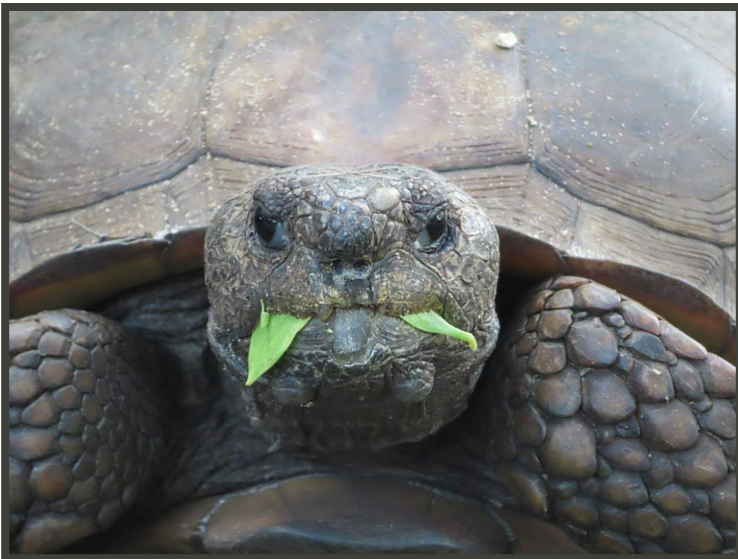
Location: GS-2, Suite 209 F

# Cover Art Statement

*“You Looking at Me?”*

As an environmental management intern for Palm Beach County Parks and Recreation, one of my responsibilities was to document and photograph the various species in county parks. Here is a photograph of a gopher tortoise (*Gopherus polyphemus*) eating its lunch at Waterway Park in Jupiter, Florida. Gopher tortoises are a keystone species and are classified as “Threatened” in Florida. There were a few gopher tortoises present in this park, including a small juvenile, indicating the natural area served as a suitable habitat for the species. Although gopher tortoises are active year-round throughout Florida due to the warm climate, their peak activity outside their burrows runs May through August.

— **Arielle Perry**, BS in Biological Sciences & Physical Sciences, December 2023  
Harriet L. Wilkes Honors College  
Currently pursuing her MS in Environmental Science





FLORIDA ATLANTIC UNIVERSITY

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# Attention Students!

Have you been involved in research or scholarly activities? Share your experience!

## Submit your work to the Undergraduate Research Journal!

The Florida Atlantic Undergraduate Research Journal (**FAURJ**) is a peer-reviewed journal published online annually to:

- **Showcase** high quality undergraduate research
- **Teach** younger students of the standard of research
- **Promote** inquiry-based activities at FAU

Eligibility:

- research conducted by an undergraduate
- research mentored by FAU faculty member
- research compliant, if necessary

For complete information please visit the website:



**Application Deadline: May 31st**  
Questions? Email: [ouri@fau.edu](mailto:ouri@fau.edu)

## Become a Peer Mentor!

### Applicant Eligibility

- Good Academic Standing at FAU
- at least one semester of documented research or scholarly experience

### What's in it for you? You will:

- earn funding to support your scholarly activity
- gain experience in leadership and teamwork
- guide, mentor, and inspire your peers
- expand awareness of undergraduate research at FAU
- plan and host workshops to expand the research culture
- have tons of fun!

For complete information and application process visit:



**Application Deadline: May 31st**  
Questions? Email: [ouri@fau.edu](mailto:ouri@fau.edu)

# Oral Presentations

(10:15 am - 11:30 am)

## *Basic Sciences*

### *Basic Sciences*

#### **Attenuating Oxysterol-Mitigated A $\beta$ -Peptide Aggregation with Cationic Arginine Rich Mimetic Peptides**

By: Seymour Haque, Victor de Paula, and Deguo Du

Faculty Mentor(s): Deguo Du

Presenter(s): **Seymour Haque** and Victor de Paula

Dysregulation of cholesterol homeostasis has been shown to be a key driving factor in the progression of Alzheimer's disease. Cationic-arginine rich peptides (CARPs) with a lipophilic ELK-helical domain are designed to inhibit oxysterol-mediated A $\beta$  aggregation and activate LRP-1 (a lipoprotein receptor known to promote A $\beta$ -efflux), which consequently reduces neurotoxicity of A $\beta$ -peptide aggregates. Computational tools such as HADDOCK are utilized to assess the mimetic's binding affinity to LRP-1 and molecular interactions between CARP mimetics and LRP-1. In vitro studies such as ThT aggregation kinetics, CD spectroscopy, and AFM are used to monitor A $\beta$  aggregation kinetics, fibril formation, and membrane interactions. Preliminary results indicate that CARP mimetics have a distinct effect on A $\beta$ -peptide aggregation and in-silico studies yield key insights into designing novel peptide mimetics. Future research includes testing the mimetic peptides in neuronal cell cultures to further evaluate the efficacy of the designed peptides, offering potential therapeutic insights for Alzheimer's disease.

### *Basic Sciences*

#### **Deciphering the Role of APP O-glycosylation in the Pathogenesis of Alzheimer's Disease**

By: Gustavo Mundim, Nancy Vela, Ramya Ayyalasomayajula, Ivet Boneva, Deepika Regmi, Deguo Du, Dmitriy Minond, and Maré Cudic

Faculty Mentor(s): Maré Cudic

Presenter(s): **Gustavo De Nadai Mundim**

Alzheimer's disease (AD) is one of the most common aging neurodegenerative disorders. New evidence continues to emerge supporting the idea that deficiencies in amyloid-beta precursor protein (APP) trafficking and clearance of amyloid-beta (A-beta) peptides are the initiating events of AD pathogenic processes. To gain a better insight into the role O-glycosylation plays, we synthesized APP (glyco)peptide models with a sequence that includes A-beta-(1-9) at the C-terminal side, bearing the Tyr681 O-GalNAc moiety. Additionally, either IKTEEISEVKM or IKTEEISEVNL (NL=Swedish mutation) is at the N-terminus, thus incorporating beta-(BACE1) and alpha-secretase (ADAM10) cleavage sites near and within the A-beta-40 domain, respectively, bearing the O-glycosylation sites at Ser667 and/or at Thr663. Enzyme activity levels were measured and characterized, conformational analysis was conducted in three relevant solvent systems to evaluate the peptide environment and O-glycosylation-induced conformational changes, and the morphology of the A-beta-40 aggregates formed without or in the presence of APP (glyco)peptides were imaged.

### **Investigating a Polymer-Induced Liquid Precursor Phase in Artificial Strontium Sulfate Mineral Phases**

By: Celina Detwiler Gray, and Vivian Merk

Faculty Mentor(s): Vivian Merk

Presenter(s): **Celina Detwiler Gray**

The process of biomineralization creates biologically relevant structures like shells, exoskeletons, and bones. Biomolecules incorporated into inorganic crystals impact their structure, shape, polymorph, and orientation. Transient precursor phases can occur during biomineralization, characterized by structural disorder before crystallization. Identification of amorphous precursor stages is important to understand crystallization pathways, yet they are understudied in strontium sulfate ( $\text{SrSO}_4$ ) biominerals. We hypothesized that polyanionic biomolecules promote the formation of a polymer-induced liquid precursor (PILP) phase in  $\text{SrSO}_4$ , previously observed in calcium carbonate and calcium phosphate minerals. This in-vitro study investigated biomimetic  $\text{SrSO}_4$  crystallization in the presence of polyanionic polymers, including poly(aspartic acid), poly(glutamic acid) and poly(acrylic acid), using multiscale microscopy and vibrational spectroscopy. Crystals were grown using aqueous solutions of strontium chloride and sodium sulfate by slow co-precipitation with polymers present. We observed rounded crystal shapes under the Scanning Electron Microscope and peak broadening in X-ray Diffraction, indicating an amorphous  $\text{SrSO}_4$  phase.

## ***Health and Medical Sciences***

### **Quantification and Distribution of Leptin Receptor-Expressing Neurons in the Mouse Insular Cortex**

By: Abhishikta Srigiriraju, Zhe Zhao, Skylar Anthony, and Sarah Stern

Faculty Mentor(s): Howard Prentice and Zhe Zhao

Presenter(s): **Abhishikta Srigiriraju**

The insular cortex is a cortical brain region that participates in a diverse range of functions, including gustatory, auditory, and pain processing, and has connections to several other regions, such as the amygdala, thalamus, and sensory cortex. Additionally, leptin is a peptide hormone synthesized by adipocytes that increases the feeling of satiety, or lack of hunger, when bound to its receptor. Our data shows the presence of leptin receptor-expressing (ObRb) neurons in the mouse insular cortex, suggesting that the insular cortex has a function in regulating satiety. Furthermore, digital overlays of Nissl-stained brain slices with fluorescent brain slices, which contained mCherry-expressing ObRb neurons in the insular cortex, were used to quantify the number of ObRb neurons in each layer of the insular cortex across various coronal depths. This quantification will allow for the further study of the layer-specific connectivity insular ObRb neurons have to other brain regions.

*Health & Medical Sciences*

**Prevalence of Pain Phenotypes and Co-morbidities of Chronic Pain in Parkinson's Disease**

By: Hannah A. Thomas, Lisa Goudman, Marisa DiMarzio, Grace Barron, and Julie G. Pilitsis

Faculty Mentor(s): Lea Sacca and Julie Pilitsis

Presenter(s): **Hannah Thomas**

Between 24% to 83% of patients with Parkinson's disease (PD) who see neurologists have reported chronic pain. To better assess this prevalence across all patients with PD, we leveraged a large international database with electronic medical records from over 250 million patients (TriNetX Cambridge, MA, USA). We described demographics, co-morbid conditions and medication differences between patients with PD and without PD who have chronic pain. Extracted data included 4,507 patients with PD and 4,214,982 age-matched control patients without PD. A chronic pain diagnosis was identified in 19.3% of males and 22.8% of females with PD, but only 3.78% and 4.76% respectively in age-matched patients without PD. Significantly more PD patients had received tramadol, oxycodone, and neuropathic agents ( $p < 0.001$ ) than patients without PD. In summary, chronic pain in patients with PD is five times as common as in age-matched controls in general practice settings.

*Health & Medical Sciences*

**Simulating Global Motion of the Brain in Response to Trauma: Differential Biomechanics**

By: Kyle Villalobos

Faculty Mentor(s): Terje Hill

Presenter(s): **Kyle Villalobos**

This research aims to develop a three-dimensional topological model of the brain to simulate concussive movement within the skull in response to applied forces and injurious stimuli. Traumatic brain injuries (TBIs), particularly concussions, pose significant diagnostic challenges; the brain's complex biological dynamics contrast the limitations of current imaging techniques. Leveraging biomechanical methods and ANSYS LS-DYNA software, the project entails creating an anatomically accurate brain model that is manipulated by randomized force vectors, effectively simulating real-world scenarios. Computational analysis of the brain's motion in response to these forces allows the study to focus on identifying regions of concern and predict injury outcomes more accurately. The present study successfully culminates in the development of a robust system of differential equations precisely describing gross brain movement within the skull. Consequently, the validated model, accompanied by comprehensive simulation results and mathematical expressions, definitively enhances TBI diagnosis and treatment planning.

## ***Behavioral, Educational, and Social Sciences***

*Behavioral, Educational & Social Sciences*

### **Examining the Impact of Racial Attitudes on the Public's Support for Reentry Initiatives**

By: Shania Grant

Faculty Mentor(s): Cassandra Atkin-Plunk

Presenter(s): **Shania Grant**

Prior research suggests that views of racial resentment and systemic racism can impact one's support for various reentry initiatives (e.g., housing and employment programs). Approximately 32% of those incarcerated are Black and 24% are Hispanic, highlighting their disproportionate representation in the criminal justice system. Given this and the fact that 95% of people will be released from prison, it is imperative to understand how racial attitudes relate to public opinion of reentry initiatives, which this study seeks to address. This study will present results from opt-in online surveys using a sample of FAU students and a nationally representative sample. Results will be contextualized within the broader public opinion literature examining criminal justice policies, as policymakers and politicians consider public opinion when deciding how to spend public funds.

*Behavioral, Educational & Social Sciences*

### **Analyzing Americans' Priorities within Economic Development and Environmental Protection: Is There a Bias?**

By: Pablo Fabregas Navas

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Pablo Fabregas Navas**

This study aims to gauge an understanding of public perspectives on the prioritization between economic development and environmental protection. Do Americans prioritize either, and if so, do they hold contrasting viewpoints, with a delicate balance potentially existing for an optimal societal outcome? Determined to answer this question, I conducted a multiple-choice survey to a sample of 200 respondents on Amazon MTurk to identify if specific demographics of the American populace would demonstrate statistically significant correlations within their ecological and economic biases. Initially, my theory was that respondents who were either younger, attained higher education, or had higher incomes would lean to prioritize environmental protection more than their counterparts. In part, I was proven correct, but with notable exceptions that unveiled drastic ideological differences between generational gaps, gender, and levels of education within the participants. These findings reflect how personal values, national interests, and societal priorities interact within the American landscape.

*Behavioral, Educational & Social Sciences*

**Robo Replacement: AI in the Workplace**

By: Noah Rapson

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Noah Rapson**

A survey conducted nationwide via Amazon Mechanical Turk gathered 184 responses from Americans aged 18 and above, exploring sentiments towards AI's impact on the job market and preferences regarding AI-related media consumption. Analysis using SPSS revealed a correlation between income levels and fear of AI job displacement, with higher-income individuals exhibiting greater apprehension. Additionally, gender influenced preferences for AI-related media/art consumption, with males showing a higher inclination towards both AI art and media, while females tended to prefer media consumption. These findings suggest that higher-income individuals may perceive greater risk from AI due to potential job displacement, whereas lower-income individuals may feel less threatened. Furthermore, the data implies that for AI companies venturing into entertainment, media production may hold broader appeal among both genders compared to AI art.

*Behavioral, Educational & Social Sciences*

**The Impact of Adventure Therapy on Openness to Treatment and Social Connectivity for Veterans**

By: Alyssa DiGiovanna and Laura Vernon

Faculty Mentor(s): Laura Vernon

Presenter(s): **Alyssa DiGiovanna**

Military culture stigmatizes therapy, decreasing treatment seeking and increasing isolation. Adventure therapy may bypass that stigma. This study tests whether participants in an adventure program will report relatively high treatment seeking willingness and sense of social connection. Participants included 24 veterans from the 2022 and 2023 Huts for Vets programs. Data collection occurred via survey. Preliminary results indicate that after the adventure program, most participants reported they are definitely open to or would seek out traditional one on one therapy (70.8%) and therapies with veteran groups (70.8%), and 95.9% completely or mostly agreed that there are positive ways to address mental health. A majority (70.8%) completely or mostly agreed the program inspired them to connect with more veterans. These findings suggest that adventure therapy may offer benefits regarding openness to therapy and social connectivity for veterans.



**If “Love” is Always the Answer, Then the Answer Must Come from a Space of Love – A Qualitative Study**

**Measuring the Effect of Love on Decision Making**

By: Pasha Niroo and Emerson Lee

Faculty Mentor(s): Laura Vernon

Presenter(s): **Pasha Niroo**

Every day, we navigate through thousands of decisions, some ordinary and some stressful. Research indicates emotions heavily influence decision-making, suggesting heart-centered practices like the Freeze Frame Meditation from the Heart Math Institute can alleviate stress and foster positive choices. This study investigates whether tapping into a space of “love” through a modified Freeze Frame Meditation reduces decision-related stress and enhances emotional well-being. Participants were divided into experimental and control groups, engaging in either the Freeze Frame technique or visualizing a “typical day.” Pre- and post-questionnaires assessed emotional states, perceived stress levels, and the influence of head versus heart responses. Finally, an inner smile meditation concluded both conditions to ensure emotional well-being for all participants. Preliminary data suggests that both approaches were impactful and facilitated emotional well-being, with the experimental (heart-centered) technique proving slightly more effective. This study highlights the potential benefits of heart-centered practices in decision-making and emotional management.

**Timing is Everything: Effects of Temporal Delay of Confidence Judgments in Memory Decision-Making**

By: Isabella Klopukh and Kevin P. Darby

Faculty Mentor(s): Kevin Darby

Presenter(s): **Isabella Klopukh**

Metacognitive confidence judgments are frequently adopted as a measure of certainty in decision-making tasks, but the mechanisms that underly these judgments have been long debated. In this work, we investigate the effect of the timing of confidence judgments in memory decisions by querying confidence immediately after, with a 3-second delay, or in a separate phase within an associative recognition task. An additional control condition did not probe confidence judgments at all to investigate how metacognitive monitoring may influence the memory decision-making process itself. The results indicate changes in memory performance and response times in conditions where confidence judgments were made, as well as a stronger association between confidence and accuracy when confidence was probed following a 3-second delay. We discuss the theoretical and practical implications of these results regarding post-decision processing of metacognitive confidence and the bidirectional relationship between memory and metacognition.

## ***Business, Marketing, Finance and Public Administration***

*Business, Marketing, Finance & Public Administration*

### **Intelligence on Investing**

By: Alexander Georgiev

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Alexander Georgiev**

In recent decades there has been an increase in attention towards investing. It is important for Americans to be knowledgeable about different investing opportunities, thus, this study aims to reveal the different factors that may affect someone's investing choices. It was anticipated that higher educated, younger people would be more likely and comfortable investing and saving for retirement. Using an 18-question survey, this study was sent out to US adult citizens through Amazon Mechanical Turk. Receiving 202 responses the data was then analyzed using SPSS. The findings that younger people are far more confident in investing shows there needs to be a focus on teaching Americans of past generations about investing and financial literacy. Results also showed that there needs to be more of a focus on informing the less educated about the importance of retirement savings, as less educated people reported having less saved for retirement.

*Business, Marketing, Finance & Public Administration*

### **Tailored Temptations: Your Take on Personalized Advertising**

By: Adin Garbowit

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Adin Garbowit**

According to a Think with Google survey, 90% of marketers believe personalized marketing, utilizing personal data for targeted ads, boosts profitability. Understanding consumer views on this is vital. A 14-question survey sampled US consumers over 18 via Amazon Mechanical Turk, yielding 196 responses. Hypotheses suggested older and more educated respondents would be more distrustful of this form of advertising. SPSS analysis of the survey data confirmed these hypotheses. Those over the age of 50 expressed discomfort with personalized ads, and those with a post-grad education or higher preferred to see less personalized advertising. Identifying who embraces personalized advertising aids marketers in tailoring ads effectively.

### **Healthcare Accessibility: Bridging the Gaps Towards Better Health**

By: Vedaant Mutha

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Vedaant Mutha**

Despite significant advancements, healthcare accessibility remains a critical issue in the United States, with disparities that persist across socioeconomic, demographic, and geographic lines. This study utilized the Amazon Mechanical Turk Platform, and a 17-question survey was conducted sampling 198 adults across the United States. The study explores the perceived barriers to care and the impact that income and gender play in healthcare access. Findings reveal that transportation, affordability, and lack of insurance emerged as the most prevalent barriers, with lower-income individuals disproportionately affected by transportation limitations. In addition, women viewed health disparities and prioritized affordability as a barrier, while men highlighted the lack of public health insurance programs. These findings highlight the need for a versatile approach to healthcare access, and policy interventions should focus on expanding access to affordable health care, improving public transportation systems, and implementing gender-sensitive strategies to effectively address the unique healthcare challenges across the USA.

## ***Cross Disciplinary Projects***

### *Cross Disciplinary Projects*

### **The Public Perception of AI Integration in Healthcare: A Survey Study on US Citizens**

By: Pranav Jambulingam

Faculty Mentor(s): Eric Levy

Presenter(s): **Pranav Jambulingam**

From education to entertainment, the integration of AI has had many benefits on how we live our day-to-day lives. Healthcare is a sector in which AI has not had much entry due to its dependency on human-to-human interaction. To analyze US citizens' opinions on the integration of AI in healthcare settings, a 17-question survey was designed and sent to various US citizens on Amazon Mechanical Turk. This resulted in 189 complete surveys. From surgery to radiology, US citizens are hesitant to let AI alone fully control their medical procedures but are open to AI's involvement with human. The less invasive the procedures, the more open people were to AI's involvement. Surprisingly, the older the respondents were, the more open they were to integrating AI into their healthcare. The future of medicine lies within AI, and understanding this data establishes a benchmark to track AI's journey into healthcare.

*Cross Disciplinary Projects***Generational Perspectives in Healthcare**

By: Joaquin Palacios

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Joaquin Palacios**

Quality healthcare is critical to increasing a country's average life expectancy. This study was conducted using a 14-question survey designed to collect data on how U.S. citizens feel about their primary care provider. The survey was distributed through Amazon Mechanical Turk and the resulting data was analyzed using SPSS, based on the demographics of the 198 participants, including race/ethnicity, gender, age, education, income, and political affiliation. Trends in the answer choices based on income found that lower-earning Americans (<\$25,000) feel that their needs are not being understood by their primary care providers, while higher-earning Americans believe the opposite—their primary care provider displays a clear understanding of their needs. This data can be used by healthcare providers and policymakers to emphasize lower-earning communities in the near future.

*Cross Disciplinary Projects***Osteobiography of Skeletal Remains Found in Palike di Mineo, Sicily**

By: August Stone and Meredith Ellis

Faculty Mentor(s): Meredith Ellis

Presenter(s): **August Stone**

This project aims to learn about life in ancient Sicily through the skeletal remains of an adult male found in Palike de Mineo, Sicily. The analysis aimed see evidence of determining factors in the individual's life which impacted the bones. Analysis of the remains showed that the individual was an adult male between the ages of 50-59 years old. The individual also showed extensive bone modification from active use, including osteophytes and wear on the joint surfaces, as well as degenerative joint disease likely linked to heavy labor. The cervical spine showed a likely fracture, causing the fusion of C3+C4 and C5+C6. Through further research the living conditions of individuals living in ancient Sicily can be more clearly understood.

# Engineering

## Engineering

### **Optimizing Thruster Layout on an Underwater ROV**

By: Eoghan McIvor and Isabella Wong

Faculty Mentor(s): James Nance

Presenter(s): **Eoghan McIvor** and Isabella Wong

Underwater Remotely Operated Vehicles (ROVs) are crucial in many industrial applications such as infrastructure maintenance, search and rescue, oceanographic research, and conservation. However, the optimal maneuverability profile for an ROV varies depending on the specific application, and current ROV designs may not always meet these requirements. This project enhances ROV maneuverability by using gradient ascent optimization to iteratively improve thruster directions in 3D Thrust Vectoring (3TV) designs. Additionally, cost-effective printed circuit boards (PCBs) were developed to simplify onboard electronics and power the electronic speed controllers (ESCs) required to drive an ROV's thrusters. We present novel ROV control software that enables efficient control of any thruster configuration as well as a custom ROV equipped with these innovations that displays enhanced maneuverability compared to previous designs, paving the way for future ROVs to better serve specific industrial needs.

## Engineering

### **KaBodali Bridge: The Design of Pedestrian Bridges in Rural Communities**

By: Alejandra Vega, Andrew Gates, Claudia Diaz, Evan Cabrera, and Tyler Owen

Faculty Mentor(s): Frederick Bloetscher and Anthony Abbate

Presenter(s): **Tyler Owen**, Alejandra Vega, Claudia Diaz, Evan Cabrera, and Andrew Gates

Around the globe, natural obstructions block rural community members from accessing essential resources such as education, healthcare, and economic opportunities. While suspended pedestrian bridges are a proven solution for crossing natural barriers such as rivers and ravines, the lack of infrastructure, materials, and equipment in many rural areas complicates the feasibility of such a project. This study focuses on the design and construction of a cable-suspended pedestrian bridge across the Mkhomati River, in the Nkhamba municipality of The Kingdom of eSwatini. Designing a safe and reliable method of crossing the Mkhomati River will enhance the opportunities of 2,500 individuals from five communities. The design and construction plan of the KaBodali Bridge was suited to the characteristics and limitations of the site, incorporating informed assumptions to ensure the safety and longevity of the Bridge. Proven solutions were researched and implemented to design a Pedestrian Bridge that is easily constructable and cost-effective.

*Engineering***Real-World Relative Moving Object Detection Using a 2D Optical Flow-Based Invariant with RAFT**

By: Ayush Gowda

Faculty Mentor(s): Daniel Raviv and Juan Yepes

Presenter(s): **Ayush Gowda**

This project successfully used machine learning methods (RAFT) to create an optical-flow transformation to detect moving objects in a 3D environment relative to a moving vehicle. This capability enables any moving camera such as a camera-equipped vehicle to identify obstacles, thereby preventing collisions. This project builds upon recently discovered algorithms to create a consistent 2D representation of any 3D environment a camera may be moving in. This allows for the detection of moving objects, as those objects will not conform to the expected 2D representation. Additionally, this method eliminates the need for directional knowledge, extensive computational resources, an inertial measurement unit (IMU), and speed or range information, most of which are typically needed. Furthermore, due to its low computational needs, this approach can be performed in real-time, making it practical for wide-spread implementation and immediate use.

*Engineering***Comparative Analysis of Traffic Accidents Between Toll Roads and Highways**

By: Armaan Tulsyani, Johnathan Valdez, Brett Greenberg, Camryn Ferguson, Malachi Brown, Krista Kostallari and Camila Alvarez

Faculty Mentor(s): Valentine Aalo

Presenter(s): **Armaan Tulsyani**, Johnathan Valdez, Brett Greenberg, Camryn Ferguson, and Malachi Brown

This study investigates and compares traffic accidents between toll roads and highways to discern potential safety disparities. Utilizing comprehensive data from various sources, including accident reports, traffic volume, and road characteristics, we analyze incident frequencies, severity, and contributing factors. Our findings reveal nuanced patterns, suggesting that toll roads may exhibit both advantages and disadvantages in terms of safety when juxtaposed with traditional highways. Factors such as traffic density, toll booth configurations, and driver behavior contribute to variations in accident rates. This research sheds light on the complex interplay between toll roads and highways in the realm of traffic safety, offering insights that can inform policy decisions and infrastructure planning for enhanced road safety measures.

*Engineering***Utilization of Carbon for Enhanced Growth of Coral Reefs: A Microfluidic Analysis**

By: Sofia Wiskoff, Camron Smith, Abhishek Ratanpara, and Myeongsub Kim

Faculty Mentor(s): Myeongsub Kim

Presenter(s): **Sofia Wiskoff** and Camron Smith

Motivated by the need to prevent global warming, significant research has been conducted on carbon capture and storage. We propose a new solvent, waste concrete in seawater, for CO<sub>2</sub> capture that could replace freshwater and heavy chemicals at lower costs and be environmentally friendly. This solution exhibits a rise in calcium ions from 270 ppm to about 850 ppm and a dissolution of CO<sub>2</sub> from 1.49g/L to 5.72g/L compared to natural seawater. We used the CO<sub>2</sub>-dissolved concrete-seawater solution to nurture coral reefs, which can store carbon efficiently in their CaCO<sub>3</sub> skeletons, holding about 70–90 million CO<sub>2</sub> tons annually. To examine the feasibility, we tested the time-dependent growth of coral polyps through micropropagation in specially designed micro-reservoirs. With spectroscopic imaging, we observed a calcification process while monitoring pH changes, enabling us to assess the long-term impact of the CO<sub>2</sub>-captured solvent on the ocean environment.

*Engineering***Statistical Study of Accident Severities On and Off Exits and Entries from Interstate Highways I-75: Naples to Lake City and I-95: Ft Lauderdale to Jacksonville**

By: Octavia Cosby, Isabel Ford, Alexandria Machacon, Aiden Prashad, Krista Kostallari and Camila Alvarez

Faculty Mentor(s): Valentine Aalo

Presenter(s): **Octavia Cosby** and Isabel Ford

Highway entrances and exits pose challenges for drivers, requiring attention and skill to navigate lane changes, ramp distance, curvature, and speed adjustments. Variables influence car crash severity, including traffic volume, driver behavior (e.g., speeding, aggressive driving, driving under the influence), design and infrastructure, weather, lighting conditions, and speed limits. Investigating severity of accidents on exits and entrances from I-75: Naples to Lake City and I-95: Ft Lauderdale to Jacksonville will enhance understanding of driver behavior and inform efforts to increase highway safety. This study aims to analyze historical car crash data for driver behavior and associated characteristics contributing to crash severity along heavily traveled highways. Identifying patterns in driver behavior and assessing highway infrastructure related to crashes at entrances and exits aims to offer insights for targeted safety improvements to reduce crash frequency and severity in critical areas.

## ***Environmental, Ecological and Marine Sciences***

*Environmental, Ecological & Marine Sciences*

### **Parentage and Dispersal Capability of a Sponge Bioeroder within Caribbean Reefs**

By: Braden Haggart and Andia Chaves-Fonnegra

Faculty Mentor(s): Andia Chaves Fonnegra

Presenter(s): **Braden Haggart**

The excavating sponge *Cliona delitrix* is one of the most abundant and highly efficient coral bioeroders in Caribbean reefs. As sea temperatures rise, this species has increased its abundance. To better understand its population expansion, we investigated the dispersal capabilities by estimating parentage and kinship of sponge individuals at the reef scale. Tissue samples were obtained from three Caribbean coral reefs and amplified for 10 polymorphic microsatellite loci. The parentage analysis was conducted using COLONY, CERVUS, and ML-RELATE, and the results were correlated with distance between individuals. We have detected unanticipated levels of clonality (6 – 14% per reef), high levels of kinship (1 – 15 siblings per reef), and presence of parents within reefs (0 – 32% of individuals per reef). The results of this analysis can help inform coral transplantation projects to avoid *C. delitrix* attachment.

*Environmental, Ecological & Marine Sciences*

### **Disease Progression in High and Low Microbial Abundance Sponges**

By: Kayla Filjon, Christopher Spagnolia, and Andia Chaves-Fonnegra

Faculty Mentor(s): Andia Chaves Fonnegra

Presenter(s): **Kayla Filjon**

Though many reef ecosystems rely heavily on sponges for ecological functions due to extreme coral loss, little is known about how these sponge populations may be threatened. This project aimed to evaluate the responses of different sponges found abundantly on Florida coral reefs to one such threat- a disease termed “white veil disease.” Individuals of high and low microbial abundance sponges were collected from Broward reefs and exposed to higher temperatures, teasing out white veil disease in one individual. All individuals were fragmented and divided into six tanks, and the progression of the disease was tracked within each fragment and throughout each tank. Changes in the microbiome in each sponge were also tracked throughout the duration of the observational trial. By understanding how this disease may affect hardy sponges, we can predict their resilience and how they may respond to areas of high stress where corals have declined.



**Observable Structures in the Nanotomography of Mineralized Cartilage in Various Shark Vertebrae**

By: Ani Briggs, Dawn Raja Somu, and Vivian Merk  
Faculty Mentor(s): Vivian Merk and Dawn Raja Somu  
Presenter(s): **Ani Briggs**

In this study, we examine nanoscopic structures of shark vertebral cartilage using synchrotron X-ray nanotomography through deep-learning image segmentation. Notably, shark vertebrae consist of three core structures, the outer, heavily mineralized corpus calcareum; the mineralized ridges that bridge the center of the vertebrae called intermedialia; and the unmineralized regions in between. At the macroscopic level, there are distinct differences in the structure and arrangement of the intermedialia, where fast-swimming mackerel sharks have mineralized lamellae, while more docile sharks show block-like mineralized centra. By visualizing samples smaller than the breadth of a hair, about 100µm across, we investigate mineralization patterns at the nanoscopic level. Our analysis demonstrates profound structural differences between corpus calcareum and intermedialia. We further compare intravertebral structures in multiple shark species, e.g. Blacktip, Blue, Blacknose, and Nurse shark. Preliminary results demonstrate that Blacktip intermedialia are characterized by a web-like structure, while Nurse intermedialia are almost completely solid.

**Wedges Have Edges: Phylogenetic Relationships in Vertebral Morphology of Carcharhiniform Sharks**

By: Emma Pawlik, Jamie Knaub, Monique Oliveira, Marcus Alert, Sonoma Arnaldy, Michelle Passerotti, Lisa Natanson, Tricia Meredith, and Marianne Porter  
Faculty Mentor(s): Marianne Porter  
Presenter(s): **Emma Pawlik**

Carcharhiniform sharks, order Carcharhiniiformes, comprise the largest order of sharks with over 270 morphologically diverse species. Previous studies have documented variation in the vertebral morphology across carcharhiniform species, including the shape and size of the mineralized double cone structure. However, it is unclear if the vertebral variation observed reflects the ecological diversity of carcharhiniform sharks. Here, we explored carcharhiniform vertebral morphology in a phylogenetic context, and expected that vertebral morphology would follow phylogenetic relatedness. We analyzed computed tomography (CT) scans of vertebrae from five genera (*Carcharhinus*, *Negaprion*, *Prionace*, *Rhizoprionodon*, and *Sphyrna*) encompassing 16 species of sharks. We measured mineralized wedges of each vertebra in the transverse (dorsal, ventral, and lateral wedge angles) and sagittal plane (double cone and intermedialia angles). Our findings indicate phylogeny may not be a strong factor influencing carcharhiniform vertebral morphology, but rather a more functional basis, like swimming or feeding style, may drive variation.

*Environmental, Ecological & Marine Sciences*

**Exploring Nesting Behaviors of the Gopher Tortoise at the FAU Preserve**

By: Martha Torres, Bailey McCormack, Lauren Gapczynski, and Evelyn Frazier

Faculty Mentor(s): Evelyn Frazier

Presenter(s): **Martha Torres** and Bailey McCormack

Gopher tortoises are a keystone species that provides resources for over 360 species. Throughout most of its range, they reproduce during the spring (May-July). While in South Florida, documentation suggests they reproduce year-round. We studied tortoises at the FAU Preserve to determine their reproductive season. After surveying burrows and determining sex of the tortoises, 3 cameras were placed in front of burrows housing female tortoises. From June to August, 5% of the videos collected captured an animal species. Camera 3 was the most active with 351 videos of gopher tortoises and 14 showed reproductive behavior. Camera 1 only captured 121 videos of gopher tortoises; however, it captured the greatest amount of reproductive behavior with 35 videos. The most activity was caught in September. August showed a greater amount of mating behavior. We have seen mating behavior such as head bobbing and an unidentified egg in one of the burrows.

***Music, Art, Literature, Theater, History and Philosophy I***

*Music, Art, Literature, Theater, History & Philosophy I*

**Giving Our Kids Goosebumps: How Popular Children's Horror Shows Us the Value of Scary Stories**

By: Ren Shamburger

Faculty Mentor(s): Timothy Miller

Presenter(s): **Ren Shamburger**

Horror is one of the most contentious genres in children's literature. For decades parents have tried to get these books taken off the shelves of school libraries, complaining that they are too gruesome and frightening for young kids to handle. Yet despite being among the most challenged books of the past three decades, both *Goosebumps* by R. L. Stine and *Scary Stories to Tell in the Dark* by Alvin Schwartz remain some of the most popular book series for middle grade readers. In this paper I examine why these two series are so enticing to kids, as well as the ways in which they, and other examples of children's horror, can actually be beneficial rather than harmful for young readers.

*Music, Art, Literature, Theater, History & Philosophy I*

**“Something to Care For”: Empathetic Gameplay and Representations of Trauma in Baldur’s Gate 3**

By: Arwen Paredes

Faculty Mentor(s): Timothy Miller

Presenter(s): **Arwen Paredes**

Online gaming communities are often thought to be spaces of toxicity, discrimination, and harassment due to the anonymity and depersonalization that the internet provides. However, RPGs (role-playing games) have evolved over time to center humanization and prioritize moral elements in the game design process. Similarly, engagement in TTRPGS (table-top roleplaying games) like Dungeons & Dragons has been shown to have potential applications in teaching morals and promoting community-building. This project provides a textual and ludonarrative analysis of Baldur’s Gate 3 to demonstrate how elements from TTRPG tradition can be applied to a digital environment to effectively incentivize empathetic gameplay and reduce moral disengagement in online spaces. It studies the intersections of player responsibility, affective materiality, and representations of trauma within the game, along with its psychological impact on players and the establishment of parasocial relationships.

*Music, Art, Literature, Theater, History & Philosophy I*

**Comparative Analysis on Which Challenger of H.P. Lovecraft and Author of Speculative Fiction Was Most in Their Work Effective: Victor Lavalle, Matt Ruff, or Misha Green?**

By: Idrissa Dial

Faculty Mentor(s): Regis Fox

Presenter(s): **Idrissa Dial**

What does Victor LaVelle, author of the novella *The Ballad of Black Tom*, Matt Ruff, author of the novel *Lovecraft Country*, and Misha Green, TV showrunner/executive producer of the show *Lovecraft Country*, all have in common? All three writers and creatives made an attempt to challenge H.P. Lovecraft’s ignorant and problematic racist ways, while also reclaiming the genre of science fiction for marginalized groups. This was accomplished through the means of using speculative fiction and black horror as a genre, that I believe all three creatives used in order to each tell their perspective stories. However, I have found that Misha Green successfully challenged H.P. Lovecraft and executed speculative fiction more effectively than Victor LaVelle and Matt Ruff ever did. This resulted in providing proper representation for black people and other marginalized groups in the media, while also stirring new conversations surrounding race and prejudice in America.

*Music, Art, Literature, Theater, History & Philosophy I*

**Reading “Brave New World” as a Religious Satire**

By: Leslie Chacon

Faculty Mentor(s): Regis Fox

Presenter(s): **Leslie Rose Chacon**

Aldous Huxley’s novel *Brave New World* is known for its startling predictions on modern science, as well as how it acts as a warning on the current progress of society. It is a novel that has been studied through the lens of Marx and eugenics, yet it can also be understood through the lens of religion and satire. *Brave New World* acts as a biblical allegory that tells a satirical narrative of a modern-day Jesus and his failure to bring the World State to salvation. By looking at Huxley’s own philosophies and comparing his novel to the Bible and its tropes, this essay argues that reading Huxley as a satirical religious allegory comments on the downward internal progress of society. Understanding Huxley’s writing through this lens of social critique expands our understanding of social behaviors and the importance of individual thoughts.

*Music, Art, Literature, Theater, History & Philosophy I*

**Sonic Futures: Janelle Monáe’s Afrofuturistic Soundscapes of Queer Liberation**

By: Dakota Darwin

Faculty Mentor(s): Regis Fox and Karina Vado

Presenter(s): **Dakota Darwin**

Scholarship on Afrofuturism has generally focused on its exploration of Black identity, technology, and liberation. However, there is a growing recognition of the need to expand Afrofuturist discourse to include discussions on queerness and sexuality within the genre. This expansion seeks to address the often neglected experiences and perspectives of Black queer individuals within Afrofuturism through Janelle Monáe’s work, which has been recognized and celebrated for its intersectional exploration of queerness, Blackness, and Afrofuturistic settings. I will examine how her exploration of Afrofuturistic realities creates spaces of empowerment, freedom, and resistance for Black women and femmes intersections of identity, thereby redefining and expanding the discourse on queerness in contemporary society. My research actively unveils Afrofuturistic realities that challenge norms, foster empowerment, and serve as a resonant force for social change.

*Music, Art, Literature, Theater, History & Philosophy I*

**The Fantasy: Harry Potter and the Morals of Christianity**

By: Pamela Smith

Faculty Mentor(s): Regis Fox

Presenter(s): **Pamela Smith**

Is there Christianity in fantasy? Are children at risk of being negatively influenced? In terms of J.K. Rowling's Harry Potter series, there has been debate on this issue, resulting in challenges and a successful book ban. The real question is, does the series have a Christian undertone or is it satanic in nature? Looking at the role fantasy plays in society, from its origins to its role in the series, this project focuses on three core Christian morals (the concepts of choice, humility, and sacrifice) that are shown within the series, specifically in my primary sources Goblet of Fire and Order of the Phoenix, as opposed to the normally addressed Sorcerer's Stone and Deathly Hallows. This provides a fresh perspective to an already much talked about subject while simultaneously arguing that Christianity and fantasy do not have to be mutually exclusive and can coexist with each other.

***Music, Art, Literature, Theater, History and Philosophy II***

*Music, Art, Literature, Theater, History & Philosophy II*

**The Problematic Consistency of Labor Estrangement and Structural Inequalities within Dystopian Literary Fiction**

By: Sara Pierson

Faculty Mentor(s): Stacey Balkan

Presenter(s): **Sara Pierson**

Energy infrastructure plays a vital role in our society. It encompasses the roads, cables, and pipes that run underground, but how do these objects interact with the laborers upon whom they rely on to keep such services intact? In examining two dystopian literary texts, I analyze how elements of physical infrastructure divide and alienate the laborer from themselves, the energy they produce, and the rest of society. *The Time Machine* (by HG Wells), and the film *Sleep Dealer* (by Alex Rivera) are from radically different times in US history, yet each addresses the problematic political climate surrounding the energy worker. I address troubling and isolating properties of energy infrastructure in these dystopian worlds, and how the worker becomes invisible as a result. Drawing on the work of Ashley Dawson, I reveal how energy transitions affect both the worker and the society in which they occur by juxtaposing these two texts.

*Music, Art, Literature, Theater, History & Philosophy II*

**Healing Their Outlook: Female Nurses and Soldiers' Morale During the Civil War**

By: Sadie Shank

Faculty Mentor(s): Evan Bennett

Presenter(s): **Sadie Shank**

During the Civil War, female nurses were present throughout the battlefields and hospitals. History books continuously mention these nurses, but they focus primarily on the effect they had on a soldier's physical well-being. However, female nurses also greatly impacted a soldier's mental status - their morale. Unlike surgeons and doctors, nurses were able to provide individual attention to the soldiers. In addition to their many other responsibilities, this diverse group of women dedicated more time to each soldier, made personal connections with the wounded, and wrote letters to the soldiers' loved ones on their behalf. This presentation explores the many ways in which female nurses bolstered soldiers' mental resilience, and argues for their indispensable role not only in tending to soldiers' physical wounds but also in protecting their mental wellbeing during one of the nation's most turbulent periods.

*Music, Art, Literature, Theater, History & Philosophy II*

**Ukrainian Resistance During World War II: Ukrainian Insurgent Army (UPA) [Український Опір Під Час**

**Другої Світової Війни: Українська Повстанська Армія (УПА)]**

By: Stefan Tsapenko

Faculty Mentor(s): Douglas McGetchin

Presenter(s): **Stefan Tsapenko**

During and following WW2, the Soviet and later Russian Federation enforced the narrative that Ukrainians fighting in the war against the Soviets were Nazis. Using my proficiency in the Ukrainian and Russian languages, I have conducted research regarding Ukrainian participation in WW2 and concluded that this narrative is largely anti-Ukrainian propaganda. My research focused on the Ukrainian Insurgent Army (UPA) which was formed in 1942 by the Organization of Ukrainian Nationalists (OUN) as a militant wing. The OUN was the center of Ukrainian nationalism from 1929 and strove for an independent Ukrainian state. Russian regimes repressed Ukrainian nationalism causing them to turn to the Reich who promised statehood. After Ukrainians proclaimed independence in 1941, the Nazis jailed leaders and massacred civilians. My research proved that the UPA fought the Nazis between 1942-1945 and the Soviets between 1939-1960. The UPA fought for an independent Ukrainian state in WW2, not for Nazism.

*Music, Art, Literature, Theater, History & Philosophy II*

**The Encroachment and Effects of the Postfeminist Sensibility on the Popular Romance Genre**

By: Sasha Switz

Faculty Mentor(s): Taryne Taylor

Presenter(s): **Sasha Switz**

The popular romance genre, while historically seen as a category of fiction promoting anti-feminist rhetoric and ideology, has now claimed a more feminist turn in the content it is producing. However, much of its feminist sentiment is surface-level, not promoting any actual productive feminist doctrine. I argue that the works in the popular romance genre commonly thought of as feminist instead suffer from a postfeminist sensibility, not contributing to actual feminist dialogue and instead forwarding regressive ideas of gender. I will demonstrate this by analyzing two texts, “The Love Hypothesis” by Ali Hazelwood and “Icebreaker” by Hannah Grace, through Judith Butler’s theory of gender as performance.

*Music, Art, Literature, Theater, History & Philosophy II*

**The Civil Rights Movement as a Case Study of Cold War Ideological Suppression**

By: Kris Barrios

Faculty Mentor(s): Eyal Weinberg

Presenter(s): **Kris Barrios**

Although the Civil Rights Movement and the Cold War are subjects in history that are often taught in isolation from one another, my paper argues that they are fundamentally intertwined. More specifically, my research shows that the ideological warfare between the United States and the Soviet Union was a catalyst for the U.S. government’s suppression of the Civil Rights Movement. Furthermore, my research illustrates that the censorship of public discourse on matters of race occurred not at the hands of fringe extremists, but at the command of government officials. I conclude that it was under the guise of American patriotism that these officials led a campaign against Civil Rights activists, relegating any who challenged the status quo to the category of communist.

# Poster Presentations

## Poster Session I - Morning

(8:45 am - 10:00 am)

*Poster - Session I*

*Health & Medical Sciences*

### **1. The Effects of Sodium Butyrate and Calcitriol on the Growth of Endometrial Cells**

By: Sadine Al-Farauki, Nagham Abdalghani, Kashmala Swati, Afeez Adejola, Teddy Manrique and James Hartmann

Faculty Mentor(s): James Hartmann

Presenter(s): **Sadine Al-Farauki**, Nagham Abdalghani, Kashmala Swati, and Teddy Manrique

Endometriosis is a disease that affects approximately 10% of women and is characterized by pain in the lower abdomen, heavy and painful menstruation, and infertility. The endometrial cells naturally found in the uterus become lesion-like, grow like cancer, and attach to the peritoneal cavity along various organs such as the ovaries, fallopian tubes, and the outside of the uterus. We aimed to find a means to reduce lesions and stop the spread of a painful, debilitating disease using different concentrations of sodium butyrate and calcitriol, as the mixture has not been previously studied on endometriosis. We produced and confirmed novel results as the concentrations of 0.5 micromolar butyrate and 0.5 micromolar calcitriol worked efficiently together to cause 12z endometrial cell death. This is due to the compounds inhibiting the invasion and proliferation of ectopic and eutopic endometrial stromal cells by lowering the synthesis of IL-6, Bcl-2, and Bcl-xL.

*Poster - Session I*

*Engineering*

### **2. Autonomous Underwater Vehicle with Subsea Cable Tracking Capabilities**

By: Conor Ginley, Landon McLain, and Jakob Michels

Faculty Mentor(s): Pierre-Philippe Beaujean

Presenter(s): **Landon McLain**, Conor Ginley and Jakob Michels

Our group was tasked with creating an autonomous underwater vehicle capable of underwater cable surveys suspended throughout the water column and lying on the seabed. The vehicle is required to measure distance, inclination, heading, depth, and tension of the cable and operate in high currents. Moreover, with hydrodynamic performance in consideration so no forces were exerted on the cable, the final design utilizes a single hull that houses a pressure vessel and a ballast system with an exoskeleton used to attach fins and two thrusters that will serve to maneuver the vehicle. At the aft of the vehicle is a tension measuring device that houses a motorized roller system and instrumentation to gather data during the mission. These motorized rollers will crawl along the surface of the cable at a low speed using a third roller to continuously deflect the cable, allowing tension in the cable to be measured.



### **3. Siloxane Levels in Biogas Generated from Anaerobic Co-Digestion of Food Waste Diverted from Landfills**

By: Lusnel Ferdinand, Laura Martinez, Carmael Ocean, and Daniel Meeroff

Faculty Mentor(s): Daniel Meeroff

Presenter(s): **Lusnel Ferdinand**, Laura Martinez and Carmael Ocean

Anaerobic digestion (AD), commonly used in wastewater treatment is commonly under-utilized but can provide a sustainable means of diverting food waste from landfills while generating renewable energy and producing a valuable fertilizer product. High strength organic feedstocks such as food waste (FW), fats, oils, and grease (FOG), and thickened waste activated sludge (TWAS), can be combined in AD to produce methane to generate electricity at a higher rate than wastewater solids alone. One possible drawback is the generation of siloxanes, which are found in household detergents and personal care products in the feedstock. Siloxanes cause premature wear and tear on the machinery, increasing the costs of operation and maintenance. Since FW is unlikely to contain siloxanes, biogas from experimental samples co-digested with FW were analyzed to determine if reduction of siloxanes occurs while also producing high amounts of methane compared to traditional AD with wastewater solids alone.

### **4. Evaluating Tidal Impact on Beach Morphology**

By: Allyson Wleklinski, Austin Scheinkman, and Tiffany Roberts Briggs

Faculty Mentor(s): Tiffany Roberts Briggs and Austin Scheinkman

Presenter(s): **Allyson Wleklinski**

Coastal morphology change is driven by wind, waves, and currents modulated by tides. In microtidal regions (<2m tidal range), tides are often overlooked in coastal morphology change studies, as the water level variability has not been considered a significant factor. However, with sea level rise and coastal squeeze, tidal variability may play a more substantial role than previously thought. This project aims to quantify tidal impacts on beach profiles in southeast Florida's microtidal region by evaluating profile change during high and low tidal events. Three transects were surveyed using an RTK-GPS, one in an area with high urban development and two in areas with no urban development area. Sediment samples were collected and sieved to analyze grain size variability across the beach at the dune toe, mid-beach, and shoreline. Preliminary results indicate during periods of higher tides, the elevated base level may have facilitated greater morphologic change through wave activity.

*Poster - Session 1*  
*Basic Sciences*

### **5. Exploring the Role of Glycosylation on Amyloid- $\beta$ Peptide Aggregation**

By: Valentina Sopo Borraez, Nancy Vela Navarro, Alejandra Coronel-Zegarra, Vivian Merk, and Maré Cudic  
Faculty Mentor(s): Maré Cudic  
Presenter(s): **Valentina Sopo Borraez**

Alzheimer's Disease (AD) is characterized by significant brain changes linked to the accumulation of amyloid- $\beta$  (A $\beta$ ) peptides, which result from cleavage of the Amyloid Precursor Protein (APP) by  $\beta$ - and  $\gamma$ -secretase. The isoform A $\beta$ 40 aggregates into oligomers and fibrils that form amyloid plaques in the brain of AD patients. Although the link between A $\beta$  assembly and cellular toxicity remains unclear, studying A $\beta$ 40 aggregation kinetics holds significance for understanding AD pathology. Moreover, previous research reported by our group indicated that the Swedish mutation and mucin-type O-linked glycosylation near the  $\beta$ -secretase cleavage site of APP affects its susceptibility to  $\beta$ -secretase cleavage and A $\beta$ 40 aggregation. Therefore, A $\beta$ 40 was synthesized using Fmoc solid-phase peptide synthesis (SPPS) and characterized via RP-HPLC, MALDI-TOF, and Circular Dichroism. Additionally, A $\beta$ 40 coinubation with Swedish-mutated glycopeptides was done to examine the impact of glycosylation on A $\beta$  aggregation, and the morphology of the resulting aggregates was analyzed using Transmission Electron Microscopy.

*Poster - Session 1*  
*Health & Medical Sciences*

### **6. Role of Free Radicals in the Reduction of Heme by Methylene Blue with Ascorbate**

By: Parshan Marvasti, Daniel Quintero, and Andrew Terentis  
Faculty Mentor(s): Andrew Terentis  
Presenter(s): **Parshan Marvasti**

Indoleamine-2,3 dioxygenase 1 (IDO1) is a cytosolic enzyme that plays a critical role in the human immune response. Presently it is not clear how and when the reductive activation of IDO1 occurs, though it is widely known that the artificial cofactor system, methylene blue with ascorbate, is efficient at activating IDO1 in vitro. The objective of our research was to study the reaction of ascorbate/methylene blue with the heme protein myoglobin (Mb). We studied the rate of reduction of the heme iron of Mb with UV-vis spectrophotometry under aerobic and anaerobic conditions and in the presence of various radical and reactive oxygen species scavengers such as superoxide dismutase, catalase, formate, and metal chelating agents such as EDTA and Chelex. The results of our study provide new insights into the mechanism by which ascorbate/methylene blue reduces heme proteins, and informs future studies on how IDO1 may be activated in vivo.

### **7. Exploring The Relationship Between Shark Denticles and Environment**

By: Kyle Sagon, Madeleine Hagood, and Marianne Porter  
Faculty Mentor(s): Marianne Porter and Madeleine Hagood  
Presenter(s): **Kyle Sagon**

Sharks are cartilaginous fish that have evolved over 450 million years, and have denticles, placoid scales that are hard and tough. Dermal denticle properties change and differ among species, and we aim to improve our understanding of environmental factors on denticle morphology. We will establish an idea of how variation may benefit sharks (as protection, abrasion resistance, drag reduction, etc.) within their environment through denticle morphometric analysis using Scanning Electron Microscopy (SEM). We hypothesize that shark species inhabiting environments consisting of physical, abrasive structures like coral will have wider, thicker denticles, particularly in the lateral and ventral body regions. We will quantify environmental contributions by measuring the morphometrics (size, shape, and overlap) of dermal denticles through the processing program ImageJ. The purpose of this research is to provide insight into the shark denticle structure and pose new potential applications for future biomimetics.

### **8. Advancing Conservation Through AI: Computer Vision for Efficient Animal Detection in Camera Trap Videos**

By: Dean Cane and Kate Detwiler  
Faculty Mentor(s): Kate Detwiler  
Presenter(s): **Dean Cane**

In the early 2000s, potential sightings of the presumed extinct Miss Waldron's Red Colobus Monkey suggested a possible population in Côte d'Ivoire. Our research aims to employ a high-performance computer vision AI model for animal detection in field-based camera trap videos, addressing the challenges posed by the vast amount of data collected. In this project, the Zamba Cloud platform was employed to leverage an AI system for the identification of videos depicting monkeys, distinguishing them from instances where movement was detected but no monkey was present. The evaluation of the system's performance revealed a success rate of 79% in identifying videos featuring monkeys after screening a dataset comprising 200 videos. Though current results miss desired detection accuracy the ongoing student pipeline will facilitate continuous training and refinement, anticipating improved outcomes. This research contributes to conservation efforts, enhancing efficiency in video analysis and promoting the integration of AI in wildlife monitoring.

*Poster - Session 1*  
*Health & Medical Sciences*

### **9. A Comparison of STI/HIV Rates Between U.S. Military Service Members and Local Citizens at Domestic and Overseas African Military Bases**

By: Cecilia Malafaia and Candy Wilson

Faculty Mentor(s): Candy Wilson

Presenter(s): **Cecilia Malafaia**

Rates of Sexually Transmitted Infections (STIs) in the U.S. military have historically been higher than those in the civilian population and those rates increase when deployed overseas. The purpose of this study was to compare STI data on active-duty members stationed domestically to data from publicly available STI rates from overseas in ten African countries that have U.S. military bases. A correlational research design was used to compare demographic data and STI rates. We used the Ray's Bureaucratic Caring theory with operationalized definitions of the seven theoretical dimensions: Social/cultural; Political; Economic; Technological; Physical; Legal; Educational. The findings of this study showed statistical significance within the Legal, Educational, and Economic dimensions of caring. We found that four countries were more advanced within one or more of these dimensions reported a higher likelihood of STI's. Findings will inform our larger follow-on study about the prioritization for study recruitment locations.

*Poster - Session 1*  
*Classroom Research Project/Assignment*

### **10. The Lived Experience of Fathers as Caregivers of Their Children**

By: Janai Llerena and Ashley Rivera

Faculty Mentor(s): Ashley Rivera

Presenter(s): **Janai Llerena**

According to the U.S. Census Bureau, about 6 out of 10 men are fathers. The literature demonstrates that the role of fathers has a significant influence on their children's lives. Traditionally, the role of the father has been labeled as the provider; however, with societal transitions, fathers have obtained more of the caregiving role. The purpose of this study is to understand the lived experience of fathers as caregivers to their children. A qualitative descriptive phenomenology study was used and analyzed using Colaizzi's method. Three major themes emerged: (1) father's upbringing influences how they care for their children now as parents; (2) fathers spend quality time with their children through play, and (3) the greatest barrier to caregiving for fathers is finances. These findings have important implications for the nursing profession because it displays the experience of fathers as caregivers and helps nurses provide better care for this population.

*Poster - Session 1*  
*Business, Marketing, Finance & Public Administration*

### **11. Unveiling Financial Crises: Insights, Patterns, and Mitigation Strategies**

By: Suniti Patel, Jennifer Howarth, and Lily Mignone

Faculty Mentor(s): Eric Levy

Presenter(s): **Suniti Patel**, Jennifer Howarth and Lily Mignone

Financial crises remain a recurrent global challenge, necessitating a deeper understanding of their origins, impacts, and effective mitigation strategies. This research delves into the multifaceted nature of financial crises, employing a comprehensive methodology that integrates historical analysis, econometric modeling, and case studies. This study aims to identify common patterns, triggers, and transmission mechanisms by examining a diverse range of crises across different economies and periods. Expected findings include insights into how macroeconomics plays a part in dealing with financial crises and how economists have predicted and tried to prevent future crises. Furthermore, the research seeks to elucidate the socio-economic consequences of financial crises on individuals, businesses, and governments, shedding light on optimal recovery strategies and policy responses. Through a systematic analysis, this research contributes to developing robust frameworks for crisis prevention and management in the global financial landscape.

*Poster - Session 1*  
*Environmental, Ecological & Marine Sciences*

### **12. Analyzing the Effects of Stress on the Gut Microbiome, Cognition, and Sexual Ornamentation of a Songbird**

By: Joseph Swaress, Morgan Slevin, and Rindy Anderson

Faculty Mentor(s): Rindy Anderson

Presenter(s): **Joseph Swaress**

Our project examines how stress impacts the gut microbiome, which may lead to health and fitness variation among songbirds. Specifically, we will test the hypothesis that stress negatively affects the gut microbiome, which consequently negatively affects many traits in songbirds. Zebra finches are gregarious, and solitude is a moderately stressful stimulus for them. We used social isolation to induce mild but chronic stress in captive zebra finches and quantified gut microbiome qualities, beak ornamentation, cognitive performance, and body mass before and after treatments for both cohorts of isolated and socially housed birds. I will present preliminary results for most aforementioned variables and discuss our predictions for the gut microbiome results. These results contribute to the growing evidence that stress can impact gut microbiome qualities, which accordingly can affect other aspects of health and behavior. This is pertinent to situations where songbirds are isolated in wildlife hospitals or captive breeding programs.

*Poster - Session 1*  
*Health & Medical Sciences*

### **13. Interactions Between Dopamine and Serotonin in a Mouse Model of Neuropsychiatric Disorders**

By: Siddhi Gavkar, Randy Blakely, Adele Stewart, Lorena Areal, and Paula Kurdziel

Faculty Mentor(s): Monica Maldonado and Randy Blakely

Presenter(s): **Siddhi Gavkar**

The dopamine transporter (DAT) Val559 mutation was identified in individuals with neuropsychiatric disorders and results in anomalous dopamine efflux. DAT Val559 knock-in mice exhibit compensatory serotonergic hyperinnervation in a region-specific and sex-biased manner that may result from dopamine dysfunction during development. The goal of the current project is to utilize whole brain clearing and light sheet microscopy to uncover functional changes in serotonin signaling resulting from the DAT Val559 mutation across the entire murine brain. To do this, WT and DAT Val559 mice were treated with 5-HT releaser, fenfluramine, and isolated brains were cleared and stained for c-fos, a marker of neuron activation. By imaging and quantifying c-fos+ cells across the whole brain, identification of those circuits most impacted by expression of the DAT Val559 variant will be accomplished, which will allow for the generation of novel hypotheses regarding the neural substrates underlying behavioral phenotypes in DAT Val559 mice.

*Poster - Session 1*  
*Behavioral, Educational & Social Sciences*

### **14. The Influence of Working Memory, Grit, and Personality on Resident In-Training Exam Performance**

By: Alexis Crowder, Michael DeDonno, and Joy Longo

Faculty Mentor(s): Michael DeDonno

Presenter(s): **Alexis Crowder**

A better understanding of factors associated with academic performance is of value to institutions of higher education. By understanding these factors, mentors and advisors can better prepare students to achieve desired academic goals. Working memory is one of the executive functions of the brain which processes short-term storage of information. The influence of working memory on academic performance is of interest to cognitive psychologists and human performance researchers. Grit which can be defined as one's passion and perseverance towards long term goals, is also a predictor of academic performance. The factors of personality as offered by the big-five factors of personality have also been aligned with academic performance. A question arises as to how these factors collectively influence medical residents' performance on in-training exams. Our goal is to offer a model to medical resident programs that will enhance the training of physicians.

*Poster - Session 1*  
*Basic Sciences*

### **15. Exploring Nonmuscle Myosin II Subcellular Localization and Dynamics in Dendritic Spines**

By: Natasha Mayorga, Shayna Reed, and Courtney Miller  
Faculty Mentor(s): Tricia Meredith and Courtney Miller  
Presenter(s): **Natasha Mayorga**

Learning and memory storage in the brain are driven by synaptic plasticity - the rapid formation and stabilization of connections between the axon terminals of a presynaptic neuron and the dendrites of the postsynapse. During methamphetamine (METH) use, a subset of synapses in the basal lateral amygdala (BLA) brain region undergo aberrant plasticity that results in persistent memories of drug use. The central hypothesis in the Miller lab is that unique synaptic plasticity mechanisms are achieved through distinct expression patterns, trafficking, and interacting partners of the motor protein nonmuscle myosin II (NMIIB). Using superresolution imaging techniques, the distribution of NMIIB protein and its trafficking during simulated synapses will be elucidated to better understand its role in learning and memory. Uncovering these dynamics holds significance in the development of therapeutics to selectively inhibit METH-associated memories while leaving others intact, which may aid in preventing drug relapse in individuals.

*Poster - Session 1*  
*Engineering*

### **16. Developing Adsorbent Materials for Direct Carbon Dioxide Capture from Ambient Air**

By: Laura Rojas and Masoud Lashaki  
Faculty Mentor(s): Masoud Lashaki  
Presenter(s): **Laura Rojas**

Carbon dioxide concentration, a prominent anthropogenic greenhouse gas responsible for global warming and climate change, has experienced a rapid increase since the Industrial Revolution, primarily caused by human-generated emissions. Due to the excessive release of CO<sub>2</sub>, heat becomes trapped in the atmosphere, resulting in rising global temperatures and severe consequences like sea level rise and extreme weather circumstances. CO<sub>2</sub> capture technologies have achieved significant attention as potential approaches for climate change mitigation. This project aims to develop materials suitable for direct CO<sub>2</sub> capture applications. Amine-grafted silica adsorbents were synthesized by modifying silica material with triamine groups using grafting methods. These samples were analyzed using Thermogravimetric Analysis (TGA) to evaluate equilibrium uptake capacity, amine efficiency, and adsorption kinetics. The final candidate, which exhibited superior performance in the mentioned tests, was further analyzed to study their performance consistency over cycles.

*Poster - Session 1*  
*Engineering*

**17. A Comparative Study of Driver Behavior in Relation to Speed limits, Focusing on Rural Areas versus Urban Areas**

By: John Carter, Krista Kostallari, and Camila Alvarez

Faculty Mentor(s): Valentine Aalo

Presenter(s): **John Carter**

Our study delves into the behavior of drivers in both rural and urban environments, particularly their adherence to posted speed limits. These limits play a critical role in ensuring pedestrian safety, maintaining traffic flow, and reducing the likelihood of fatal collisions. In urban areas, where population density is higher, speed limits typically range between 25-35 mph, while rural areas often feature higher speed limits due to narrower roads. In Florida, aggressive driving is a pressing issue, with approximately 15% of drivers exceeding speed limits, endangering the safety of 2.35 million licensed drivers. By comparing driver behaviors between rural and urban settings, our research seeks to inform targeted awareness campaigns aimed at improving community safety on the roads. Understanding drivers' tendencies in different environments is essential for devising effective strategies to mitigate risks and promote safer driving habits.

*Poster - Session 1*  
*Health & Medical Sciences*

**18. Investigating Risk Factors Among Young Black and White Women with Early Onset Breast Cancer**

By: Asia Starling and Tarsha Jones

Faculty Mentor(s): Tarsha Jones

Presenter(s): **Asia Starling**

There has been an alarming increase of breast cancer diagnosis among the young black population before the age of 45, outlining the urgent need to understand the risk factor differences among young black and white women. The purpose of this study was to examine and compare modifiable and non-modifiable risk factors among black and white women diagnosed with early onset breast cancer. A cross-sectional descriptive research design was used to examine multilevel risk factor differences between participants. Results revealed positive implications of the following modifiable risk factors: BMI, stress, and use of products with carcinogens. Results also revealed negative implications of the following non-modifiable risk factors: family history, age at first period, and BRCA gene mutation. The implications of this study illustrate the need for further large scale research on specific environmental risk factors and risk factor differences among young black and white women.



*Poster - Session 1*  
*Behavioral, Educational & Social Sciences*

### **19. The Effects of Divorce on Childhood Education**

By: Markeith St Val and Destiny Fava  
Faculty Mentor(s): Michael Maniaci  
Presenter(s): **Markeith St Val**

Many students experience the challenge of having divorced parents while in grade school. Despite this fact, few studies have explored the impacts of divorce on children's academic performance. This study investigated the extent to which parental divorce impacts children's performance in school, as well as divorced vs. non-divorced parental involvement in children's academics. Exploratory analyses examined the correlation between parental divorce and parental involvement with their children's academics, as well as how children's academic performance is affected when having divorced parents. The significant implications of this study are discussed, including whether divorce should be taken into account for children in schools, and whether tailored programming for children and parents presents a pathway for mitigating intergenerational consequences of marital separation.

*Poster - Session 1*  
*Health & Medical Sciences*

### **20. Genetic Engineering: Future's Hope, or a Wicked Omen?**

By: Rafsan Siddique  
Faculty Mentor(s): Samuel Director  
Presenter(s): **Rafsan Siddique**

Survival has been a top priority in the race of mankind, with many obstacles and internal problems that can harm one's health. As technology has advanced for us to find easier solutions to make life easier, people have thought of the use of genetic engineering to modify human bodies to gain better survival. In this paper, I will discuss the concepts of genetic engineering and eugenics and how these methods of human enhancements can help provide many important survival benefits for generations, such as curing harmful diseases. I will present many of the positive outcomes from these biomedical methods as well as some of the negative concerns people have with these innovations. These will surely address some ethical issues regarding the use of human enhancements and how to counteract it to ensure safe use of it and provide beneficial results.

Poster - Session 1  
Basic Sciences

### 21. Dissect the MEP Glia Gene Expression Profile

By: Destiny Collado and Laura Fontenas

Faculty Mentor(s): Laura Fontenas

Presenter(s): **Destiny Collado**

Our objective is to expand our knowledge of MEP glial identity by identifying transcriptional profiles of MEP glia to further analyze it in other species and in future studies. Using available single-cell RNA sequencing zebrafish datasets that capture MEP glia at key developmental timepoints, we plan to generate zebrafish lines to reveal new genetic processes and markers that are important for MEP glial development and function. So far, we have identified clusters of MEP glia based on known markers and chosen 4 isolated candidate genes (riok1, plp2, plk1, and pls3) to validate their expression using in situ hybridization. For each candidate gene, we will create antisense RNA probes and perform colorimetric and fluorescent in situ hybridization in fixed transgenic larvae that express green fluorescent protein (GFP) in MEP glia. We will then analyze the overlap of GFP with mRNA, and the expression of the candidate genes at 48 hours post-fertilization.

Poster - Session 1  
Environmental, Ecological & Marine Sciences

### 22. Incubation Temperature Effects on Leatherback (*Dermochelys coriacea*) Sea Turtle Hatchling Performance

By: Caroline Miller, Heather Seaman, and Sarah Milton

Faculty Mentor(s): Sarah Milton and Heather Seaman

Presenter(s): **Caroline Miller**

As the threat of climate change worsens, sea turtles are facing devastating consequences, with their survival reliant on the beach microenvironment. The effects of climate change are increasing threats, through the elevation of sand temperatures, which can jeopardize the survival of sea turtle hatchlings. This study examined the relationship between nest temperatures, corticosterone levels, and hatchling land locomotion. Nest temperatures were measured via data loggers placed in various nests, blood samples were taken from hatchlings to extract corticosterone, and crawling speed and righting response time were measured. Initial findings suggest that higher incubation temperatures may negatively correlate with hatchling locomotor performance, thereby influencing overall survival chances in the face of global climate change. This research contributes to understanding how climatic shifts affect vulnerable species like sea turtles and the importance of considering physiological stress mechanisms in conservation strategies.

**23. A 1400-year Reconstruction of Fire History from a Landslide-Formed Lake in Costa Rica**

By: Danielle Nering, Taber Friedel, Erik N. Johanson, Sally P. Horn, and Mauricio Murillo Herrera

Faculty Mentor(s): Erik Johanson

Presenter(s): **Danielle Nering**

This study presents initial macroscopic charcoal trends from our study site, Laguna Arancibia, in Costa Rica. The sediment cores examined were recovered in 2019 from a small (1ha), moderately deep (6.2m) lake in the western portion of the Central Valley region. At 1250 meters elevation, Laguna Arancibia likely formed at ca. 1500 cal yr BP by a landslide event. Macroscopic charcoal deposited in lake sediments is a direct environmental proxy for fire activity within a watershed. Often influenced by major climate drivers or anthropogenic activity, fire events are frequent and variable in the tropics. We analyzed macroscopic charcoal to characterize the intensity and frequency of fire events over time in two size ranges: 125-250 $\mu$ m and 250-500 $\mu$ m. The initial results of this dataset are plotted by sampled depth and will later be compared to pollen, isotopes, and other datasets to reconstruct the environmental change for the region.

**24. Integration of Hyperspectral Sensor as UAV Payload for Airborne Imaging Spectroscopy**

By: Tuang Vaan and Tucker Hindle

Faculty Mentor(s): Tucker Hindle

Presenter(s): **Tuang Vaan**

Optical remote sensing, particularly multi- and hyperspectral imaging, has many applications in environmental monitoring such as mapping vegetation species and estimating water quality. Since objects in the environment reflect and absorb sunlight, sensors can measure the energy (radiance) for a given location and observe a unique spectral signature across the electromagnetic spectrum. As compared to a common digital camera with only three red-green-blue (RGB) channels, a hyperspectral imager (HSI) has the advantage of collecting data at hundreds of different wavelengths for the same spatial extent - each pixel in the image provides the continuous spectrum of the energy arriving at the sensor. These precise spectral measurements help to differentiate similarly colored objects in the environment. The present study integrated a visible and near-infrared HSI on a remotely piloted aircraft system. This includes custom integration of a 3D-printed mounting bracket, electrical power supply, GNSS/IMU module.

*Poster - Session 1*

*Environmental, Ecological & Marine Sciences*

### **25. Scanning Electron Microscopy for the Analysis of Shell Growth Bands**

By: Raghavi Yadlapally, Zane Abdallah, Katharine Napora, Jamie Knaub, and Tricia Meredith

Faculty Mentor(s): Katharine Napora

Presenter(s): **Raghavi Yadlapally** and Zane Abdallah

Shell analyses, including utilizing oxygen isotope analysis and assessing growth bands, are widespread in paleoecology and archaeology. Growth bands are concentric rings that speak to the shell's age, seasonal variation, health, and environmental history. In this work, we used Scanning Electron Microscopy (SEM) and other methods to visualize subannual bands. Gaining insight into subannual bands will yield more high-resolution data than alternative shell analyses. Over the last several years, there has been a substantial expansion in the array of preparation and analytical methods advocated for and executed in studies documented globally. We prepared and analyzed bivalve shells sourced from a diverse range of archaeological and modern contexts to expand this innovative work geographically to Eastern North America. Within this project, we discuss optimal practices, methodology, and exploratory data analysis derived from our ongoing study of subannual bands.

*Poster - Session 1*

*Environmental, Ecological & Marine Sciences*

### **26. Testing Territorial Responses to Different Categories of Song in Bachman's Sparrow (*Peucaea aestivalis*)**

By: Melissa Guedes, Jaedyn Wint, Hans Gonzembach Kayser, and Rindy Anderson

Faculty Mentor(s): Rindy Anderson

Presenter(s): **Melissa Guedes** and Jaedyn Wint

All songbirds use broadcast song to defend territories and attract mates. Behavioral ecologists have extensively studied this category of song and much is understood about its social function. Some species of songbirds also produce additional categories of song, such as complex song. The social function and information content of complex song is unknown and identifying the factors that drive the evolution of complex song in different species is not well understood. We conducted playback of complex song and broadcast song within Bachman's sparrow territories to measure individual behavioral responses. We played songs on the territories of 32 banded male sparrows using a within-subjects design. We hypothesize that individuals perceive complex song as a stronger threat and therefore respond more aggressively to complex song compared to broadcast song. Analyses of our results are currently underway and will be presented.

*Poster - Session 1*  
*Health & Medical Sciences*

**27. Parkinson's Patients Performance in Cognitive and Exercise Assessments Compared to Healthy Adults**

By: Lea Goldenberg and B. Sue Graves

Faculty Mentor(s): B. Sue Graves

Presenter(s): **Lea Goldenberg**

Parkinson's patients have mobility issues in day-to-day life which can be addressed through cognition and functional fitness. This study will compare two populations, healthy older adults and high functioning older adults living with Parkinson's disease. Emotional and physical well-being will be self-assessed using a PDQ-39 questionnaire to determine the functional capacity of the participants. The Senior Fitness Test on the Trazer Machine and the Biodex Balance System will measure cognitive and motor functions analyzed by an Artificial Intelligence-based framework to model these assessments. This biofeedback model can potentially assist individuals in analyzing their current performance and can suggest future improvements. It is hypothesized that those with Parkinson's Disease will have no significant difference compared to healthy adults, given they are high-functioning and community-dwelling. This study provides insight into the varied performance levels within Parkinson's patients and may inform tailored interventions and therapeutic strategies.

*Poster - Session 1*  
*Behavioral, Educational and Social Sciences*

**29. Learning About Gujarati: Cultural Identity and Family Language**

By: Vritti Sodha and María D. Vásquez

Faculty Mentor(s): María D. Vásquez

Presenter(s): **Vritti Sodha**

Language loss is a prevalent problem that is occurring in immigrant families in the United States. Since regional languages such as Gujarati are not used outside of households and community gatherings, it is not given much importance to learn. In order to combat this problem, community centers hold Gujarati classes for students of all ages to help preserve the language, but the lack of motivation to learn the language still remains. This is because a student needs to have a connection to the language to be motivated to learn it, which can be made through active learning. This study will examine the engaging characteristics of a Gujarati class by identifying characteristics of active learning. Data sources will include observations, journaling, and photo elicitation.

*Poster - Session 1*  
*Health & Medical Sciences*

### **30. The Relationship Between Postpartum Anxiety and Breastfeeding Length Among Postpartum Women**

#### **During Covid-19**

By: Theodora Tertus and Christine Toledo

Faculty Mentor(s): Christine Toledo

Presenter(s): **Theodora Tertus**

Postpartum anxiety is one of the most common mental health disorders following delivery and can have major impacts on the breastfeeding experience of a mother. The purpose of this study was to evaluate the relationship between postpartum anxiety and breastfeeding length. Study participants included 106 postpartum South Florida women who gave birth to a live child during the COVID-19 pandemic. Participants were asked to fill out a Redcap Questionnaire that included demographics, breastfeeding practices, and the generalized anxiety disorder measure. Descriptive statistics and a Pearson's bivariate correlation were conducted using SPSS. Study results indicate that there was no statistically significant relationship between breastfeeding length and postpartum anxiety scores  $r(104) = .823, p = .022$ . The average anxiety rating of the participants, which was a moderate level ( $M = 9.94$ ), was higher than the national average. Future studies should include more variables for significant findings.

*Poster - Session 1*  
*Basic Sciences*

### **31. Fluorescent Cholesterol Probes and their Interactions in Model Membrane Systems: Liposomes and GUVs**

By: Dana Benavides, Nicholas McInchak, and Maciej Stawikowski

Faculty Mentor(s): Maciej Stawikowski

Presenter(s): **Dana Benavides**

Cholesterol is a molecule found in cellular membranes that regulates various biological processes, ranging from membrane structure to cell signaling. Fluorescent imaging techniques have revolutionized the study of cellular membranes and cholesterol dynamics, allowing researchers to study these processes. By synthesizing fluorescent cholesterol probes (CNDs), and analyzing their properties through different assays, we can gain insight into membrane interactions and intracellular cholesterol transport. In this study we report the synthesis of two novel fluorescent cholesterol probes and investigate their behavior within model membrane systems - liposomes and GUVs. We also characterize their interactions with  $\beta$ -methyl cyclodextrin (BMCD) which is used to extract cholesterol from biological membranes, as well as load cholesterol probes for their cellular uptake.

**32. Meaningful Use (MU) Rates of Electronic Health Records (EHRs) in Socio-economically Disadvantaged Areas**

By: Anjali Kamath, Annelise Bontemps Verret, Ana E. Munoz Jaramillo, Judith P. Monestime, and Pierre Alexandre

Faculty Mentor(s): Pierre Alexandre and Judy Monestime

Presenter(s): **Anjali Kamath** and Annelise Bontemps Verret

The objective of this study is to analyze MU rates of EHRs adoption for Primary Care Providers (PCPs) in the Florida Medicaid Interoperability Program. We aimed to determine whether there is a lag in MU rates in counties with a high poverty level and rural counties. The Center for Medicare and Medicaid Services provided incentive payments to PCPs who adopted and achieved meaningful use of EHRs. Using the provider participation database, we conducted a retrospective cohort study, integrating socio-economic datasets from state and federal sources. Using 0.05 significant level, bivariate associations indicate that PCPs located in rural counties had significantly higher MU rates (63.2%) relative to PCPs located in urban counties (44.7%). PCPs in counties in poverty were found to have significantly higher MU rates (51.4%) relative to PCPs located in counties not in poverty (50.1%). Adjusted odds ratios and 95% confidence intervals from multivariate analysis will be reported.

**34. Investigating Cell-Type Specific Protein Changes of Key Cholesterol Regulators (SREBP2, SCAP,**

**Insig1) Within an Unorthodox Alzheimer's Disease Model Using Fluorescent Microscopy**

By: Joel Edouard, Haylee Mesa, and Qi Zhang

Faculty Mentor(s): Qi Zhang

Presenter(s): **Joel Edouard**

Amyloid precursor proteins (APP) that yield beta-amyloid (Ab) after sequential cleavages by beta and gamma-secretase are one of the most studied proteins due to its close ties to Alzheimer's disease (AD). Despite decades of investigation, its intrinsic functions in the brain remains unclear. Our previous study uncovered a functional connection between cholesterol, APP, and synaptic dysfunction which leads to neurodegeneration. Moreover, we observed several AD-associated cellular pathologies in the brain of APP-null mice which lacks Ab. In this study, we examine various brain region's astrocytic and neuronal expressions of cholesterol-regulating proteins, which include SREBP2, SCAP, and INSIG-1 for measuring brain cholesterol metabolism in APP-null mice and wildtype controls. Since aging is the primary risk factor for AD, we include 15 and 30-month-old mice for cellular growth comparison. Because astrocytes synthesize cholesterol whereas neurons consume astrocytic cholesterol, we measure the regulating proteins in both cell types separately, observing significant differences.

*Poster - Session 1*

*Behavioral, Educational & Social Sciences*

### **35. Impacts of Help Seeking Styles on Partner Perceptions in STEM**

By: Hana Al-Hraki, Lana Jaber, Isabella Perez, Destiny Fava, Samantha Gnall and Chad Forbes

Faculty Mentor(s): Chad Forbes

Presenter(s): **Hana Al-Hraki**, Lana Jaber and Isabella Perez

This research explores how Social Identity Theory (SIT) impacts partner perceptions for women in STEM fields. Past research on SIT suggests individuals favor members of their group over others, potentially leading to experiences of gender bias. The study aims to understand how help-seeking interactions during a math task influence partner perception. Participants will be assigned to work on math problems via computer with an in-group or out-group member. After they will be asked to rate the quality of the partners' help, perceptions of the partner, and overall effectiveness. Our hypothesis predicts partner perceptions will vary based on group membership (in-group vs. Out-group) and type of help sought (i.e., hint or answer). Overall, the results of this study can be used to create better classroom approaches that support learning through more effective help interactions.

*Poster - Session 1*

*Behavioral, Educational & Social Sciences*

### **36. Mirror, Mirror: Effects of Visual Perception on Bimanual Coordination**

By: Carter Sale, Twenchi Denoe, Eva Pokharel, Abigail Sinu, Aliza Sloan, and Scott Kelso

Faculty Mentor(s): Aliza Sloan and Scott Kelso

Presenter(s): **Twenchi Denoe**

What happens to your coordinative abilities when what you see and what you feel your body is doing do not match? To explore this, we placed a mirror between participants' hands and asked them to coordinate their finger movements in a windshield-wiper (anti-phase) pattern. Now the participants feel themselves moving in anti-phase while seeing one of their hands and its mirrored reflection move in-phase. When task demands are high people spontaneously switch from anti-phase to more stable in-phase patterns. Therefore, we hypothesized that viewing the mirrored pattern would make it harder for participants to maintain anti-phase. We tested coordination under two barrier conditions (opaque, mirror) at progressively higher frequencies between 1.4-3.6Hz. We quantified the fingers' phase relation over time to assess coordination stability. Preliminary results support our hypothesis, suggesting that visual information plays a crucial role in modulating the stability of coordinated activity.



*Poster - Session 1*  
*Engineering*

### **38. A Scaled Model Approach: Investigation of Structural Integrity of Timber Bridges**

By: Victor Vasquez and Madasamy Arockiasamy

Faculty Mentor(s): Madasamy Arockiasamy

Presenter(s): **Victor Vasquez**

This study assesses the structural performance and health of timber bridges, specifically focusing on trestle bridges crucial for railroads, by evaluating vertical deflection under load using dial gauges. Given that many timber bridges were designed with a life expectancy of 50 years, the impact of aging and weathering is crucial. To address accessibility issues in traditional deflection measurement methods, a cost-effective 1:12 scale model representing a 30-foot span timber bridge will undergo static load tests, with deflection measured at specific joints using dial gauges. The deflection data will be compared with Deflection Pro software analysis for accuracy. This project aims to offer practical insights into deflection measurements, contributing to enhancing structural integrity and safety in aging wooden bridges, with implications for future constructions. The study ultimately seeks to inform improved bridge design, promoting enhanced safety and efficiency in bridge infrastructure.

*Poster - Session 1*  
*Behavioral, Educational & Social Sciences*

### **39. The Effect of Participation in Middle School Speech & Debate on High School Academic Performance**

By: Nicholas Ostheimer and Kristin Potter

Faculty Mentor(s): Kristin Potter

Presenter(s): **Nicholas Ostheimer**

Extracurricular activities may influence the academic performance of current middle school students for years down the line. Participation in middle school speech and debate is associated with a range of social, civic, and academic benefits for students. The intent of this research is to find out how active participation in speech and debate extracurricular activities affects academic performance in subsequent years of high school and dual enrollment in college. Data is collected from students at FAU High School, who are 9th-12th grade high school students. The effect of middle school speech and debate participation on academic performance in high school is measured by grade point achievement in classes and performance on exams. The effect in dual-enrollment college is measured by grade point average (GPA). Speech & debate participants are anticipated to exhibit an increase in grade point achievement and standardized exam scores for high school English and history classes.

*Poster - Session 1*

*Environmental, Ecological & Marine Sciences*

**40. Documenting the Changes to Vegetative Biodiversity across Forty Years in FAU's Urban Nature Preserve**

By: Jasmine Coyle, Ronica Deshmukh, and Keyona Ghosh

Faculty Mentor(s): Jasmine Coyle

Presenter(s): **Keyona Ghosh** and Ronica Deshmukh

A 1990 survey documented the variety of plant species in the small, natural preserve that sits at the north end of the FAU campus in Boca Raton. In the forty years since, urbanization has spread across the area, reducing the size of the preserve and altering the plant life therein. This study seeks to explore the change in biodiversity that has occurred in the FAU preserve by analyzing vegetation and comparing new surveys to the 1990 data. This study employs stratified quadrats, transects, and iNaturalist to document Preserve species. ArcGIS will be utilized to integrate data from literature reviews and current vegetation studies to map the native plant distribution, providing a geographical view of biodiversity changes since 1990. Ongoing findings aim to depict changing biodiversity, highlight management impacts, and educate about the comprehensive effects on plant biodiversity and ecosystem health across South Florida due to urbanization.

*Poster - Session 1*

*Behavioral, Educational & Social Sciences*

**42. The Relationship Between Self-Reported and Observer-Rated Maternal Anxiety During Mother-Infant Interactions**

By: Annalisa Tran, Jacqueline Stotler, and Teresa Wilcox

Faculty Mentor(s): Teresa Wilcox

Presenter(s): **Annalisa Tran**

The current study investigated the relationship between self-reported maternal anxiety with observer-rated levels of maternal anxiety in mother-infant free-play interactions. While maternal anxiety has been previously associated with maladaptive maternal behaviors during mother-infant interactions, there have been no studies to date that directly examine mother's self-perception of anxiety and externally rated anxiety. A final sample of 34 infants (aged 6 – 24 months) and their mothers participated in a free-play session via Zoom. The Coding Interactive Behaviors (CIB) scale was used by trained coders to rate maternal anxiety. The GAD-7 was administered to mothers within one week of free-play and used to determine self-reported anxiety levels. Anticipated outcomes include a positive association between observer-rated anxiety and self-reported anxiety. These findings will contribute to the literature by emphasizing the nuanced way that maternal anxiety manifests during mother-infant interactions and its impact on interaction qualities.

**43. Analyzing Consecutive Storm Impacts on Beach Geomorphology and Sedimentology within Palm Beach County, Florida**

By: Alondra Calderon, Leanne Hauptman, and Tiffany Briggs  
Faculty Mentor(s): Tiffany Briggs and Leanne Hauptman  
Presenter(s): **Alondra Calderon**

Sandy beaches are among the most important coastal environments for providing habitats, protecting coastal communities, and reducing coastal flooding. Loss to the subaerial beaches is becoming a problem that is affecting coastal communities due to rising sea levels and frequency of major storms. With the uncertainty in global climate, frequency, and intensity of storms, research is needed to understand the beach response after continuous storm impacts. This study aims to evaluate storm-induced subaerial sedimentology and morphology change after two consecutive storms during the 2022 hurricane season in Palm Beach County, Florida. Four sites were evaluated: three managed beaches and one non-managed beach. Beach profiles were collected during pre-, post-, and recovery surveying. Sediment samples were collected during each event at each study site's back beach, mid-beach, and high water line. Results from this study have the potential to help management efforts in understanding how beaches respond to consecutive storm impacts.

## Poster Presentations from Undergraduate Researchers from Miami-Dade College

*Poster - Session 1*

*Environmental, Ecological, & Marine Sciences*

### ***Lemna minor* (Duckweed) - Lipid Extraction for the purpose of Biofuel Production**

By: Christell Meonez, Isabella Gonzalez, Sofia Schraer, and Juan Morata

Faculty Mentor(s): Juan Morata

Presenter(s): **Christell Meonez, Isabella Gonzalez and Sofia Schraer**

Interest in alternative energy surged due to rising carbon emissions from fossil fuels. Extracted biomass, like *Lemna minor* (Duckweed), offers promise for various applications, including animal feed, soil fertility, and wastewater treatment. This study aimed to observe nutrient impact on bioactive compounds by extracting lipids using three organic solvents: Ethanol, Hexane, and Chloroform. Lipid extraction via Soxhlet method yielded promising results. In this study, we cultivated Duckweed in a controlled lab environment, dividing it into different settings within the lab. Duckweed was placed in a fume hood under white light and under natural light to observe the effects on lipid extraction of each light source. With 95% Ethanol, a 6.77% lipid yield was achieved, surpassing previous findings. The findings underscore the versatility of extracted biomass and its potential to mitigate the harmful effects of carbon emissions. Further research is vital for maximizing its potential in combating climate change.

*Poster - Session 1*

*Health & Medical Sciences*

### **Dietary Recommendations for Women using Hormonal Contraceptives**

By: Cary-Ann Selby, Olubisi Faoye, and Larry Frolich

Faculty Mentor(s): Olubisi Faoye and Larry Frolich

Presenter(s): **Cary-Ann Selby**

Adult women have distinct lifestyle health patterns and physiological responses to medications. Hormonal contraceptives are some of the most commonly prescribed medications, used by millions of women worldwide. These drugs have a major physiological impact and appear to have more pronounced effects with duration. Our goal is to extract pertinent information regarding the importance of these drugs on nutritional needs. Exogenous hormones work in contraception by suppressing ovulation but have other systemic effects. Their use may influence nutritional status by altering gastrointestinal absorption, nutrient metabolism, weight changes, and distribution of adipose tissue. We examine current evidence on the interactions between hormonal birth control and micronutrient status, compiling data from observational and interventional trials on markers like serum vitamins, minerals, antioxidants, and carotenoids. The objective is to clarify if certain contraceptive methods appear protective or detrimental regarding nutritional indicator, elucidating any implications for dietary requirements or counseling for this patient subgroup.

Poster - Session 1  
Environmental, Ecological & Marine Sciences

### ***Chlamydomonas reinhardtii* Biofuel Lipid extraction and Growth Dynamics**

By: Kiara Alietti, Shana Nichols, and Juan Morata

Faculty Mentor(s): Juan Morata

Presenter(s): **Kiara Alietti and Shana Nichols**

The primary objective of this research is to explore the growth and concentration patterns of *Chlamydomonas reinhardtii* over a defined period of time. A diluted *Chlamydomonas reinhardtii* solution was prepared by adding 20 mL of stock solution to each 200 mL Erlenmeyer flask containing TAP medium and soil water. These flasks were then incubated under specific conditions, and samples were collected for spectrophotometric analysis and microscopic observation. This multi-faceted approach aims to provide a comprehensive understanding of *Chlamydomonas reinhardtii*'s growth dynamics, enhancing the reliability of our findings. Samples were carefully maintained throughout the study to prevent drying out, ensuring accurate data. The incorporation of soil water revealed a noticeable increase in *Chlamydomonas reinhardtii* concentration. Additionally, a Soxhlet extraction was implemented to determine lipid yield and viability for biofuel production, crucial for assessing its potential as a renewable energy source. This analysis offers insights into using *Chlamydomonas reinhardtii* as a sustainable alternative to fossil fuels.

Poster - Session 1  
Environmental, Ecological & Marine Sciences

### **Lipid Extraction of *Egeria densa* (Elodea)**

By: Ricardo El Sayah, Oscar De Leon, Arly Lara, and Juan Morata

Faculty Mentor(s): Juan Morata

Presenter(s): **Ricardo El Sayah, Oscar De Leon and Arly Lara**

Researchers investigate alternative energy sources because they have a lower carbon footprint and a longer lifespan than fossil fuels. Algae and aquatic plant biofuels, such as those produced by *Egeria densa* (Elodea), are promising due to their biodegradability and eco-friendliness. Recently the focus is on establishing the best lipid yields and ratios for biofuel generation from healthy and decaying Elodea utilizing different solvents. The researchers exposed Elodea to both natural and artificial light causing solarization of chlorophyll. Lipid extractions with hexane, chloroform, and ethanol were carried out to compare findings with earlier Miami Dade Lipid Extraction research. Maintenance was performed biweekly, followed by centrifugation, Soxhlet extraction, and evaporation. Yield % was calculated using flask and lipid weight. The results demonstrated a decrease in lipid yield percentage while utilizing decaying Elodea, with a 3.3% drop in hexane and 1.8% in ethanol, demonstrating that decomposition has an impact on lipid extraction efficiency independent of the solvent utilized.

**Poster Session II - Afternoon**  
(2:15 pm - 3:30 pm)

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

**1. Romantic Partner Evaluations: A Linguistic Analysis Approach**

By: Isabella Klopukh, Morgan Cope, and Michael Maniaci

Faculty Mentor(s): Michael Maniaci

Presenter(s): **Isabella Klopukh**

Although people tend to hold highly positive attitudes about their romantic partners, negative evaluations may also arise, leading to a lack of clarity about one's relationship. Cross-sectional survey measures are limited in their ability to capture the dynamics of relationship evaluations. In the current study, researchers collected audio recordings from 69 participants that discussed the positive and negative aspects of a romantic relationship and then continuously rated the valence of their statements. Participants completed traditional survey measures of relationship outcomes. To determine if the way participants discussed their romantic relationship predicted performance on the computer rating task and self-reports, researchers will conduct sentiment analysis using the LIWC coding system to assess affect, cognitive processes, and pronoun usage (i.e., "I" versus "we"). Results regarding the content of reported relationship narratives, participant ratings of their recorded statements, and survey measures of Couple Identity Clarity, Couple Satisfaction, and Relationship Evaluations will be discussed.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

**2. Undergraduate Student Academic Performance at Hispanic Serving Institutions (HSI): A Systematic Review**

By: Sofia Blanco, Abigail Sinu, and María D. Vásquez

Faculty Mentor(s): María D. Vásquez

Presenter(s): **Vritti Sodha** and Abigail Sinu

Hispanic Serving Institutions (HSIs) are accredited, degree-granting institutions of higher education with at least 25% undergraduate Hispanic/Latino students. Universities designated as HSIs are eligible for special federal funding which can support special programs to enhance every student's learning. This study evaluates and summarizes articles that examine the manner in which Hispanic undergraduate students' characteristics relate to academic performance at HSIs. To understand how student traits and scholarly success relate, we conducted a systematic review using Zotero to categorize and screen empirical data. Our eligibility screening form forged grounds for correlational analysis by requiring quantitative correlational studies with programs for undergraduates at HSIs relating to academic performance, achievement, or persistence. We have so far compiled 23 peer-reviewed articles, of which 7 were excluded from our study. Data will include a report on articles published per year and journal among other information including the themes found in the review.

### **3. Size and Sex Distribution of Blacktip Sharks in Southeast Florida**

By: Savannah Arvin and Stephen Kajiura

Faculty Mentor(s): Stephen Kajiura

Presenter(s): **Savannah Arvin**

The Blacktip Shark is a common coastal shark found throughout the United States eastern seaboard from Florida to New York. This species has a well-established migratory pattern and overwinters in Southeast Florida. During these months the sharks form large aggregations in the nearshore environment. The Elasmolab caught 201 blacktip sharks; determination of the size and sex of these sharks helps inform us about the composition of blacktip shark aggregations. It appears that the males migrate farther south and dominate the sex distribution with females remaining at higher latitudes and only rarely occurring in the large aggregations. This information is important for the recreational fishery that targets the aggregated sharks and may selectively catch adult males. This may contribute to a healthy shark population which supports both a recreational and commercial fishery for this species.

### **4. Studying the Positional Stapling of Hairpin Peptides with Long Flexible Loops**

By: Sophie Muransky, Sarah Naylon, Stephane Roche

Faculty Mentor(s): Stephane Roche

Presenter(s): **Sophie Muransky**

An advantageous way of creating new marketable drugs is by rational design, where the target and its receptors are structurally studied to determine regions of binding. These “druggable” regions can sometimes be home to unique secondary structures such as  $\beta$ -hairpins, that are conformationally difficult to mimic with tools such as peptidomimetics and macrocyclization. The use of a remarkably stable  $\beta$ -straps previously developed in our lab has been proven to allow for folding of loops into a  $\beta$ -hairpin conformation. These mimics typically consist of loops of 8-12 residues in length, whereas some hot loops in antibodies reach up to 24 amino acids. Synthesis of modalities of this size are relatively unheard of, and a gap exists in the ability to mimic these challenging epitopes. We seek to delve into the optimization of stabilizing  $\beta$ -straps utilizing non-covalent interactions and study the formation of terminal cysteine staples to enhance the global hairpin rigidity.

*Poster - Session 2*  
*Health & Medical Sciences*

### **5. Amyotrophic Lateral Sclerosis: A Review of the Research Literature and Its Treatments**

By: Delilah Penate and Gary Perry

Faculty Mentor(s): Gary Perry

Presenter(s): **Delilah Penate**

ALS is a motor neuron disease that results in the degeneration of the neurons involved in movement. Typically, within a few years patients diagnosed with ALS will die due to respiratory failure since they become paralyzed and lose the ability to breathe independently. Generally, most patients have sporadic ALS, but about 5-10% of patients will have a familial type of ALS. Gene mutations related to ALS often cause issues in proteins that are meant to process nucleic acids. Stem cells are used to both research ALS and to treat it, through the growth of motor neurons and astrocytes. The two most prominent genetic mutations, C9ORF72 and SOD1, contribute to the vast majority of familial cases of ALS, and some treatments exist to target these specifically. Notably, tofersen can be used for those patients with the SOD1 gene mutation.

*Poster - Session 2*  
*Business, Marketing, Finance & Public Administration*

### **6. Networking Communication**

By: Jackson Shinneman

Faculty Mentor(s): William Paczkowski

Presenter(s): **Jackson Shinneman**

Utilizing AI and direct communication methods, like phone calls, offers a competitive advantage over passive forms of communication. Email and texting have made communication easier, but reliance on them may hinder job prospects. Employers seek confident, expressive candidates who can articulate their goals. Phone calls allow for personal connection, showcasing character and personality, leading to engaging conversations and immediate feedback. Employers appreciate proactive efforts, valuing direct engagement over passive communication. A simple phone call demonstrates seriousness and willingness to engage directly, setting candidates apart. Integrating AI for crafting clear messages enhances communication effectiveness. In essence, prioritizing direct communication methods, particularly phone calls, signals commitment and separates individuals from those relying solely on passive communication channels.



### 7. Dopamine Dynamics During Social Interaction in a Model of Neuropsychiatric Disorders

By: Tristan Wells, Adele Stewart, and Randy Blakely

Faculty Mentor(s): Randy Blakely

Presenter(s): **Tristan Wells**

The dopamine transporter variant Ala559Val (Val559) has been identified in individuals with autism spectrum disorder, a disorder characterized by altered social behavior. The DAT Val559 substitution results in anomalous dopamine efflux leading to sex-biased behavioral phenotypes in mice harboring the mutation. Here, we investigate the molecular mechanism(s) underlying male-specific deficits in sociability in DAT Val559 mice by monitoring real time dopamine release in the nucleus accumbens (NAc) during interaction with a sex-matched juvenile stimulus mouse utilizing fiber photometry coupled to a genetically encoded dopamine sensor. Male DAT Val559 mice interact with the juvenile mouse less, a phenotype accompanied by a dramatic reduction in social stimulus-driven dopamine release in the NAc relative to controls. In contrast, female DAT Val559 mice spend more time socializing with the stimulus mouse and display intact dopamine elevations in the NAc with a faster rise and sustained elevations with repeated interaction as compared to WT mice.

### 8. Isolation and Identification of Peptides from Marine Sponges

By: Janara Arencibia and Lyndon West

Faculty Mentor(s): Lyndon West

Presenter(s): **Janara Arencibia**

Natural products play an important role in modern medicine and serve as novel drugs and lead compounds in drug discovery. *Halichondria melanodocia* is a Caribbean sponge found in the Florida Keys that grows on mangrove roots and seagrass beds. Previous research on this sponge has been limited and resulted in the identification of several lactams and the polyether toxin okadaic. Research on this sponge led to the identification of a minor unidentified peptide that was not characterized due to insufficient quantities. Cytotoxicity testing has revealed the compound has an IC<sub>50</sub> of 1- and 2mM against PC3 human prostate and lung adenocarcinoma A549 cancer cell lines. The objective of this research is to obtain sufficient quantities (>10mg) of this unidentified compound for structural characterization and biological screening and to create an efficient isolation and purification protocol to identify the presence of a new bioactive peptide in the marine sponge.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

### **9. Influence of Distinct Facial Cues and Executive Functions on Age-related Changes in Children's Abilities to Identify Faces and in Face Emotion Recognition**

By: Kevin Nunes and Gizelle Anzures

Faculty Mentor(s): Gizelle Anzures

Presenter(s): **Kevin Nunes**

This research explores the development of children's face-processing abilities by looking at two main aspects of human perception- face identity recognition and emotion recognition. Children between the ages of 6-14 years of age will participate in a cross-sectional pilot study to complete different tasks related to the use of different facial cues(i.e., holistic face processing, featural processing, and configural processing) and different measures of executive function ( i.e., working memory, visual attention/inhibition, and task switching). Children will also complete a face identity recognition task and a facial expression recognition task. Our hypothesis predicts both processing of distinct facial cues and executive functions will drive age-related changes in face identity and face emotion recognition.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

### **10. Lost on the Map: Unraveling Geographic Illiteracy**

By: Kevin Martinez

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Kevin Martinez**

Geographic illiteracy, the finite knowledge of geography, has shown that individuals struggle with geographic knowledge. A 21 multiple choice question survey was designed that tested Americans' knowledge of global geographical information. A total of 192 people over the age of 18 responded to the survey. The initial view was that most Americans aren't well versed in geographic knowledge, so therefore they would perform poorly on this survey. Contrary to the initial hypothesis, approximately 70% of the respondents demonstrated that they had a notable grasp of geographical understanding. Interestingly, respondents in the 65+ age group showed their understanding of geography, by having a near-perfect score in answering the questions. As a result, this study fails to support the initial view. However, the results of the survey show many interesting correlations that speculate possible questions of what causes geographic illiteracy in certain demographics.

*Poster - Session 2*  
*Behavioral, Educational & Social Sciences*

### **11. Echoes of Silence: An Analysis of American Attitudes Towards Firearms**

By: Zack Brand

Faculty Mentor(s): Monica Escaleras and Eric Levy

Presenter(s): **Zack Brand**

In recent times, there have been a wide array of major events involving gun violence in the United States, which has resulted in many calls for a change in the national and state gun laws. I want to find out how many Americans and what demographics of Americans support the status quo and how many believe we need a change to the nation's gun laws. The respondents to the survey were given opinion-based questions regarding the politics surrounding firearms in the United States, while the other questions focused on demographic inquiries. This is one of the most divisive questions grappling Americans currently and for generations, with gun ownership on the rise it is important to understand how Americans view the current situation.

*Poster - Session 2*  
*Health & Medical Sciences*

### **12. The Effect of COVID-19 and Long-COVID on the Brain and Nervous System**

By: Sonia Davila

Faculty Mentor(s): Gary Perry

Presenter(s): **Sonia Davila**

COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Long-COVID affects a substantial percentage of COVID-19 survivors, even after they have recovered from the initial infection and tested negative for the virus. Commonly reported neurological symptoms include headaches, cognitive and memory impairment and loss of smell or taste that continue for at least four weeks after the beginning of symptoms or release from hospital. Recent research has aimed to explain the effect of COVID-19 on the brain and nervous system and how those implications can potentially lead to long-COVID, with possible explanations to date being residual tissue damage, continued viral presence, and chronic inflammation that persist from acute COVID-19. This review of the research literature details the local and systemic pathways by which SARS-CoV-2 can enter the nervous system, inducing a low-grade chronic neuronal injury that may underlie observed neurological impairments.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

### **13. Points of Prescription: Recruitment of Pharmacies in Palm Beach County**

By: Kezia Abraham, Abigail Sinu, and Katharina Rynkiewich

Faculty Mentor(s): Katharina Rynkiewich

Presenter(s): **Kezia Abraham** and Abigail Sinu

The Ethnography Lab at Florida Atlantic (ELFA) studies human interactions with their environments, including workplace environments in medical and pharmaceutical practice. This exploratory project maps pharmacies in Palm Beach County to observe antibiotic exchanges between pharmacists and patients. The place-bound observer selects the pharmacy sites according to proximity to school and home. The recruitment process involves speaking to pharmacy managers, explaining project details, and obtaining their written consent to partake in the study. The results we will present highlight the complex social process of recruiting for in-person observational studies of diverse healthcare settings as experienced by a student researcher in training. Weekly observation for this project is underway and will continue through spring 2024 to demonstrate the nature of antibiotic exchanges at multiple private pharmacies.

*Poster - Session 2*

*Business, Marketing, Finance & Public Administration*

### **14. Fashion in the Fast Lane**

By: Ava Vignola

Faculty Mentor(s): Monica Escaleras

Presenter(s): **Ava Vignola**

The effects of fast fashion range from human rights violations to environmental devastation. This study explores the views of Americans on Fast Fashion. It was hypothesized that many Americans prioritize price when shopping, due to the growth of fast fashion companies. 193 people completed a questionnaire on Amazon Turk that contained 16 questions about the ethics of fast fashion. The data showed that most Americans consider the price to be more important than the ethics when shopping, with a statistically significant difference in older consumers prioritizing price over ethics. The results also showed that males are more likely to disagree than females that fast fashion is unethical. This data can be used to create marketing strategies to encourage American consumers to purchase from sustainable companies. This study provided insight into American consumers priorities when shopping for fashion.

*Poster - Session 2*  
*Behavioral, Educational & Social Sciences*

**15. Pawprints on Purchases: How does Animal Testing in Products Affect American's Purchase Decisions?**

By: Madison Vignola

Faculty Mentor(s): Eric Levy and Monica Escaleras

Presenter(s): **Madison Vignola**

The practice of animal testing includes experimenting on animals to assess the reaction and safety of products, usually causing distress and harm. The controversy centers on the banning of animal testing. To gain effective insight on this topic, a questionnaire including 191 participants was published on Amazon M Turk. The survey showed the majority of those earning less than \$25,000 a year admitted to purchasing from brands that use animal testing. This high percentage proves how those with lower income have limited purchase decisions and shows how companies may choose animal testing over other alternatives as it is more readily available. Understanding how testing on animals can affect American purchase decisions provides a unique view that enables us to comprehend consumers' behavior regarding how their products are made in the corporate world.

*Poster - Session 2*  
*Health & Medical Sciences*

**16. The Impact of Diet Coaching to Improve Dietary Protein on Dietary Intake of Calcium and Vitamin D in Middle-Aged Women**

By: Stephanie Decosma and Sareen Gropper

Faculty Mentor(s): Sareen Gropper

Presenter(s): **Stephanie Decosma**

Women are at an increased risk for muscle and bone-related diseases, such as sarcopenia and osteoporosis, respectively due to inadequate protein, calcium, and vitamin D consumption. This study's purpose was to examine if 12 weeks of nutrition education and dietary coaching versus nutrition education without coaching to improve protein intake in middle-aged women would also increase calcium and vitamin D intakes. Using a randomized control, pretest posttest design, 25 participants were randomized to the intervention (nutrition education, coached) group, and 28 participants were randomized to the control (nutrition education, not-coached) group. Two-tailed pair sample t-tests revealed a significant increase in calcium intakes in both the control and intervention groups from baseline to 12 weeks. No significant changes occurred in vitamin D intakes in either group. These findings show promise for the use of nutrition education to improve diet among this population.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

### **17. The Distribution of Toys in the Environment and its Influence on Infant Involvement During Dyadic**

#### **Play: An Online Study**

By: Emma Bermudez, Christie Mattera, Jacqueline Hammack, and Teresa Wilcox

Faculty Mentor(s): Teresa Wilcox

Presenter(s): **Emma Bermudez** and Christie Mattera

This study investigated the influence of toy distribution on infant involvement during dyadic play sessions with mothers. While previous research has examined the impact of toy types and number of toys separately in controlled environments, this study uniquely explored their combined effect in naturalistic settings. Forty-eight infants aged 12-to-24 months and their mothers participated in four-minute free-play sessions via Zoom using toys selected by mothers. The Coding Interactive Behaviors (CIB) scales were utilized to determine infant involvement. Toy distribution was determined by using a ratio of the types of toys present in the environment. Anticipated outcomes include an association between the presence of fewer organizational toys and higher infant involvement, while higher ratios of responsive and symbolic toys may correlate with decreased involvement. This study contributes to a deeper understanding of how the toy environment influences infant engagement in dyadic play, offering insights into optimizing play environments for infant development.

*Poster - Session 2*

*Environmental, Ecological & Marine Sciences*

### **18. Testing Female Preference for a Mating Signal Using Operant Conditioning**

By: Erika Wilczek, Jerry Gambrell, and Rindy Anderson

Faculty Mentor(s): Rindy Anderson

Presenter(s): **Erika Wilczek**

Operant conditioning, a form of learning that uses rewards and punishments, is a successful method for testing the mating preferences of female songbirds because male song is inherently rewarding. This paradigm allows researchers to test the bird in a two-choice assay to determine which song qualities female songbirds find attractive in a male. We built a new wireless operant conditioning chamber to address the challenges facing the previous wired designs. Using this design, we can quantify hops on each perch to determine preferred song. I will test whether female finches prefer the songs of familiar males to unfamiliar males. I predict that the females will prefer the songs of familiar males since this preference has been shown in other songbird species. This project will add to the existing knowledge of what qualities female finches prefer when selecting a mate, and the degree this preference varies among individual females.

### **19. An Operant Conditioning Chamber to Test Auditory Perception of Captive Songbirds**

By: Jerry Gambrell, Erika Wilczek, and Rindy Anderson

Faculty Mentor(s): Rindy Anderson

Presenter(s): **Jerry Gambrell**

Operant conditioning approaches to animal research, though time-consuming and work-intensive, have yielded important discoveries. Our project seeks to improve the efficiency of research by designing a custom, semi-autonomous operant conditioning system capable of presenting auditory stimuli to subjects (songbirds), while sensing and logging subjects' resulting behavior (frequency/duration of perching). The system uses an innovative sensing technique for capturing accurate data that avoids pitfalls associated with using other methods. We also added a function to create a "tutoring mode" for subject training with non-contingent stimuli. Initially developed as a single-unit prototype, we are currently testing the unit's functionality and reliability with songbirds, while taking steps to scale up to simultaneous operation of 12 units. Our system is a significant achievement, as commercially-available systems are expensive and often do not fit the specific needs of researchers. Our project will result in an effective, inexpensive, customizable system capable of providing reliable research data.

### **20. Enhancing Group Learning for Underrepresented Students**

By: Brunny Joasil, Dani Garcia-Moreno and Chad Forbes

Faculty Mentor(s): Chad Forbe

Presenter(s): **Brunny Joasil** and Dani Garcia-Moreno

This study addresses the underrepresentation of women and minorities in STEM by exploring the impact of strategically grouped students on learning outcomes. Building on prior research concerning stereotype threats, the investigation extends from gender to ethnicity, aiming to improve inclusivity in STEM environments. Conducted at Florida Atlantic University, the study recruits undergraduates at FAU. Participants engage in a Science and Learning Task by controlling for group composition and implementing various priming strategies, with groups strategically formed based on gender and ethnicity. Rigorous controls are in place for variables such as question sequence, time allocation, and pre-existing science knowledge. Results will encompass enhanced cohesion, reduced stress levels, and positive learning experiences, conveying the significance of purposeful group composition in fostering inclusivity in STEM. This study advocates for future educational practices and policies fostering a more diverse and supportive STEM community.

*Poster - Session 2*  
*Basic Sciences*

### **21. Synthesis of the Key Precursor of the Sialyl-Tn Building Block**

By: Rebecca Salloum, Zach Gorlin, and Ivet Boneva  
Faculty Mentor(s): Maré Cudic  
Presenter(s): **Rebecca Salloum** and Zach Gorlin

Tumor-associated carbohydrate antigens (TACAs) consist of incomplete or truncated glycan structures which are often capped by sialic acid. TACAs help indicate tumor initiation, progression, and metastasis. Our primary focus is sialyl-Tn (sTn), a TACA containing a sialic acid  $\alpha$ -2,6 linked to GalNAc  $\alpha$ -O-Ser/Thr. Project objectives were obtaining gram quantities of compound 8, an O-glycosylated Thr building block. Starting compound, D-galactal was acetylated with acetic anhydride yielding peracetylated galactal. The purified peracetylated galactal was subjected to a one-pot azidochlorination reaction producing chloroazide. Chloroazide is converted to phenyl thioglycoside by displacing the anomeric chlorine. Deacetylation of phenyl thioglycoside occurs to protect at C-6 using tert-butyldimethylsilyl chloride. Additional protection at the C-3 and C-4 hydroxyls was achieved with 2,2-dimethoxypropane. The resulting compound was coupled with the pentafluorophenyl ester of Fmoc-protected Thr producing the O-glycosylated Thr building block. Full characterization of synthesized compounds is conducted using  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectroscopy.

*Poster - Session 2*  
*Engineering*

### **22. Programming a Robotic Manipulator to Avoid Damaging Fragile Objects When Grasping and Picking the Objects Up**

By: Dylan Shim and Minghan Wei  
Faculty Mentor(s): Minghan Wei  
Presenter(s): **Dylan Shim**

Robotic manipulators are able to replicate many physical actions and abilities of humans, such as grasping and picking objects up. Our research focuses on programming a robotic manipulator to grasp and pick up fragile objects without causing any damage to the objects. We accomplish this goal by using a low-cost force sensor attached to the manipulator's grippers in order to allow the manipulator to have an accurate reading of how much force it is applying when grasping an object. We have discovered that each fragile object used in our experiment has a specific range of force that can be applied by the manipulator in order to successfully pick an object up while not causing damage. Programming a manipulator to stop applying force once it reaches the maximum amount of force to pick up an object without damaging it will result in successfully picking up fragile objects.



### **23. SPNS (Self-Positivity-Negativity Scale) Correlations**

By: Ryu Morrison, Morgan Cope, and Michael Maniaci

Faculty Mentor(s): Michael Maniaci and Morgan Cope

Presenter(s): **Ryu Morrison**

When people engage in novel, interesting, and challenging activities, they take part in a process known as self-expansion. The explanation behind this is that doing new and exciting things introduces a person to new ways of defining themselves, resulting in their “self” expanding. Even though self-expansion is generally associated with higher self-esteem, people are not equally motivated to self-expand. Objective self-ambivalence, referring to simultaneously having high positive evaluations and high negative evaluations of the self, could influence whether a person wants to expand on their identity. Therefore, the aim of the proposed study is to examine the correlation between objective self-ambivalence and self-expansion preference by creating and administering a new measure for objective self-ambivalence (titled the SPNS Scale, or self-positivity/negativity scale) based on the Positive Negative Relationship Questionnaire (PNRQ; Rogge, Fincham, Crasta, & Maniaci, 2017) alongside other relevant measures.

### **24. The Application of Game Theory in Poker**

By: Cameron Hackett

Faculty Mentor(s): Eric Levy

Presenter(s): **Cameron Hackett**

This research investigates the extent to which game theory principles are applied by players in poker, specifically focusing on their utilization without explicit knowledge of game theory. Players may use strategies aligned with game theory concepts without formal training. A comprehensive survey will be conducted using SurveyMonkey to create the study and Amazon Mechanical Turk, getting roughly ~200 responses from poker players from nationwide backgrounds and locations. The survey will explore how often people use game theory in poker without knowing it. While many players lack former knowledge of game theory, they are expected to exhibit behaviors consistent with its principles. Factors like experience, opponent observation, and trial and error learning are all game theory concepts that players may be using without knowing. This study provides insights for strategic intuition in poker decision-making and contributes to understanding gameplay dynamics in this context.

*Poster - Session 2*

*Behavioral, Educational & Social Sciences*

**25. How Climate Change Concerns Differ by Political Ideology Among the Florida Atlantic Student Body**

By: Angela Easterling, Livia Borges, Sonthonax Jean-Baptiste, Jordan Thompson, and Geoffrey Wetherell

Faculty Mentor(s): Geoffrey Wetherell

Presenter(s): **Angela Easterling**, Sonthonax Jocean-Baptiste and Livia Borges

Political partisanship plays a crucial role in determining the significance of climate change and its impacts on individuals. In this study, we will survey 200 FAU undergraduate students recruited from SONA and on the FAU campus. The survey will ask participants to rate their level of concern with a range of environmental issues and gives them the opportunity to express their environmental concerns. We expect liberal and conservatives to differ in their concern for various environmental issues. This insight is important in influencing how people respond to climate change and how this may be motivated by their partisanship. In addition, this study can help inform people, regardless of political partisanship, of ways to engage them in the issue. Given that FAU is located in south Florida, an area particularly vulnerable to climate change, FAU undergraduate students would be a prime population of interest in addressing the above questions.

*Poster - Session 2*

*Cross Disciplinary Projects*

**26. Bioarchaeological Analysis of Three Individuals Excavated from Palike di Mineo, Sicily**

By: August Stone, Madison Rieth, and William Burnett

Faculty Mentor(s): Meredith Ellis

Presenter(s): **August Stone**, Madison Rieth and William Burnett

This study presents the analysis of three individuals excavated from the site of Palike di Mineo, Sicily in May and June of 2023. The archaeological site contained numerous individuals buried, but this study focuses on two adult males and one subadult. The burials are estimated to be from the Imperial Period of the Roman Empire, or between 20 CE - 360 CE. Information collected includes age, sex, stature, and taphonomy of the individuals. Burial style, artifacts, and position of the burials are used to present data on the possible conditions of life in ancient Sicily. Our intent of this project is not to answer the questions posed, but rather to contribute data to the greater discussion of archaeology in this area.

*Poster - Session 2*  
*Basic Sciences*

### **27. A Parameterization Method of Unstable Manifolds for Delay-Differential Equations**

By: Adam Zaidan

Faculty Mentor(s): Jason Mireles-James

Presenter(s): **Adam Zaidan**

This project develops computational methods to parametrize the unstable manifolds of equilibria and periodic solutions to delay-differential equations (DDE) with constant delay. These manifolds are approximated by a Chebyshev-Taylor or Chebyshev-Fourier-Taylor series expansion, respectively. In our approach, we integrate a DDE to create a compact delay map on a fixed domain whose iterates solve the DDE after rescaling and translation. Invariant circles of a delay map correspond to the associated DDE's periodic solutions. As such, we compute a periodic solution's unstable manifold by computing the associated invariant circle's unstable manifold. This method extends parametrization methods for invariant circles in finite dimensions and improves upon previous methods for computing unstable manifolds. We apply our method to various DDEs of interest, such as cubic-Ikeda, Mackey-Glass, and Wright's equation.

*Poster - Session 2*  
*Engineering*

### **28. Sickle Cell Impedance Detection Device**

By: Shilei Richards, Jacob Mullins, Abraham Silva, Alvaro Morales, Smith Matthias, Gineson Rousseau, Sarah Du, and Oscar Curet

Faculty Mentor(s): Sarah Du and Oscar Curet

Presenter(s): **Shilei Richards** and Jacob Mullins

This report presents the design and development of an automated microfluidic system aimed at assessing the severity of sickle cell blood using electrical impedance measurement. Sickle Cell Disease (SCD), an inherited blood disorder, leads to the formation of "sickle" shaped red blood cells, causing occlusion in blood vessels. Pain crises associated with SCD have been correlated with the severity of the condition. Our device seeks to provide an effective means for individuals with SCD to monitor pain crises and manage their condition by testing the severity of SCD. With our device, the severity of SCD is tested by running the patient's blood through a microfluidic chip and measuring the impedance of the occlusion that occurs in the chip. No occlusion will occur if the blood is normal.

*Poster - Session 2*  
*Basic Sciences*

### **29. Tomato Microbiomes Associated with the Resistance of Bush Grown Tomatoes and the Susceptible**

#### **Everglades Varieties to Early Blight Disease**

By: Shan Damas and Nwadiuto Esiobu

Faculty Mentor(s): Nwadiuto Esiobu

Presenter(s): **Shan Damas**

Tomatoes are vegetable fruits feasted globally and suitable for many things. They are susceptible to microbial diseases such as Blight disease, which causes severe damage and harvest loss. The prospect of using well-screened bio-control plant microbiomes can help reduce the spread of this disease and have positive agricultural outcomes. This study employed two varieties of tomatoes, one resistant to the early blight (Bush Grown Tomatoes) and another very susceptible (Everglades varieties), to identify the contrasting and unique ribotypes associated with healthy resistant tomato varieties. Also, we would cultivate the microbial compositions of the various niches in the tomato plant to isolate potential bio-control agents. The 16S rRNA sequence analysis will reveal microbial taxonomic profiles from which functional diversity and their potential role in conferring resistance to tomato plants during blight infections can be deduced. Our data will help create microbiome-based solutions to improve the resistance of Florida native tomatoes (Everglade).

*Poster - Session 2*  
*Health & Medical Sciences*

### **30. Investigating Phosphorylation-Dependent Regulation of Serotonin Transporter (SERT) in Modulating**

#### **MDMA Response: Insights from Ala276 Knock-In Mouse Model**

By: Sofia Wasilewski, Carina Meinke, Adele Stewart, Tristan Wells, Sammanda Ramamoorthy, and Randy Blakely

Faculty Mentor(s): Randy Blakely

Presenter(s): **Sofia Wasilewski**

Serotonin (5-HT) is an essential neuromodulator integral to mood, cognition, and social behavior. The presynaptic 5-HT transporter (SERT) mediates its clearance and availability. Dysregulation of SERT has been linked to multiple disorders, including depression and autism spectrum disorder (ASD). SERT activity and trafficking has been shown to be regulated through phosphorylation at Thr276, a site targeted by PKG. To study the importance of the phosphorylation-dependent regulation of SERT, the Ala276 knock-in (KI) mice will be used to investigate potential changes SERT activity and conformation using MDMA-induced 5-HT release. While our KI mice exhibit reduced sociability, which is one of the core symptoms in ASD, MDMA is heavily studied for its 5-HT-dependent prosocial effects. By measuring in vivo 5-HT release using fiber photometry, MDMA-induced locomotion, and MDMA's inhibition of 5-HT uptake, our results will contribute to better understand how the inability to phosphorylate SERT at Thr276 impacts SERT conformation and activity.

### **31. Enhanced Heat Transfer on Inclined Surfaces for Thermal Management of Electronic Devices**

By: Cristian Pena, David Markwick, Mahyar Ghazvini, and Myeongsu Kim

Faculty Mentor(s): Myeongsu Kim

Presenter(s): **Cristian Pena** and David Markwick

Extreme heat flux from electronic devices such as smartphones and laptops causes system malfunctions and failure. Nucleate boiling, characterized by the continuous growth of vapor bubbles on a heated surface, can effectively handle the excessive heat from hot spots because of substantial thermal transport from phase change. This study investigates the effect of surface orientation on thermal transport and bubble generation during nucleate boiling. The study utilizes high-speed imaging and laser-induced thermometry to examine transient bubble growth and associated thermal transport near a bubble from local temperature measurements. The results show that the surface orientation significantly influences bubble shape, diameter, and generation rate. As the included angle of the surface increases, the temperature gradient in the liquid near growing bubbles becomes larger, implying enhanced thermal transport or efficient cooling. We will discuss an innovative strategy for developing cooling systems to control extreme heat by surface orientation with bubble growth.

### **32. Development of Fluorescent Cholesterol Probes with Improved Enzymatic Stability**

By: Nicholas McInchak and Maciej Stawikowski

Faculty Mentor(s): Maciej Stawikowski

Presenter(s): **Nicholas McInchak**

Cholesterol is a vital component of eukaryotic membranes, playing critical roles in membrane structure and various biological processes. A deeper understanding of its subcellular localization and transport will lead to a better understanding of cholesterol-related diseases and potential treatments. Using fluorescent cholesterol analogs and live-cell imaging has proven to be a promising method to elucidate information about cholesterol's subcellular localization and transport. Utilizing the naphthalimide fluorophore, we have developed a library of novel fluorescent cholesterol analogs. Molecular dynamics simulations and giant unilamellar vesicles were employed to study how closely the analogs resemble cholesterol in model membrane systems. In our previous work, we developed fluorescent cholesterol probes linking the fluorophore to cholesterol via an ester bond. Our prior studies suggest that the ester linkage in the analogs could be subject to enzymatic hydrolysis. To address this hypothesis, several new analogs incorporating linkers with improved hydrolytic stability have been developed and characterized.

*Poster - Session 2*  
*Health & Medical Sciences*

### **33. The Relationship Between Comorbidities on Hospital Readmissions in Patients with Heart Failure**

By: Arielle Axelrod

Faculty Mentor(s): Mary Ann Leavitt

Presenter(s): **Arielle Axelrod**

Health failure affects over 6 million adults in the United States with approximately 1 million new cases yearly. There is an increasing prevalence of comorbidities associated with heart failure resulting in increasingly poor clinical outcomes for these patients. The purpose of this study was to explore correlations between comorbidities and 90-day hospital readmission in 80 heart failure patients ages 62 to 99. A quantitative secondary analysis using Chi-Square was used to investigate the relationship between comorbidities and hospital readmissions. The results revealed no significance between hospital readmissions and hypertension, atrial fibrillation, diabetes mellitus, coronary artery disease, or renal failure in patients with heart failure. Recommendation for future research includes incorporating a more diverse population to identify high risk comorbidities as it relates to hospital readmission, quality of life, and prognosis in patients with heart failure.

*Poster - Session 2*  
*Classroom Research Project/Assignment*

### **35. Analyzing the Impact of Lane Expansion and Population Density on Vehicular Collision Rates in South Florida**

By: Alex Altieri, Megan Escobio, Anthony Gutierrez, Joshua Rasam, Krista Kostallari and Camila Alvarez

Faculty Mentor(s): Valentine Aalo

Presenter(s): **Alex Altieri**, Megan Escobio, Anthony Gutierrez and Joshua Rasam

South Florida, an area defined by diverse urban and suburban areas, has seen explosive population growth. To meet this growth, roadways have begun to expand. However, are these expansions enough to mitigate an increase in reported collisions? This research project aims to investigate the complex interplay between the number of lanes and population density on vehicular collision incidence through quantitative analysis of traffic accident data, road infrastructure, and demographic information. Preliminary findings suggest a nuanced relationship, with an increase in lanes and higher population densities correlating with a rise in collisions, yet their interaction effects present a more complex scenario, potentially influenced by other factors such as traffic flow, road quality, and urban planning policies. This project aims to isolate these variables and provide evidence-based recommendations for policymakers, urban planners, and traffic safety experts to design safer roads in South Florida and similar regions.

**36. Sustainable Transformation: Uniting for Change through ‘Commit Today, Transform Tomorrow’ Social Marketing Campaign**

By: Allison Todd, Hannah Garner, Cassidy Espinoza, Amanda Destefano, Emily Mortimer, Maria Mucino, Maria Portilla, Trisannia Nelson, Tianna Gaddis, Sierra Danastor, and Mariana Freire Pratas Palma

Faculty Mentor(s): Eileen Acello

Presenter(s): **Allison Todd**, Hannah Garner, Cassidy Espinoza and Amanda Destefano

Our research project delves into the pressing need for sustainable actions in the face of climate change and environmental degradation, highlighting the crucial role of time in influencing the trajectory of our future. Through a comprehensive approach involving focus groups, surveys of educators, and interviews with business leaders, we gathered diverse perspectives on sustainability. This data collection informed the development of a social marketing campaign, “Commit Today, Transform Tomorrow,” which aims to inspire sustainable behaviors and promote environmental stewardship. By tailoring tactics to specific target audiences and utilizing strategic social media platforms, we seek to engage students, consumers, business leaders, and marketing professionals in proactive sustainability initiatives. Our findings underscore the importance of unified efforts across demographics and professions to drive meaningful change toward a greener and more sustainable future for all.

**37. Next Generation Plant Booster: Proof of Concept via Expression of Green Fluorescent Proteins in**

**Plant-Growth-Promoting-Bacteria**

By: Jon Sullivan and Nwadiuto Esiobu

Faculty Mentor(s): Nwadiuto Esiobu

Presenter(s): **Jon Sullivan**

Traditional agricultural practice has relied on antibiotics, pesticides and chemical fertilizers to combat issues such as stress, disease and nutrient deficiency. Genetically modified bacteria symbionts of plants represent a cost-effective and sustainable solution to issues like these. The goal of this research is to examine the transformation efficiencies of bacteria already known to have beneficial impacts on plants, in expressing Green Fluorescent Protein introduced via a monomeric plasmid and electroporation. Pseudomonas and Bacillus strains will be tested. This will serve as a proof of concept that Plant Growth Promoting Bacteria can be transformed with genes coding for beneficial compounds. The impact of this research could provide insight into developing alternative agricultural practices, reducing operating costs and increasing sustainability. On top of the agricultural and economic benefits the same practice could be expanded to conservation of endangered plant species by providing them with better mechanisms to deal with environmental stressors.

Poster - Session 2

Behavioral, Educational & Social Sciences

### 39. Infant Index-Finger Pointing Frequency and Compliance Behaviors in Mother-Infant Dyads

By: Charledgar Bedouet, Jacqueline Hammack, and Teresa Wilcox

Faculty Mentor(s): Teresa Wilcox

Presenter(s): **Charledgar Bedouet**

This study investigated the association between spontaneous index-finger pointing production in infants and their degree of compliance behaviors when engaged in play with their mothers. Compliance and index-pointing are social behaviors that begin to arise around the second year of life and develop as social complexity increases, with both requiring 1) the ability to engage in shared attention/goals and 2) an awareness of the intentions of others. 55 infants between 12- and 24-months-old and their mothers were video recorded during free play in a naturalistic environment online via Zoom. Frequency of index-finger production initiated by the infant was assessed by trained coders. Compliance behaviors were coded using the Coding Interactive Behaviors (CIB) rating system. Anticipated outcomes include a positive association between index-pointing frequency and compliance behaviors. This study will provide insight into the relationship between infant compliance behaviors and infant-initiated communication in dyadic interactions.

Poster - Session 2

Basic Sciences

### 40. Effects of Serotonin in MSR Activity of *Drosophila*

By: Vitor Baruffi, Itzel Cabrera, Lara Darwish, Maria Merlano Gomez, and David Binninger

Faculty Mentor(s): David Binninger

Presenter(s): **Vitor Baruffi**, Itzel Cabrera, Lara Darwish and Maria Merlano Gomez

It has been shown in our published studies, as well as unpublished data from our lab, that the absence of methionine sulfoxide reductase (MSR) activity can lead to an increase in the intracellular level of serotonin, a necessary neurotransmitter. In this research proposal, we seek to understand the correlation between serotonin levels and the reduced developmental time of MSR-deficient *Drosophila melanogaster*, or fruit fly. For such, we will conduct in vivo changes in serotonin levels via food supplementation. By modifying the amount of serotonin, we can analyze the direct phenotypic effects of different serotonin levels in *Drosophila*. The *Drosophila* possess many advantageous traits we can take advantage of in research. It is possible to simulate various complex behaviors and locate their brain circuits, enabling us to possibly replicate many human neurodegenerative disorders (NDDs), opening opportunities for the development of novel treatment methods.



#### **41. The Closet**

By: Saturn Vogeley and Erica Torres

Faculty Mentor(s): Dorothea Lemeh

Presenter(s): **Saturn Vogeley** and Erica Torres

The closet is a metaphor used for queer people who have not told anyone about their identity, these people are described as being “In the closet”. This piece is an art installation that is meant to be a representation of the idea of closet as a physical space represented through the bird cage. We have created multiple characters as figurines to display the differing experiences of being in, leaving and being out of the closet. We wanted to highlight how for queer people the closet is both protective and restrictive and through our setting of the scene it is meant to show the multitude of perspectives that queer people have on the closet.

#### **42. Exploring Photodynamic Therapy-Induced Molecular Changes in Skin Tissue Using Raman Spectroscopy**

By: Thi Nguyen and Andrew Terentis

Faculty Mentor(s): Andrew Terentis

Presenter(s): **Thi Nguyen**

Photodynamic therapy (PDT) is a promising method, using light-sensitive substances like porphyrins to target and eliminate cancer cells while protecting nearby healthy tissue. Porphyrins, known for their photosensitizing properties, generate reactive oxygen species upon light exposure, making them effective in PDT. However, optimizing PDT protocols for better treatment outcomes remains challenging. This study aims to enhance cancer treatment precision using PDT by analyzing tissue changes with porphyrins and light through Raman spectroscopy, integrating machine learning for improved analysis. Here, we show that treating skin cancer with porphyrin solutions and visible light creates specific chemical patterns, as detected by Raman spectroscopy and analyzed through PCA, indicating the potential for improved cancer treatment precision. Our primary discovery reveals the molecular alterations in cancer tissues treated with porphyrins and light during PDT. Understanding chemical interactions in PDT improves skin cancer treatment and lays the foundation for treating various cancer types.

*Poster - Session 2*

*Classroom Research Project/Assignment*

### **43. Identifying Comorbidities that may Correlate with ICD Alerts in Persons with Heart Failure**

By: Kaydrina Simeon and Mary Ann Leavitt

Faculty Mentor(s): Mary Ann Leavitt

Presenter(s): **Kaydrina Simeon**

Implanted cardioverter/defibrillators (ICDs) are devices for patients with heart failure (HF) programmed to generate alerts for cardiac decompensation. Other comorbidities may put patients at greater risk of ICD alerts. The purpose of this secondary analysis was to explore what pre-existing diagnoses may put patients at risk of heart failure decompensation as indicated by an alert from their ICD. There were 40 participants: 35 males and 5 females, ages 53-99. This retrospective chart review using quantitative methodology was analyzed using crosstabs and Chi-squared. Findings revealed that 2 participants with diabetes, 8 with hypertension, 10 with atrial fibrillation, 3 with chronic kidney disease, and 6 with coronary artery disease received an alert from their ICD. Diabetes mellitus and coronary artery disease had the closest relationship to ICD decompensation alerts. Nursing implications include the need for close monitoring of patients with HF and these comorbidities.

*Poster - Session 2*

*Engineering*

### **45. Low-Orbit Radiation Exposure Vessel (LOREV) CubeSat Plant Research**

By: Cody Kalczuk, Courtney Moon, David Markwick, Grant Scheurich, Luke Scudato, Thomas McGowan and Oscar Curet

Faculty Mentor(s): Oscar Curet

Presenter(s): **Courtney Moon**, Luke Scudato, Thomas McGowan, Cody Kalczuk, David Markwick and Grant Scheurich

Long-term space missions require the cultivation of plants, but current research on plant development in space requires a significant amount of astronaut participation. The low-orbit radiation exposure vessel (LOREV) CubeSat explores a solution to this issue as a project designed for autonomizing life science research involving a small class of miniaturized satellites known as a CubeSat. Through a high-altitude balloon experiment (HAB) conducted in spring of 2024, this study showcases the effects of solar radiation on plant development. Insight into the larger consequences of crop development in radiation-exposed conditions is gained from the data collected during this mission, which is essential for long-duration space missions. The LOREV CubeSat includes a pressurized Environment Controlled System (ECS) with self-adjustment features and active radio communication. Data is collected on CO<sub>2</sub>, radiation, altitude, pressure, temperature, and humidity sensors, and a thermoelectric dehumidifier and heating elements regulate humidity and temperature.

## ***Poster Presentations from Undergraduate Researchers at Palm Beach State College***

*Poster - Session 2*

*Environmental, Ecological & Marine Sciences*

### **Ecological and Human Health Impacts of Pesticides Use in Banana Production: A Review**

By: Kyla Torres, Lourdes Baldera, and Shivangi Prasad

Faculty Mentor(s): Shivangi Prasad

Presenter(s): **Kyla Torres and Lourdes Baldera**

We discuss the harmful impacts of pesticide use in banana production in this project. This review will highlight the adverse effects of pesticides on nearby communities, wildlife, and the environment, specifically in Central America. The review will examine recent literature focusing on the various abiotic and biotic elements impacted by agricultural pesticide use. In humans, aerial spraying of Mancozeb poses various health hazards to pregnant women and children from elevated levels of Manganese, a known neurotoxin, in drinking water. Furthermore, relatively high urinary levels of ETU (ethylene thiourea), a degradation product of Mancozeb, are associated with hypothyroidism in women, disrupted fetal brain development, and a higher chance of respiratory effects in infants. Aquatic ecosystems are adversely impacted by the leaching of pesticides, which reduces species richness and macroinvertebrate communities in canals, streams, and lagoons. Pesticide pollution diminishes the biodiversity of native organisms, which, in turn, alters the food web.

## **Poster Session III - Late Afternoon** (3:45 pm - 5:00 pm)

*Poster - Session 3*  
*Engineering*

### **1. The Electromagnetic Oxygen and Hydrogen Device (EMOH) - A New Take on Aeration Technology**

By: Maria Russo, Ruben Masters, Youssef Mohamed, Michael Micele, Deric Hernandez, Tobi Fell, and Fred Bloetscher

Faculty Mentor(s): Fred Bloetscher and Oscar Curet

Presenter(s): **Maria Russo**, Youssef Mohamed, Rubin Masters, Michael Micele, Deric Hernandez and Tobi Fell

Water pollution, stemming from factors like fertilizers and toxic VOCs, is causing frequent and harmful algal blooms in Florida's bodies of water. Traditional methods, such as surface aeration and chemical additives, prove ineffective and environmentally destructive. This project introduces a novel aeration technique called the Electromagnetic Oxygen and Hydrogen Device (EMOH). Utilizing magnetohydrodynamics, EMOH generates micro-and-nanobubbles of hydrogen and oxygen through an electromagnetic field, electrical current, and moving fluid, and such device will be applied in the stormwater retention pond behind Engineering East at Florida Atlantic University. The carefully designed piping system surrounding EMOH aims to minimize head loss, ensure optimal pump performance, and accommodate in-field sensors with a user interface. Laboratory and in-field data will be used to track the water quality until a dissolved oxygen level of 10 mg/L is met, thus confirming the success of the project and the beginning of innovative aeration technology for water restoration.

*Poster - Session 3*

*Music, Art, Literature, Theater, History & Philosophy*

### **2. Spelling it Out: Black Club Women's Community Work in Florida and its Impact on the Suffrage Movement**

By: Bethany Champlin

Faculty Mentor(s): Evan Bennett

Presenter(s): **Bethany Champlin**

Florida's involvement in the suffrage movements in the late nineteenth and early twentieth century has little dedicated scholarship and black women's activism in the state even less so. This research project sought to understand how black Floridian women were involved in the suffrage movements of the early twentieth century, how that differed from more popular white-dominated activist movements, and how their activism impacted the communities they were involved in. Through examining personal documents from accomplished Floridian activists like Mary McLeod Bethune, documents from national clubs like the National Association for Colored Women, and scholarship on black women's clubs in Florida, this project argues that community work supported and perpetuated the foundation of women's suffrage within the ideals of the black club movement, and the fight for equal suffrage after the 19th amendment was continued from this basis to end Florida's discriminatory voting laws targeting African American voters, especially women.

### 3. Uncovering the Ethical Dilemmas of Physician-assisted Suicide

By: Grace Donovan

Faculty Mentor(s): Samuel Director

Presenter(s): **Grace Donovan**

Physician-assisted euthanasia (PAE) is a medical practice where a physician facilitates a patient's death by providing the means or information necessary for the patient to end their own life. PAE was intended for a small subset of patients with a terminal and incurable illness who would choose to end their life on their terms and timeline. Within my research, I critically examined the moral implications of physician-assisted euthanasia and analyzed numerous perspectives on the uses of PAE. My study argues that PAE poses significant moral harm to both patients and physicians by undermining the healing ethos of what is medical practice. I uncovered numerous perspectives on the uses of PAE, both for and against its potential benefits and downfalls. Physician-assisted euthanasia is an uncertain territory between right and wrong in the medical field and my research aims to shed light on the ethical landscape that is physician-assisted euthanasia.

### 4. CRE-Lox-Mediated Tyrosine Kinase Receptor B Knockdown in Dentate Granule Neurons Reverses

#### Epileptogenesis in a Vertebrate Model of Adult-Onset Epilepsy

By: Denitsa Kostadinova, Adrianna Tran, Tashi Dillon, and Ceylan Isgor

Faculty Mentor(s): Ceylan Isgor

Presenter(s): **Denitsa Kostadinova** and Adrianna Tran

Temporal lobe epilepsy (TLE) is the most common form of epilepsy that can emerge in adulthood. In some patients, the underlying cause of epileptogenesis is unknown. TLE patients display increased hippocampal expression of BDNF, its receptor TrkB, and an abnormal integration of dentate granule neurons. Dentate granule neurons have a particularly important function of gating cortical input to prevent excess activity from spreading throughout and beyond the hippocampus. Alterations in granule neuron connectivity are thought to contribute to the breakdown of this gating function, allowing limbic seizures to develop. The purpose of this experiment is to test if knockdown of tyrosine kinase receptor B (TrkB; the receptor of brain-derived neurotrophic factor, BDNF) in dentate granule neurons via tamoxifen-induced Cre-lox deletion will sufficiently block the emergence of tonic-clonic seizures and prevent pro-epileptic destabilization of the dentate gate in a mouse model of adult-onset epilepsy.

Poster - Session 3

Environmental, Ecological & Marine Sciences

### **5. Remote Sensing Technology Sheds Light on Primate Associations in the New Lomami National Park,**

#### **Democratic Republic of Congo**

By: Angel Ellis, Geraldine Cardoso Ruiz, Larissa Guimaraes Bafile, Rithika Mathew, and Kate Detwiler

Faculty Mentor(s): Kate Detwiler

Presenter(s): **Rithika Mathew** and Geraldine Cardoso Ruiz

The Congo Basin is the world's second-largest rainforest, composed of high biodiversity yet significantly understudied. We analyzed 4042 camera trap videos captured in 2021 in the newest protected area of the Congo Basin, the Lomami National Park. Our research focused on studying the associations between seven primate species found in the southern sector of the park. We identified 1073 primate events, from which 823 were solitary (only one individual), 160 were conspecific (two or more individuals of the same species), and 44 were polyspecific (two or more individuals of different primate species). From the conspecific events, the most prevalent species were *Cercopithecus ascanius* with 87 social events and *C. wolffi* with 25 social events. As more primate species dwindle in population due to causes like habitat loss and hunting, this study is crucial for the understanding of interspecies relationships and primate communities in valuable conservation areas.

Poster - Session 3

Environmental, Ecological & Marine Sciences

### **6. Effects of Genetically Modified Soybeans Expressing CP4-EPSP Protein and Non-GM Conventional**

#### **Soybeans on the Assembly and Structure of Microbiomes of Leaves and Roots.**

By: Shania Henry and Nwadiuto Esiobu

Faculty Mentor(s): Nwadiuto Esiobu

Presenter(s): **Shania Henry**

The creation of herbicide-tolerant crops is one of the major revolutions of Agricultural Biotechnology in the 21st century. Herbicide glyphosate (known commercially as RoundUp) is a potent agrochemical used to inhibit the growth of unwanted weeds. The expression of the soil-borne *Agrobacterium* sp. 47.6 kD EPSPS protein, gives plants the capability to be resistant to glyphosate and potentially accumulate the toxic agrochemical. It is not known how these widespread GMO impact soil microbial diversity and specifically the plant microbiomes. We hypothesize that exposure of plant microbiomes to glyphosate will destabilize the Plant\*Microbe symbiosis needed for sustainable soil health and fertility. In addition, we predict that the rhizobiome and phyllosphere bacteria of GM soybeans will have a lower diversity and reduced relative abundance of beneficial microbes. In this study, we examine the impact of CP4-EPSPS engineered soybean and RoundUp on soil microbiomes, while comparing those results with conventional soybean & RoundUp.

### **7. Correlation Between Inflammatory Markers And Fatigue Scores In The Preoperative Period Of CABG**

By: Giulia Klapper and Rita de Cassia Gengo e Silva Butcher  
Faculty Mentor(s): Rita de Cassia Gengo e Silva Butcher  
Presenter(s): **Giulia Klapper**

Fatigue is a prevalent and distressing symptom and may influence outcomes after coronary artery bypass grafting (CABG) surgery. Factors contributing to fatigue severity are yet to be determined. This study aimed to investigate the correlation between fatigue severity and inflammatory markers in the preoperative period of CABG. In this correlational study, 86 participants (61.6±8.4 years old; 80.2% male) waiting for CABG in a hospital in Brazil were enrolled. General and exertional fatigue were assessed using standardized and validated tools (DUFSS and DEFS). Inflammatory markers (IL-6, IL-10, CRP, TNF- $\alpha$ ) were obtained from blood samples. Data were analyzed using Person's correlation. The study was approved by the IRB. There were weak and non-significant correlations between DUFSS, IL-6 ( $r=.10$ ,  $p=.401$ ) and TNF- $\alpha$  ( $r=.14$ ,  $p=.191$ ), and DEFS and IL-10 ( $r=.10$ ;  $p=.352$ ). These findings suggest that inflammatory markers are not correlated with fatigue severity. This study should be replicated in a larger sample.

### **8. The Creation of a S.T.A.R.: a Cross-Age Scientific Curricular Experience Program Model**

By: Ella Bethke and Katherine Hendrickson  
Faculty Mentor(s): Katherine Hendrickson  
Presenter(s): **Ella Bethke**

Our aim is to find and share curricular activities that are easy to implement and captivating. The S.T.A.R. program is a cross-age scientific curricular experience program model that utilizes hands-on activities with instruction by trained high school students. Previous research (Hendrickson 2023) has shown that the S.T.A.R. program structure provides effective instruction and engages learners. The goal of this project is to create a comprehensive program model allowing educators to effectively develop and implement this program in their educational setting. We hope that this model will allow educators to introduce more hands-on scientific learning to increase both student interest and ease of implementation.

*Poster - Session 3*

*Environmental, Ecological & Marine Sciences*

### **9. A Camera Trap Study of the Carnivore Community in the Lomami National Park and Buffer Zone**

By: Sophia Hernandez-Bueso and Kate Detwiler

Faculty Mentor(s): Kate Detwiler

Presenter(s): **Sophia Hernandez-Bueso**

Lomami National Park (LNP) in the Democratic Republic of the Congo was established in 2016 to preserve its ecosystem and high biodiversity found in the region. The Primatology Lab at Florida Atlantic University has been conducting ground to canopy, or “column”, camera trap surveys in the LNP and buffer zone to conduct research on the ecology, behavior and conservation of its primate species. The lab has generated a large bycatch dataset, including cryptic carnivore species. We investigated the species richness of the carnivore community. We found 11 carnivore species at three study sites: two inside LNP and one within the buffer zone. We explored the effects of habitat, stratum, and location on the absence and presence of carnivores. Our study reveals unique characteristics of this carnivore community and the importance of surveying the canopy to detect arboreal species. Overall, these findings enhance our understanding of this understudied predator community.

*Poster - Session 3*

*Environmental, Ecological & Marine Sciences*

### **10. Coding for Field Biology: Generating a Species Accumulation Curve Using Camera Trap Data**

By: Eszter Varga and Kate Detwiler

Faculty Mentor(s): Kate Detwiler

Presenter(s): **Eszter Varga**

Conserving tropical rainforests is critical to protecting the world’s biodiversity. Camera traps have become a widely used tool for surveying rainforests for animal species, especially cryptic and rare species. Biologists use the species accumulation curve analysis to understand the effect of sampling effort in determining the number of species occurring in an area. The purpose of this research project was to calculate a species accumulation curve for camera trap data collected in the Tanoe-Ehy Swamp Forest of Cote d’Ivoire between 2019-2022. Due to over 5,700 lines of data, it was necessary to use R Studio to write a code to complete the analysis. We conducted extensive data clean up steps to successfully generate the species accumulation curve. Our results yielded 25 species and indicated that the survey effort was sufficient to estimate species richness of the arboreal mammal community in the Tanoe-Ehy Swamp Forest.



### **11. Do Polarized Individuals Respond Differently to Political Memes?**

By: Orianna Soubllette, Rylie Patterson, Maya Danni, Emma Sanchez, Jordan Thompson, Geoffrey Wetherell

Faculty Mentor(s): Geoffrey Wetherell

Presenter(s): **Orianna Soubllette**, Rylie Patterson and Maya Danni

Memes are often used to convey political ideas online. Affective polarization is a dislike of others with opposing political beliefs. This is increasingly prevalent in the U.S.. Individuals' level of polarization may affect how they perceive political memes under a multitude of moral categories (Thompson, 2023). For example, under the moral foundations theory, conservatives align with binding foundations, whereas liberals align with individualizing foundations (Graham et al., 2009). This study investigates the relationship between individuals' polarization, individuals' political orientation, memes' moral category, and memes' effectiveness. Participants will respond to polarization survey items and rate liberal and conservative moral memes in terms of meme effectiveness. We expect that polarized conservatives will rate all memes as more effective than non-polarized conservatives. We also expect that polarized liberals will rate individualizing foundation memes as more effective than non-polarized liberals. Implications will be discussed.

### **12. Banana Coup D'état: A Retrospective Deep Dive into the Geopolitics of Bananas**

By: Maria Farah

Faculty Mentor(s): Adrian Finucane

Presenter(s): **Maria Farah**

This is a historical analysis of the roots of US foreign intervention through the lens of the Guatemalan coup d'état of 1954. It explores the dynamics between the US government, the CIA, and private enterprises like the United Fruit Company. To secure the financial interests of a small group of people, the CIA undertook a covert operation named Plan PBSuccess which intended to inflict "psychological warfare" on the people of Guatemala to overthrow their president. This study contends that PBSuccess was the blueprint for later US foreign interventions in other regions; moreover, this argument focuses on the roots of US foreign intervention and its political effects in other countries.

*Poster - Session 3*  
*Behavioral, Educational & Social Sciences*

### **13. Cancel Cancel Culture?**

By: Kerri Cohn

Faculty Mentor(s): Eric Levy

Presenter(s): **Kerri Cohn**

In today's digital age, celebrities hold great influence through their massive social media platforms. However, does the average American agree that with great power comes great responsibility? This power holds a public debate on accountability and puts pressure on celebrities to do the right thing. This survey explored how Americans view celebrity conduct online and their attitudes towards their behavior. My initial hypothesis was critical of younger demographics. To test my hypothesis, I created a 16-question survey, gathering data from 189 respondents aged 18+ representing diverse demographics, through IBM's SPSS, I found unexpected results. In contradiction to my hypothesis results showed that Americans of all age groups are quite fond of celebrities and believe they are using social media responsibly. This challenges the assumption that celebrities have an ethical responsibility online. Further research could clarify the factors shaping these opinions and reasons across age groups, despite celebrities' societal impact.

*Poster - Session 3*  
*Basic Sciences*

### **14. Acute Stress and Chronic Stress and its Effects on Feeding Behavior in Mice**

By: John Vo, Sebastien Bullich, Sarah Stern, Jon D. Moore, Ericca Stamper, Tracy Mincer, and Kelsie Bernot

Faculty Mentor(s): Kelsie Bernot and Sebastien Bullich

Presenter(s): **John Vo**

Eating disorders (ED) are found to display comorbidity with mood disorders such as anxiety and depression, and a notable common risk factor is stress. Indeed, clinical studies tend to describe acute stress as anorexigenic, whereas chronic stress is more orexigenic. Yet little is known about stress and ED relationships at a brain level. In conjunction, there is growing evidence that the insular cortex (IC), a brain region known as a hub integrating multiple internal and external stimuli, is involved in anxiety as well as over-eating behaviors. I aimed to understand how corticosterone, the stress hormone, impacts feeding and IC activity in mice. We found that mice ate less when acutely exposed to corticosterone and is associated with a decreased IC activity reflected by decreased cFos expression. However, when treated chronically, they increase their food consumption. Together, these results suggest that stress hormone modulates IC activity, thus shaping eating behaviors.

**15. Dermal Denticles Morphology of Bonnethead (*Sphyrna tiburo*) Shark Skin**

By: Hannah Epstein, Madeleine Hagood, Jamie Knaub, and Marianne Porter

Faculty Mentor(s): Marianne Porter

Presenter(s): **Hannah Epstein**

Dermal denticles, tooth-like scales that cover the surface of shark skin, vary in morphology between species and sexes. The denticles provide benefits including protection and enhancements to swimming speed through drag reduction. Limited research has been conducted to investigate the sex differences of denticle characteristics in the *Sphyrna tiburo* (bonnethead shark), a species known to exhibit sexual dimorphisms in head and body size. We hypothesized that female bonnethead sharks would have a higher denticle density and percent overlap, as these metrics provide the shark with greater protection during mating. We used scanning electron microscopy (SEM) to image denticles at high resolution and calculated denticle morphometrics and overlap with ImageJ software. We found that female bonnetheads have higher denticle densities and percent overlap when compared to males. This study can enhance the current understanding of the physical differences in shark skin between sexes, and evolution of protection and mating among sharks.

**16. Micelles and Sensors: Utilizing the Shuttles to See the Invisible**

By: Nicolas Salas

Faculty Mentor(s): Renjie Wang

Presenter(s): **Nicolas Salas**

One of the major issues of chemical sensing is the permanence of the molecules in the system. Utilizing Poly(1,2-butadiene-block-ethylene oxide) (PB-PEO) block copolymer micelles ability to shift phases between an ionic solution of 1-butyl-3-methylimidazolium hexafluorophosphate ([BMIM][PF<sub>6</sub>]) and water to transport and retrieve chemical sensors by regulating the temperature. Previous studies show that the physical integrity of the micelles is maintained when the shape is changed, making (PB-PEO) a suitable mechanism of chemical sensor administration and retrieval. According to this information, micelles have a major potential to expand the area of chemical sensing as it can make molecules reusable and more effective in incompatible solutions.

*Poster - Session 3*

*Behavioral, Educational & Social Sciences*

### **17. Children of Divorce: Able to Grow or Destined to Fail?**

By: Destiny Fava and Michael Maniaci

Faculty Mentor(s): Michael Maniaci

Presenter(s): **Destiny Fava**

Parental divorce can detrimentally impact adult children's romantic relationships (e.g., frequent conflict, dissolution, lower trust) (Amato & Keith., 1991). However, few studies have explored the adaptive outcomes that can result from experiencing parental divorce. Participants were recruited from a crowdsourcing platform to provide a representative sample of adults. This study investigates how experiencing parental divorce impacts accuracy in emotion recognition in emerging adults. Results explore whether the experience of parental divorce influences whether individuals hold "Destiny" or "Growth" beliefs in romantic relationships. These results provide directions for future research by uncovering the potentially adaptive skills that come with experiencing parental divorce.

*Poster - Session 3*

*Basic Sciences*

### **18. Development of Fluorescent Diacylglycerol Probes**

By: Christopher Gomez, Sarah Louis, Nick McInchak, Haylee Mesa, Qi Zhang, and Maciej Stawikowski

Faculty Mentor(s): Maciej Stawikowski

Presenter(s): **Christopher Gomez**

Diacylglycerols (DAGs) are an important class of signaling lipids. They participate in numerous interactions and are at the crossroads of many signaling pathways. Intracellular excess of diacylglycerols is stored in lipid droplets (LDs) which are important cytoplasmic organelles that play a crucial role in lipid regulation and metabolism. Currently the study of LDs is aided by fluorescent lipid probes, so the development of useful lipid probes is important. In this study we report the synthesis and characterization of a fluorescent DAG probe platform using the 1,8-naphthalimide fluorophore. This fluorophore has the benefit of being solvatochromatic, having large Stokes shift, and being photostable. The easy preparation of the fluorescent diacylglycerol probes and their reliable tagging of LDs will make it a viable option for live cell imaging and studies of diacylglycerol signaling.

*Poster - Session 3*  
*Environmental, Ecological & Marine Sciences*

### **19. Reconstructing Environmental Change and Organic Matter Trends from a Boreal Peatland in Maine**

By: Kayla Connolly, Erik Johanson, Xavier Comas, Danielle Nering, Sabina Gyawali, Sanjeev Luintel, and Graham Morrison-Plumley

Faculty Mentor(s): Erik Johanson

Presenter(s): **Kayla Connolly**

This study presents the initial results of Loss on Ignition (LOI) analysis of a 7.5-meter peat core collected in Summer 2023 from a boreal peatland in Maine, USA. The recovered core likely captures an environmental record of the entire Holocene, but the core is undated. Our first step to reconstruct how climate and environmental conditions changed at the study site was to reconstruct a high resolution (4-cm interval) record of Organic Matter (OM) across depth. We expected high OM values across the record but decreases in the values likely represent drier climate intervals. In the future, we'll analyze additional environmental proxy analyses such as peat humification, charcoal and pollen analyses, and the development of an age-depth model to accurately date the timing of these changes. Connecting environmental proxy records to existing geophysical surveys of the study site can help identify how resilient the peatlands are to climate stress over time.

*Poster - Session 3*  
*Health & Medical Sciences*

### **20. Testing Soil for Potential Antibiotic Discovery**

By: Maya Venkatesh and Michelle Cavallo

Faculty Mentor(s): Michelle Cavallo

Presenter(s): **Maya Venkatesh**

TinyEarth is a nationwide institution where undergraduate researchers work to address the crisis of pathogens becoming increasingly resistant, rendering existing treatments ineffective. This research project strives to educate undergraduate researchers about this dire issue in our country. Our main research questions are if we can isolate bacterial species that produce antibiotics from soil samples and if so, can we identify and characterize those bacterial species? As for the methodology, the undergraduate researchers first collect soil samples in a local soil environment to dilute in a lab setting. PCR reactions and gel electrophoresis confirm DNA integrity, followed by sequencing for identification, and additional tests characterize biochemical properties and differentiate Gram-positive from Gram-negative bacteria. The experiment results depend on whether any tests show signs of antimicrobial properties. We expect to discover antibiotics from this research experiment, especially because we will use soil samples on campus that have previously shown promising results.

*Poster - Session 3*  
*Health & Medical Sciences*

### **21. Investigating the Ownership of a Pet Dog's Impact on Depression Levels in Military Adolescents**

By: Makenna Simpson and Laurie Martinez

Faculty Mentor(s): Laurie Martinez

Presenter(s): **Makenna Simpson**

During the ages of 12 to 18, adolescents undergo significant cognitive development, which in turn impacts emotional well-being. The purpose of this study was to explore the relationship of pet dogs and depression levels among military adolescents (MA) aged 12-18 whose parents are active military members or veterans. This quantitative pilot study compared 6 dog-owning MAs with 6 non-dog-owning MAs from a single time point within the parent study. Results indicate no significant difference in depression levels based on pet dog ownership. However, on average, the group with pet dogs scored 1.4 points lower depression scores (CES-D) compared to the non-dog group. This underscores the need for further investigation into pet dog ownership among military adolescents, necessitating a larger sample size for a more comprehensive analysis. Results indicate a potential intervention to help these adolescents cope with depression and alleviate some of the symptoms associated with it.

*Poster - Session 3*  
*Behavioral, Educational & Social Sciences*

### **22. Correlational Analysis of the Relationship Between Religion and Infidelity**

By: Ebony James and Lore Olson

Faculty Mentor(s): Andrzej Nowak

Presenter(s): **Ebony James**

Religious practice often includes participation in an institutional structure that is regulated through rules and practices upheld by strong moral beliefs. However, because of these stringent moral codes and hierarchies, it is often assumed that the most devout in those systems suppress their desires - that because of the pervasiveness of sacrifice in restriction in their spiritual system, they are secretly unhappy within their circumstances or marriages, or act out through sexual deviance. Using cross-sectional data collected from the 2022 General Social Survey, relationships were observed between religious affiliation and happiness, as well as attitudes toward extramarital affairs. There is a positive correlation between surveyors' belief in God's existence and their happiness, along with their belief that extramarital sex is wrong. These findings could possibly indicate that, despite assumptions, religion may bring happiness into an individual's life and decrease their desire to take part in sexual deviance.

### **23. UAV-thermal Infrared Remote Sensing of Sea Surface Temperature Correlated with In Situ**

#### **Observations at Wahoo Bay, Florida**

By: Maya Edelstein, Valini Goolcharan, and Tucker Hindle

Faculty Mentor(s): Tucker Hindle

Presenter(s): **Maya Edelstein** and Valini Goolcharan

Aerial thermal infrared remote sensing takes advantage of the fact that all objects with a temperature above absolute zero have thermal energy and will emit infrared wavelengths of radiation. Thermal infrared (TIR) cameras convert the energy in the infrared radiation emitted by a viewed object into a visible light display. Earth systems can be analyzed through their thermal signatures; therefore, temperature is an important physical measurement. The present study focuses on estimating sea surface temperature from a remotely piloted aircraft system, the Inspired Flight IF1200A equipped with the Workswell WIRIS Enterprise payload. The TIR camera operates in the 7.5- to 13.5 $\mu$ m spectral range at an accuracy within two degrees Celsius. An EXO2 SONDE water quality monitoring station at Hillsboro Inlet (Wahoo Bay), Florida measures water temperature in real-time with its data readily available through SenseStream. Aerial acquisition augments current fieldwork, while in situ observations benefit image validation and application.

### **24. Outdoor Radio Localization Using Generative Adversarial Networks for Imputing Missing Data**

By: Vikram Renganathan, Jose Baca-Bustillo, George Sklivanitis

Faculty Mentor(s): George Sklivanitis

Presenter(s): **Vikram Renganathan**

In order to sustain mass transit systems while addressing public apprehension in a post-pandemic era, we explore methods for human movement analytics by overhearing and analyzing WiFi probe signals emitted from pedestrians' smartphones and other personal devices in outdoor spaces. We use the received signal strength of the captured signals to localize and track the movement of people. Recently, it has been shown that deep neural network (DNN) based received signal strength indicator (RSSI) fingerprints achieve high localization performance with low online complexity. However, in the real-world, RSSI datasets usually contain many samples with missing values. To solve this problem, we propose using generative adversarial networks (GANs) for dealing with missing RSSI values. Experiments with real data collected along Clematis Street in the City of West Palm Beach with the FAU I-SENSE MobintelTM platform demonstrate an average localization accuracy of 90.17% for 53 potential locations of a radio emitter.

Poster - Session 3  
Health & Medical Sciences

## 25. Analysis of the Effect of Perfluoroalkyl and Poly-fluoroalkyl Substances (PFAS) on the Optical Melting

### Point of Duplex RNA

By: Franky Petion and Renjie Wang

Faculty Mentor(s): Renjie Wang

Presenter(s): **Franky Petion**

Perfluoroalkyl and poly-fluoroalkyl substances (PFAS) are used in various industries such as food and textile industries. Due to their extensive use, they can enter water sources and pollute the environment. Consequently, PFAS may accumulate in wildlife, entering the food chain and contaminating human food sources. Prolonged exposure to PFAS has been shown to cause a myriad of health issues: impaired immune function, poor development of reproductive and neurological structures, and growth of various cancers. RNA stability in humans is essential for gene expression and regulation. The exact effect of PFAS on RNA is yet unknown; therefore, this study will investigate the effects of PFAS on duplex RNA stability and its optical melting point. Anticipated outcomes include a decrease in the optical melting point and stability of RNA due to the intercalation of PFAS in RNA duplexes. RNA solutions with higher concentrations of PFAS will have a lower optical melting point.

Poster - Session 3  
Environmental, Ecological & Marine Sciences

## 26. Minimal Radial Oxygen Loss from Tropical Seagrasses: A Counter Paradigm

By: Nicole Alexiou, Alex Hoey, Logan Mignerey, Wilson Charles, and Carly Dempsey

Faculty Mentor(s): Marguerite Koch-Rose

Presenter(s): **Nicole Alexiou** and Alex Hoey

Tropical seagrasses live in anoxic sediment high in phytotoxic sulfides (H<sub>2</sub>S) and utilize Radial Oxygen Loss (ROL) from the roots to avoid tissue hypoxia and oxidize H<sub>2</sub>S. We examined the process of ROL in three dominant tropical seagrass species, *Halodule wrightii*, *Thalassia testudinum*, and *Syringodium filiforme*, from Florida Bay (FB) using two methods, methylene blue staining and 2-D O<sub>2</sub> planar optodes. Optode trials in FB sediment showed no ROL, and methylene blue trials showed a maximum of only 33% staining in response to ROL, with more staining in new roots and root tips. Older roots and slower-growing species had lower ROL, possibly due to more time in which to develop barriers to gas exchange. Our results from tropical seagrass species with high microbial O<sub>2</sub> demand and carbonate sediments high in H<sub>2</sub>S counter the current paradigm that all seagrasses sustain a highly oxidized root environment and may explain large-scale seagrass die-offs.



## 27. Application of Computed Tomography (CT) Imaging in Tropical Seagrasses: Quantifying Aerenchyma

### Tissue Critical for Gas Exchange

By: Carly Dempsey, Alex Hoey, Raghavi Yadlapally, Ryan Withers, Lucas Simo, Wilson Charles, and Nicole Alexiou  
Faculty Mentor(s): Marguerite Koch-Rose  
Presenter(s): **Carly Dempsey** and Alex Hoey

We used a cutting-edge imaging technique, Computed Tomography (CT), to examine the anatomy of tropical seagrasses and quantify internal air space tissue or aerenchyma, critical to support belowground tissue aerobic respiration in anaerobic sediments. CT scanning provided detailed measurements of aerenchyma using intact plants without lengthy fixation or cross-sectioning techniques at a high resolution (~10  $\mu\text{m}$ ). Image analysis programs (Slicermorph, inPixio, ImageJ Inc.) were used to quantify aerenchyma percent and area in three dominant tropical species, *Thalassia testudinum*, *Halodule wrightii* and *Syringodium filiforme*. Our results showed that 10-35% of the internal area was air space allowing for O<sub>2</sub> diffusion. There was a significant difference among species and tissue types (2-way ANOVA,  $p < 0.01$ ). Our results provide perspective on the use of CT scanning to examine oxidative capacity of seagrasses, and other wetland plants, which could be applied broadly across species to examine questions related to plant anatomy.

## 28. A Virus-Based Approach to Combat Bacterial Spot Disease: Cationic Supplementation for Enhanced

### Bacteriophage Activity Against *Xanthomonas euvesicatoria*

By: Jared Presby  
Faculty Mentor(s): Daniela Scheurle  
Presenter(s): **Jared Presby**

*Xanthomonas euvesicatoria*, the causative agent of Bacterial Spot disease in tomatoes and peppers, is becoming increasingly resistant to copper-based treatments due to their frequent use. This resistance, combined with the phytotoxicity from copper accumulation in soil, presents challenges for plant disease management. An emerging alternative for controlling Bacterial Spot is the use of bacteriophages (viruses that infect and lyse bacteria). This study investigates how various concentrations of cations ( $\text{MgCl}_2^+$ ,  $\text{ZnCl}_2^+$ ,  $\text{NaCl}^+$ ,  $\text{KCl}^+$ ) affect the lytic activity of three bacteriophage samples against *X. euvesicatoria* by investigating their impact on plaque formation using a plaque assay approach. The hypothesis that lower concentrations of divalent cations would enhance phage lytic activity was tested. Preliminary data showed that lower  $\text{Mg}^{2+}$  and  $\text{Zn}^{2+}$  concentrations (0.01mM - 0.1mM) increased plaque formation, indicating improved lytic activity. These results suggest the potential benefits of cation supplementation for enhancing phage effectiveness against plant pathogens like *X. euvesicatoria*.

*Poster - Session 3*

*Classroom Research Project/Assignment*

### **29. The Impact Disability has on a Child and Their Family**

By: Mariana Guzman, Sharon Darling, and Kaley Adams

Faculty Mentor(s): Sharon Darling

Presenter(s): **Mariana Guzman**

Living with a child who has a disability can have effects on the entire family including siblings, parents, and extended family (Reichman, 2008). Families of children with disabilities face many issues such as mental well-being, financial issues, educating themselves on the disability, finding the correct services and resources to help their child (Reichman, 2008). Of interest is the quality of life for children with physical disabilities and their families. This study seeks to investigate the question "How does physical disability impact young children's quality of life and their families?" Interviews and a brief literature review were conducted to illuminate this question. Findings indicate similar feelings, worries, and experiences were shared amongst parents across both the interviews and literature sources. Families of children with physical disabilities might encounter societal attitudes that stigmatize them, affecting their interactions and social experiences (Link & Phelan, 2001).

*Poster - Session 3*

*Basic Sciences*

### **30. Synthetic Tools to Study the Role of O-GlcNAcylation in Alzheimer's Disease**

By: Olivia Dandu, Andrew Whyte, and Maré Cudic

Faculty Mentor(s): Maré Cudic

Presenter(s): **Olivia Dandu**

Alzheimer's disease (AD) is a neurodegenerative illness characterized by a loss of neural function. Research indicates that, when hyperphosphorylated, microtubule-associated protein tau becomes neurotoxic and contributes to neural cell death and AD progression. Recent research suggests that  $\beta$ -O-GlcNAcylation may play a protective role against AD and other tauopathies as a modulator of hyperphosphorylation. Our objective was to synthesize Fmoc-Thr( $\beta$ -O-GlcNAc)-OPfp, an O-GlcNAcetylated amino acid, to be used as a building block for tau protein peptide models. The five-step synthesis begins with the OPfp protection of Fmoc-Thr-OH and the Troc protection of the starting glucosamine's amine group. Troc protection is important for the formation of the  $\beta$ -glycosidic bond, the naturally occurring anomer in the post-translational modification of tau. Next, the hydroxyl groups are acetylated to prime the molecule for the addition of Fmoc-Thr-OPfp via glycosylation. After the glycosylation, the Troc protecting group is removed and the final product is purified and characterized.

Poster - Session 3  
Business, Marketing, Finance & Public Administration

### **31. Analyzing the impact of window dressing on mutual fund flows**

By: Ivan Yuk

Faculty Mentor(s): Anna Agapova

Presenter(s): **Ivan Yuk**

This research project aims to investigate the influence of marking the close, a form of window dressing, on mutual fund flows on specifically NYSE stocks. Leveraging machine learning techniques, specifically a supervised learning approaches, manipulation detection methods are applied to NYSE stocks within a five-day timeframe preceding the quarterly reporting periods. Following identification of manipulated stocks and the timeframe of manipulation, mutual fund holdings are analyzed to track potential exposure during these manipulation periods. Subsequently, fund flows of the manipulated period to the following quarterly reporting period are compared, and statistical analyses, including weighted flow comparisons and linear regression tests, are conducted to assess the significance of marking the close on fund performance and investor sentiment. The study seeks to analyze the effects and implications of marking the close for mutual funds in financial markets, and how it might impact fund flows and therefore investor sentiment.

Poster - Session 3  
Behavioral, Educational & Social Sciences

### **32. Antimicrobial Resistance Policy Implementation and its Connections to The Spread of *Candida Auris***

By: William Burnett and Katharina Rynkiewich

Faculty Mentor(s): Katharina Rynkiewich

Presenter(s): **William Burnett**

This research will characterize the rising threat of antimicrobial resistance by examining global antimicrobial resistance policy and recent outbreaks of *Candida auris*, an emerging highly resistant infection, across national contexts. Through qualitative analysis of textual data, this project will identify gaps in implementation of global antimicrobial resistance policy and provide a nuanced view of infectious disease outbreaks as they occur in country. The results so far indicate possible correlations between a country's progress on implementing AMR policies and outbreaks of *Candida auris*. We have additionally identified COVID-19 as an important factor in the spread of *Candida auris* across multiple outbreaks. This study aims to contribute to research done at the Ethnography Lab at Florida Atlantic (ELFA) by contextualizing health-related challenges and their proposed solutions, all within increasingly volatile disease ecologies.

*Poster - Session 3*

*Classroom Research Project/Assignment*

### **33. Sunshine Crashes: Understanding the Impact of Weather on Traffic Accidents in Florida**

By: Abigail Joseph, Tilak Patel, Ashley Rotton, Bianca Gambino, and Sarai Aguiar

Faculty Mentor(s): Valentine Aalo

Presenter(s): **Abigail Joseph** and Tilak Patel

Weather can have a significant impact on traffic accidents. According to the U.S. Federal Highway Administration, “Weather acts through visibility impairments, precipitation, high winds, and temperature extremes to affect driver capabilities, vehicle performance (i.e., traction, stability, and maneuverability), pavement friction, roadway infrastructure, crash risk, traffic flow, and agency productivity.” This research study assesses whether car crashes increase due to specific weather conditions and gains insight into not only how weather affects the rate of car crashes in Florida, but also how weather can directly impact circumstances and behaviors that lead to car crashes. A better understanding of these factors can pave the way for increased driver awareness and safety campaigns, as well as legislation that would preserve the health and property of drivers on the roads during bad weather.

*Poster - Session 3*

*Health & Medical Sciences*

### **34. Amyloid-beta Inflammatory Evasion of the Brain’s Immune Function in the Development of Alzheimer’s Disease**

By: Mary Adam, Tyler Beeler, and Rui Tao

Faculty Mentor(s): Rui Tao

Presenter(s): **Mary Adam** and Tyler Beeler

Amyloid beta peptides, which many studies have implicated in the development of Alzheimer’s disease, accumulate in the brain despite the defensive functions of phagocytic microglial cells. We used fluorescence to observe the functions of three neural cell types (astrocytes, neurons, and microglial cells) when exposed to amyloid beta versus albumin, a harmless blood peptide used as a control. After culturing the cells, fluorescent amyloid beta and albumin were introduced to the medium at varying concentration levels for 24 hours. We then isolated the cells and observed them under a fluorescence microscope. As expected, only the microglial cells demonstrated uptake of peptides and only amyloid beta induced an inflammatory response in the cells. This inflammatory response was shown to hinder microglial cell function and could be a target for the development of future treatments.

### 35. Optogenetics of the Giant Fiber System in *Drosophila melanogaster*

By: Reagan Knabb, Daniel Sanchez Ramirez, Jerson Millan, Mikerlange Guerrelus, and Rodney Murphey

Faculty Mentor(s): Rodney Murphey

Presenter(s): **Reagan Knabb**, Daniel Sanchez Ramirez, Jerson Millan and Mikerlange Guerrelus

The Giant Fiber system (GF) is a neural pathway in *Drosophila* that mediates escape behavior by stimulating the jump muscles (TTM) and flight muscles (DLM). In this project, we utilized optogenetics to activate the GF in Gal-4/Chrimson-expressing flies to compare the responses of TTM and DLM with those from electrophysiology. Our optogenetic stimulation showed responses that varied with light intensity, duration, and frequency. Additionally, these recordings differed from those obtained following electrical stimulation. Electrical stimulation shows stereotyped patterns with distinct latencies for the two muscles (0.8ms for the TTM and 1.2ms for the DLM). In optogenetic stimulation, the responses of the TTM and DLM shared equal latencies. These differences suggest that the optical system drives the underlying neural circuits in a manner distinct from electrical stimulation. The Giant Fiber system is a promising model system to further advance our knowledge of optogenetics and circuit breaking in the *Drosophila* brain.

### 36. Demographic Predictors of Endorsement of Masculine Norms and Gender Related-Public Policies

By: Reese Crosby, Sintia Chowdhury, Joudeline Jeanlis, Angela Easterling, Jordan Thompson, and Geoffrey Wetherell

Faculty Mentor(s): Geoffrey Wetherell

Presenter(s): **Angela Easterling**, Joudeline Jeanlis, Sintia Chowdhury and Reese Crosby

In the United States, some men (e.g., hypermasculine social media influencers) believe traditional masculinity is underemphasized. We distributed a survey to 781 men, recruited from Prolific (n = 690) and an undergraduate sample (n = 91). Participants responded to demographics, Conformity to Masculine Norms Inventory (CMNI; Reidy et al., 2014), demasculinization, precarious manhood (PM; Vandello et al., 2008), Gender Role Discrepancy Stress (GRDS; Mahalik et al., 2003), and support for public policy items. We expect that older age, conservative political beliefs, higher income, and identification with a religion will predict endorsement of PM, demasculinization, GRDS, and support for both types of gender-related public policy. Additionally, we expect that younger age, conservative political beliefs, and higher income will predict endorsement of CMNI items. This research will help establish links between different conceptualizations of masculinity, demographics, and support for gender-related public policy items.

*Poster - Session 3*  
*Basic Sciences*

### **37. Privacy-Preserving Computation of Genomic and Patient Data**

By: Luke Carey

Faculty Mentor(s): Shi Bai and Lun-Ching Chang

Presenter(s): **Luke Carey**

Machine learning techniques are widely employed to study genomic and patient data. However, this raises confidentiality issues, particularly when computations are done through the cloud. These complications increase with regards to Institutional Review Board regulations, which sometimes make it impossible to share sensitive data. A recent breakthrough in cryptography, Homomorphic Encryption, allows one to perform cloud computations in an encrypted manner: one can send encrypted data to the cloud, which can perform operations, and return an encrypted result. Yet, despite its versatility, Homomorphic Encryption is typically slow. This project investigates methods to speed-up common machine learning algorithms on genomic and patient data. More precisely, we aim to develop a hybrid framework to process this data, which encrypts only sensitive data, involving advances in machine learning algorithms that support encrypted and unencrypted data simultaneously. A prototype implementation is on-going and the results are likely to make privacy-preserving computation more efficient.

*Poster - Session 3*  
*Engineering*

### **38. Empowering Engineering Education: SARL**

By: Jefferson Charles, Harry Vecchio, and Emmanuel McCrimmon

Faculty Mentor(s): Maria Petrie

Presenter(s): **Jefferson Charles**, Harry Vecchio and Emmanuel McCrimmon

Smart Adaptive Remote Laboratories (SARL), pioneered by the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI), aims to allow engineering students to complete physical labs remotely. The pandemic increased the already existing need for remote laboratories. This project provides access to remote laboratory stations for engineering students lacking the resources to apply theoretical knowledge in physical settings. The project innovatively leverages Field Programmable Gate Arrays (FPGAs) to establish remotely accessible stations through existing Online Laboratory Management Systems (OLMS). Our team is developing remote laboratories for an introductory computer engineering course. SARL will be accessible through Lab in a Window, a startup that initiated in FAU's tech runway, which manages lab galleries. SARL is the infrastructure that allows students to interact and view labs remotely. The project focuses on expanding the remote station's capabilities within OLMS.

### **39. Flowering**

By: Rebecca Wieand

Faculty Mentor(s): Dorothea Lemeh

Presenter(s): **Rebecca Wieand**

This art piece is called “Flowering.” All people attending the symposium will be encouraged to place a flower of their choosing onto the vine. This piece will consist of a green crocheted vine with green leaves and a few basic flowers of white and yellow placed on the vine. The people will then have the choice of different types of flowers with all different colours - including red, orange, yellow, green, blue, pink, purple, black, white, grey, and brown - to place at any spot on the vine. The vine is representative of society and the colour and type of the flower the person picks means nothing to me but can have meaning for the participant in how they choose to present themselves. The placement can be indicative of how they keep to themselves, like to grow in groups, and like to populate areas that need some love and flowers.

### **40. The Output State of a Quantum Computer**

By: Daniel Bloch, Korey Sorge, and Maria Petrie

Faculty Mentor(s): Maria Petrie and Korey Sorge

Presenter(s): **Daniel Bloch**

Quantum computing is a rapidly emerging field, poised at the forefront of technological advancement. By leveraging the intricate principles of quantum mechanics, it endeavors to tackle computational challenges that lie beyond the grasp of classical systems. This study delves not only into the broad-ranging impact of quantum computing across diverse domains but also places particular emphasis on the intricate task of reading the output state of a quantum computer. Through an experimental investigation of generated binary combinations encompassing 0s and 1s, the research seeks to discern and examine the probability of the resulting output state, thereby contributing to the emerging field of quantum computation.

*Poster - Session 3*  
*Health & Medical Sciences*

#### **41. Effect of a Phytoestrogen Analog on Growth and Migration of Endometrial Cells**

By: George Fernandez-Hamoui and James Hartmann

Faculty Mentor(s): James Hartmann

Presenter(s): **George Fernandez-Hamoui**

Endometriosis is a disease that affects one in ten women and is the primary cause of infertility. The endometrial cells that normally line the uterus somehow appear in the peritoneal cavity, attach to various organs therein and grow as cancer-like lesions. The disease, like breast cancer, is estrogen dependent. A key problem in the disease is the spread of the cells from the initial lesion onto other organs within the peritoneum such as the colon and ureters. A means to stop the migration and growth of the lesions is sought by many investigators. In addition, an analog of Genestin (KBU2046) has been found to have a negative effect on the migration of metastatic prostate cancer cells in a mouse model (Xu et al., 2018). The aim of these experiments is to utilize KBU2046 as an alternative to hormone therapy to treat endometriosis and to monitor the growth of endometrial cells.

*Poster - Session 3*  
*Engineering*

#### **45. NASA Regolith Advanced Surface Systems Operation Robot (RASSOR)**

By: Daniel Servidio, Eduardo Castillo-Lopez, Bryan Bautista, Amanda Mendez Hernandez, and Marquis Lee

Faculty Mentor(s): Oscar Curet

Presenter(s): **Eduardo Castillo-Lopez**, Daniel Servidio, Bryan Bautista, Amanda Mendez Hernandez and Marquis Lee

A primary method to deep space travel that has emerged has been the idea of harvesting moon resources to be used as fuel before going deeper into the depths of space. It was discovered by NASA researchers that the top layer of the moon known as "Regolith" has many uses such as refinement for fuel or energy to power settlements. To mine this material, NASA began development of the RASSOR Rover. The aim of this project is to enhance NASA's RASSOR Rover by implementing modifications to the robotic arm holding the regolith carrying drums, as well as the rovers mobile capabilities. The primary objective is to shorten the rovers arm to limit the stress on the actuators for increased efficiency in sample collection and manipulation. Additionally, adaptations will be introduced that will allow the rover to operate seamlessly in both the upright and inverted orientation.



## *Notes*