UNF
UNIVERSITY of NORTH FLORIDA

PROGRAM

UNIVERSITY OF NORTH FLORIDA

SOARS

APRIL 22, 2023

WELCOME TO SOARS 2023

The Showcase of Osprey Advancements in Research and Scholarship (SOARS) is an annual interdisciplinary conference at the University of North Florida (UNF) held in conjunction with Research Week. Co-sponsored by the Office of Undergraduate Research and the Graduate School, SOARS provides a supportive environment in which undergraduate and graduate students can share their work, regardless of the stage of development.

This year's event finishes Research Week 2023, which coincides with National Undergraduate Research Week. After several COVID-restricted years, we are excited to return to an in-person format. As the SOARS logo depicts, we are "busting out of the bust," and returning to a campus culture in which research, scholarship and creative activities (RSCA) flourish because of personal interactions between student researchers and faculty mentors. We are equally excited to return to both oral and poster presentation formats to best accommodate the different participating disciplines. It is anticipated that SOARS will remain the flagship symposium of the academic year in years to come, and the venue for the presentation for the Undergraduate and Graduate Mentor of the Year awards.

We gratefully acknowledge and thank those who contributed to the success of SOARS 2023. Specifically, we thank Kaitlyn Minnicks (Coordinator of the Office of Undergraduate Research), Kira Fellows (Coordinator of Graduate Outreach and Recruitment) and George Boston (Coordinator of Graduate Operations) for organizing the event, Rebeca Mata (Designer for the Office of Undergraduate Research) for creating the Research Week promotional materials and the program for this event, and Kim Roberts (Office Manager for Faculty Excellence and Academic Engagement) for handling all the tiny details. We also thank and acknowledge the various offices, programs and student groups who promoted their services and activities at the SOARS Resource and Club Fair.

Finally, we congratulate all the student presenters and thank the faculty mentors for their commitment to student success through RSCA.

Judith D. Ochrietor
Director of the Office of Undergraduate Research

Paige Lilley
Director of the Graduate School

EVENT SCHEDULE

Please make sure you check out the Student and Club Expo from 10 a.m. to 2 p.m. outside Building 4.

Event	Time	Location Bldg 4
Oral Session 1	10 a.m. - 10:45 a.m.	Room 1704
Oral Session 2	10 a.m. - 10:30 a.m.	Room 1705
Poster Session 1	10 a.m. - 11 a.m.	Breezeway
Oral Session 3	11 a.m. - 11:45 a.m.	Room 1704
Poster Session 2	11 a.m. - 12 p.m.	Breezeway
Awards Ceremony	12:15 p.m. - 12:45 p.m.	Building 59 Room 1701
Oral Session 4	1 p.m. - 1:45 p.m.	Room 1705
Poster Session 3	1 p.m. - 2 p.m.	Breezeway
Oral Session 5	2 p.m. - 2:30 p.m.	Room 1704
Oral Session 6	2 p.m. - 2:45 p.m.	Room 1705
Poster Session 4	2 p.m. - 3 p.m.	Breezeway

PRESENTERS

Oral Session 1

01 Boaz Israel Levy
02 Kinsey Gabree
03 Jessie Roncevic

Oral Session 2

01 Nejra Kurtovic
02 Eleanor Sand

Poster Session 1

01 Noah Constantino
02 James Hayes
03 Anthony Stacey
04 Leylanie Viruet Concepcion
05 Gavin Faircloth
06 Veronica Francis
07 Willa Close
08 Hannah Wehrung
09 Luke Grubbs
10 Jeffrey Perera
11 Justin A. Mayorga
12 Prajwol Lamichhane
13 Matthew Osborn
14 Cas Campbell
15 Dalia Elkhatib
16 Raegan Weil
17 Abby Jacobs
18 Fudhial Sayed
19 Keegan Donlen
20 Joana Macias
21 Jacary Sapp
22 Ava Allen
23 Brandon Guerin
24 Paul Christenson
25 Daniela Amalfi Ojeda
26 Maria Jose Alvarez
27 Amra Kajdic
28 Nicole Abreu
29 Vanessa Clarke
30 Amanda Yelverton
31 Krystiana Rego
32 AJ Likosar
33 Taylor Hurley
34 Bria Ferera
35 Cali Quaglia

Oral Session 3

01 Allyson Mitchell
02 Hana Kabil
03 Tegan McDill

Poster Session 2

01 Lily Stone
02 Matthew Austin
03 Isabel Hiday
04 Nathanael Coronado
05 Cheyenne Burlingame
06 Veronica Francis
07 Skyler Carlson
08 Carlos A. Hernandez Ortiz
09 Jett Baxter
10 Nazmul Kazi
11 Erica K. Flamm
12 Abhilasha Kumar
13 Shekinah Mitchell
14 Elizabeth VanDeMark
15 Emily Costabile
16 Bianca Opdenbosch
17 Samuel Olunuga
18 Molly Templin
19 Rida Khan
20 Katie G. Peters
21 Sarah Taylor
22 Andres Granados Serrano
23 Gabriella Khazal
24 Rebecca Robinson Rey
25 Taylor Weatherly
26 Sadana Sree Mukundan
29 Sydney Pell
28 Korie (Gigi) Novaton
29 Natalie Clum
30 Enderna Macsime
31 Vanessa Marin
32 Sabrina Ahmed
33 Jessica Ashley McKay
34 Avery Glenn
35 Victor Ritz

Oral Session 4

01 Destiny Cole
02 Katherine Herndon
03 Hannah E. Thomas

Poster Session 3

01 Stephanie Baskin
02 Sydney Barrett
03 Boaz Israel Levy
04 Megan Herrman
05 Whitney Washington
06 Crishana Dionne Benton
07 Andrea K.W. Smith
08 Jade Welsh
09 Andrew Miceli
10 Nazmul Kazi
11 Josephine Kaidy
12 Katlyn Sharpe

Poster Session 3

13 Paige Courtier
14 Savannah Hoover
15 Leo Muniz Trejo
16 Ashley Meglino
17 Alexander Bartkowiak
18 Waheed Khalili
19 Jessica Fliess
20 Thien Duy Nguyen
21 Matthew Connor Myers
22 Cameron Young
23 Mary Spicer
24 Jeffrey Perera
25 Klesia Xhaferllari
26 Ziena Baker
27 Dravyn Hill
28 Wyatt Greenbaum
29 Lizbeth Vera Murillo
30 Roshonda Bissainthe
31 Victoria Hayes
32 Carly Smith
33 Samuel J. Pearl
34 Alexandro Gonzalez
35 Lindsay Baker

Oral Session 5

01 Velanna Dondina-Doolan
02 Gabriel Melson

Oral Session 6

01 Sydney Pell
02 Yetzali Claudio Medina
03 Racquelle Schrader

Poster Session 4

01 Kinsey Gabree
02 Ella Markovsky
03 Janaya Ferrer
04 Justin Seagull
05 Hannah Glaser
06 Lily Miller
07 Grace Barnwell
08 Allyson Mitchell
09 Molika So
10 Karie Abel
11 Karin Gulick
12 Evan D. Kilby
13 Andrew Gomez
14 Jacey Poole
15 Austin Anderson
16 Emma Kordek
17 Elise Ballash
18 Kai Nilson

Poster Session 4

19 Taylor Harrison
20 Raul Chavarria
21 Nathan Bairen
22 Eleanor Sand
23 Gabbie Nelson
24 Hana Kabil
25 Amanda Jessel
26 LeTrenna Mosley
27 Emma C. Queener
28 Katie Jones
29 Caterina Camp
30 Elly Ben Simon
31 Gabriel Springer
32 Sarina Starling
33 Andrea Cadavid
34 James Taintor
35 Katherine Herndon
36 Camila Porfilio

MENTOR OF THE YEAR

Undergraduate Nominees

01 Chris Kelso
02 David Hoppey
03 Dawn Witherspoon
04 Elizabeth R. Brown
05 Jim Gelsleichter
06 Lindsay Toth
07 Marie Mooney
08 Shelia Goloborotko
09 Szymon Ciesielski

Graduate Nominees

01 Amber Barnes
02 Andrew Barnes
03 Christopher Baynard
04 Dag Naslund
05 Dione Thomas Webber
06 Elizabeth R. Brown
07 Frank Smith
08 Guilherme Cesar
09 Mary Beal-Hodges
10 Patrick Kreidl
11 Richard Shang
12 Wanda Lastrapes

UNDERGRAD RESEARCHERS OF THE MONTH RECIPIENTS

01 Hannah Thomas
02 Alexander Bartkowiak
03 Rebecca Rey Robinson
04 Amra Kajdic
05 Lily Miller and Sydney Williams
06 Thalia Lynn
07 Jeffrey Perera

PANDION

Student work deserves to be published. The Office of Undergraduate Research (OUR) is accepting nominations for the 4th edition of *PANDION* until June 1, 2023. Visit the OUR website for more information about the submission process or to view older volumes.

WE HOPE TO SEE YOU AT ARISE!

Oral Session 1

01 The Sephardic-Mizrahi Moment: Cultural Renewal, Jewish-Arab Rapprochement, and Zionism in the 1920s

Boaz Israel Levy

This study examines the Sephardic-Mizrahi nationalist strategy in the British and French mandates of the early 20th century. Scholars including Abigail Jacobson, Moshe Naor, and Yitzhak Bezalel indicate this community developed a third nationalist strain between Palestinian nationalism and Ashkenazi Zionism. Utilizing Alex Winder's conceptual framework for violence, Yehuda Shamir's conceptual framework for culture, and Rashid Khalidi's analytical framework, this study broadens the research on Sephardic-Mizrahi communities, the development of 20th century nationalism, and the origins of the Arab-Israeli conflict. Drawing on correspondences, reports, and newspapers, this paper argues a Sephardic-Mizrahi Moment opened by 1925, employing institutions—such as activist organizations and the press—to simultaneously achieve cultural renewal, Jewish-Arab rapprochement, and Zionism. By 1929 the Sephardic-Mizrahi Moment ended, with the Western Wall Riots signifying that institutions ironically wrought cultural decoupling, Jewish-Arab violence, and the defeat of Sephardic-Mizrahi Zionist organizations. While the brief rise of the Sephardic-Mizrahi Moment represented the diversity of early 20th century nationalism, its fall symbolized the closure of possibilities for Jewish and Arab nationalists. This study of the Sephardic-Mizrahi Moment is also relevant for diversifying popular history, mitigating problematic popular discourse, and galvanizing new possibilities for Israel-Palestine.

Mentor: Dr. Christopher Rominger

02 Ship Of Theseus and the Four Causes

Kinsey Gabree

In my paper, I discuss the thought experiment of The Ship of Theseus. The thought experiment essentially is this: if every single piece of Theseus' ship has been replaced gradually over time during its travels, is it still the same ship? I argue that we can find an answer to this question using Aristotle's four causes. The four causes are the material cause, the formal cause, the efficient cause, and the final cause. Each of these contribute to what makes something itself; in this case, the ship. The material cause is what the ship is made out of; the "stuff," essentially. The formal cause is the blueprint of the ship; the shape, or appearance. The efficient cause is who or what created the ship. The final cause is the ultimate goal of the ship; what is its purpose? With this understanding of the four causes in mind, we will understand why the ship of Theseus is indeed not the same ship after its voyage. Some say the ship of Theseus is the same ship because the efficient cause and the final cause remain the same. In my paper, I respond to these opposing views in detail.

Mentor: Dr. Jonathan Matheson

03 Last Rites

Jessie Roncevic

In the spring of 2023, the Hicks Honors College, in collaboration with the Florida Institute of Oceanography, offered a course called Honoring the Oceans, led by Honors professors across the State University System, including Professor Jennie Ziegler and Dr. Dorsey Olbrich from UNF. As part of the course, Honors students from UNF and other Florida universities boarded the Florida Institute of Oceanography's research vessels, the R/V Weatherbird II and the R/V Hogarth. This work is a reflection of the voyage taken on the R/V Weatherbird in March of 2023 and lessons that explored how the economy, sciences, arts, politics, history, and media interpret and affect the oceans. It is also inspired by the recent advances in language-based AI and projects that use advanced machine learning with the aim to decipher whale language and establish communication with them. The poem, "Last Rites", written from the perspective of a whale, imagines how the whale might answer to humans.

Mentor: Professor Jennie Ziegler

Oral Session 2

01 Sunshine Organics & Compost

Nejra Kurtovic

In this generation, the environment has been impacted significantly due to pollution, deforestation, and burning of fossil fuels. This program, Environmental Leadership, allows for us young individuals to work with those who are trying to refine our environment while priming us into stronger, superior leaders. I was partnered with the astounding “Sunshine Organics & Compost” to compose a plan to implement a task which consistence of the concepts: leadership and environment. Our strategy was to create a survey for restaurants in the UNF facility to participate in to help us evaluate what happens to the leftover food scraps. I had to use different methods of leadership such as: communication, kindness, and eye contact. These methods helped produce a leader in me while involving myself in refining the environment. The results that we’re produced from this study showed that food waste isn’t properly composted, and in fact, is just thrown away. Overall, this causes landfills to pile up creating pollution and other greenhouse gases. This study has allowed me to recommend different methods of disposing of food waste such as using a composting facility. Not only will this improve the overall environment, but it’ll allow us to live a much healthier lifestyle.

02 Mangroves and the Marsh

Eleanor Sand

In spring of 2022 I attended a symposium and saw National Park Service (NPS) Ranger Ches Vervaeke present how they are tracking mangroves growth patterns and noticing a trend of the species moving north due to changes in the climate. A few years ago, the park rangers discovered a clump of mangroves for the first time in Timucuan Ecological and Historical preserve, containing what could be the most northern mangrove in North America. With warmer winters, mangroves that normally would not have survived the frosts are starting to take root here in northern Florida. This can have long term effects if the mangroves choke out the marsh which could be serious if a freeze then kills off the mangroves leaving the shoreline vulnerable to storm surges. This project will take a statistical look at what conditions are optimal for mangroves to grow in order to help Timucuan Ecological and Historical Preserve combat this new issue as well as discuss whether or not we should amend mangroves protected status in the state of Florida.

Mentor: Dr. Elena Buzaianu

Poster Session 1

01 Simultaneous Color Viscosity Printmaking

Noah Constantino

I will present the results of using the color viscosity technique on the plates I am creating for my senior exhibition at the UNF Gallery. I will demonstrate the process in hands-on workshops, alongside my mentor, Professor Goloborotko, who studied under the artist Krishna Reddy, the creator of this technique. This complex technique approaches Intaglio plates as sculptural surfaces. By applying inks of different viscosity with brayers that have different densities, the ink interacts at varying levels of the plate and expresses the variations and intensities of the image. The process is quite complex, and the expressiveness of imagery is outstanding. In this process, I render digital drawings onto my plate using screenprinting, which allows for a solid base of extreme highlights and harsh lines. This image transfer process helps me plan the areas I want to have sitting on the top layer and which areas need to fall back into space. Using a rotary drill tool, I can emboss the highlighted top layer by cutting it into the plate, creating valleys and plateaus to interact with the ink. The variation of mark-making and careful planning of color layering allows for a dynamic sense of space and vibrancy at a micro-level. Developing my work with this method made my practice reach levels I never imagined. I am eager to display intaglio printmaking with these newly found possibilities and show the importance of working with this traditional method using a contemporary practice and dimensionality.

Mentor: Professor Sheila Goloborotko

02 Can Film be a Form of Philosophy?

James Hayes

Although philosophy is traditionally engaged through prose or verbal dialectic, the hypothesis of film-as-philosophy states that non-documentary narrative films not only stimulate philosophical discussion but can expand our knowledge of the world by advancing novel epistemic premises to philosophy that are unique to the form of cinema itself. While there are many proponents of film-as-philosophy, one of its prominent detractors is Bruce Rusell who argues that although film can inspire philosophical inquiry and present detailed counterexamples, it is not philosophy in and of itself. By citing several varied sources, I will provide a comprehensive overview of the film-as-philosophy debate and ultimately argue for the position that film can epistemically expand philosophy. I will consider the advantages and disadvantages of the predominant, yet restrictive, view of film-as-philosophy and address the objections raised by Russell. After providing a working landscape, I will focus on Shawn Loht's position that film is not philosophy in and of itself but its engagement with the audience is what makes film philosophy, is the most persuasive argument in favor of film-as-philosophy. Using Loht's thesis as a new starting point, I will argue that not only is film a form of aesthetics and that the engagement of film constitutes philosophy, but that it, in some instances, is the most effective aesthetically engaging form of philosophy due to its accessibility, the fluidity of its language, emotional resonance, and transformative potential.

Mentor Dr. Jonathan Matheson

03 Colonization and Globalization of Peruvian Cuisine

Anthony Stacey

Peruvian cuisine is considered one of the most exquisite in the world. Its flavor and variety are due to the cultural exchange of indigenous people, Afro-Peruvians, and Spaniards, as well as the influence of immigrant groups from China, Japan, Italy, and other European countries. Peru experienced worldwide attention in the early 1990s that brought its culinary masterpieces to the forefront of elite culinary stages. This recognition has had certain impacts on Peruvian culture and, more specifically, on Peruvian cuisine. This presentation defines and questions the concepts of culture, globalization, and cultural appropriation with concrete examples of the impact of these trends on Peruvian cuisine. It also examines how food is taken out of its cultural context when it is put out into the world and the impact of globalization on such food. Although globalization has allowed Peruvian cuisine and culture to spread throughout the world, it can also be said that this recognition has come with a high price because it has caused changes in the country's culture. As Raul Matta has stated, Peruvian cuisine has gone through a process of cultural appropriation that strips food products of their traditional lower-class and indigenous

characteristics to market positive aspects that appeal to international audiences and infuses cultural elements from other cuisines that have already received worldwide recognition. As a result, Peruvian food has become accessible on a global scale but changed, so it has lost a certain level of authenticity that it was once known for.

Mentor: Dr. Constanza Lopez

04 The Rationality of Love

Leylanie Viruet Concepcion

Love is a concept and an experience with value placed by us that led many to see it as an essential part of a flourishing life. The problem is that because we have trouble finding it; it is rational to question its validity. Therefore, what is love? In particular, is love rational or irrational? The concept of love, the reasons for loving someone, and how we show affection are rational. The particular reason for the circumstance is that there is a nature to it making it comprehensible, however, the experience of falling and being in love is irrational. According to Alexander Moseleys, the view of love is irrational, based on how he emphasized the absurdity of desiring permanence in a relationship that's leading to an inevitable end and by exploring the soulmate framework. In this paper, my response to Camus will be that love is rational for numerous reasons like the soulmate framework being about adding value to the experience, the fact that romantic love is not the only kind of love, the fact that it is naturally occurring since no reason for loving is entirely independent according to Alexander Jech and because the nature of love has no boundaries due to its metaphysical properties. Which I will justify by analyzing different claims like the nature of emotions, the etymology of 'love', and the aim of love written by Alexander Mosely also known as egos which refers to romantic love, philia referring to friendly love, and agape selfless universal love.

Mentor: Dr. Jonathan Matheson

05 Industrial Outsourcing: The Case Against Maquiladoras

Gavin Faircloth

For decades now, the US has increasingly relied on foreign manufacturing to supply its demand for goods. A key catalyst for the growth of this dependence was the introduction of the North American Free Trade Agreement (NAFTA) which suddenly put US manufacturing directly in competition with Mexican manufacturing for who would supply goods to the US. The main portion of this Mexican manufacturing industry would be made up of manufacturing plants owned by US corporations operating in Mexico. These plants, called maquiladoras, would become one of the most important suppliers of goods to the US. This change would signal the start of an explosion in international dependence and directly lead to the incredibly globalized world economy we know today. However, this market freedom does not come without a cost, and we hear increasing worries about our newfound dependence on countries like China for goods and the mistreatment of laborers that occurs in these less regulated environments. Major issues like that make it important to analyze these maquiladoras as they are one of the first modern cases of large-scale international outsourcing for the US. Understanding the history of this phenomenon will help us find how this movement of manufacturing may be disrupting the development of labor rights across the world while being completely unsustainable as a system to be relied on into the far future.

Mentors: Dr. Alison J. Bruey and Dr. Jenni Lieberman

06 The Effects of Hurricane Maria Through Art

Veronica Francis

In September 2017, a Category 5 hurricane hit the Caribbean. The resulting damage was extensive and devastating to numerous countries such as Dominica, Puerto Rico, and the US Virgin Islands. Of all these places affected by Hurricane Maria in that year, it was Puerto Rico that suffered the most significant impact due to the massive power outages across the island. As a result, infrastructure collapsed, affecting homes and businesses alike. This situation made matters worse for an already struggling economy. Since then, economic recovery efforts have continued but have been slow, with many Puerto Ricans having to leave the island searching for a better future in the United States. In the face of all this devastation and dispossession, Puerto Rican artists have shown their creativity through powerful pieces that highlight the resistance and strength of their people. After experiencing or witnessing first-hand the impact of the storm, art has served on the one hand, to help alleviate the emotional pain caused by losing so much in the aftermath of Hurricane Maria, and on the other, to denounce the corruption of the government on the island and the abandonment of the United States. This poster looks at

how artistic representations give a voice to those who have lost everything and form communities of action and care. The artists have collectively expressed their feelings through colorful and stylized images. These symbolic manifestations emphasize the resilience that rebuilds hope.

Mentor: Dr. Constanza Lopez

07 Getting Growing with Jacksonville School for Autism

Willa Close

This research project arises out of a semester-long Environmental Leadership Program internship in collaboration with the Jacksonville School for Autism (JSA). JSA is a not-for-profit, private, K-12 educational institution established in 2005 to provide an individualized, full-service curriculum to students with Autism Spectrum Disorder (ASD). The JSA director and staff have spent the past several years devising and implementing an environmental enrichment program meant to teach ASD students important concepts regarding gardening and outdoor stewardship as part of their comprehensive education at JSA. This semester, JSA staff and interns are piloting a community launch event wherein food and wellness products that have been grown, produced, and packaged by JSA students will be sold to the community. Tentatively called "G.E.T Growing," the community event intends to build upon the foundations of JSA's STEP program that teaches students the necessary skills to be successful once they graduate. This project intends to serve two simultaneous purposes. Firstly, it serves as a record of G.E.T. Growing's conception— documenting the process of building the necessary framework to make the community event possible. This framework includes but is not limited to infrastructure needs, research processes, marketing material design, and weekly gardening classes with JSA students. Secondly, the project seeks to track the benefits and outcomes arising from G.E.T. Growing, on both a personal level for the students and for the Jacksonville community as a whole.

Mentor: Kelly Rhoden

08 Climate Conversations

Hannah Wehrung

Even as members of the Jacksonville community witness and experience the challenges posed by the climate crisis, many lack the appropriate information, communication techniques, and confidence in pursuing solutions that enable productive dialogue. This project aims to equip Jacksonville to participate in such dialogue using the implementation of four participatory, skills-building trainings reaching up to fifty people in a session. Each training is tailored to a population of interest; this includes young professionals, university students, environmentally focused civil society organizations, and the interfaith community. A survey of participants is conducted before and after each training to assess impact. Prior to the first training, a majority of participants reported uncertainty about discussing climate change with colleagues, family, and the general public. Some reported feeling unsure as to why it is important to use communication tools that have been researched and tested with the public when talking about climate change with others. After workshop, participants strongly agreed that the training increased their skill and/or knowledge of how to better communicate climate change and strongly agreed they learned something that will apply to their work, either now or in the future. Participants also reported increased assuredness and optimism about their ability to participate with others to address climate change alongside a decreased sense of helplessness, indifference, and uneasiness.

Mentor: Kelly Rhoden

09 Developing Predictive Models for Detecting Student Misconceptions in Short Answers

Luke Grubbs, Kazi Hasan, and Dr. Indika Kahanda

The application of Natural Language Processing (NLP) techniques in the automated grading of student-written short-response answers to writing exercises offered in STEM courses, as well as providing meaningful feedback, is viewed as having potential efficient and favorable applications in stimulating student learning. However, such exercises require more time to grade, and applying NLP techniques for automation could make the process more time efficient and effective for both the student and the professor. The purpose of this work is to investigate the feasibility of applying NLP techniques on a set of 185 unique student responses from a writing quiz in an electrical circuit analysis course to be able to correctly identify student misconceptions in any given sentence. This was performed using holdout validation of various supervised binary classification models such as Multilayer Perceptron, Multinomial Naïve Bayes, Gaussian Naïve Bayes, and Support Vector Machines (SVMs), trained using

Bag-of-Words features. The hyperparameter-tuned SVM model produced the highest result, displaying an F1-score of 0.74, substantially higher than the Gaussian Naïve Bayes F1-score of 0.67. These very promising results could likely be further bolstered with a thorough investigation of comprehensive hyperparameter optimization, the use of various stemming and lemmatization techniques, and the application of alternative features through word embeddings combined with Recurrent Neural Networks.

Mentor: Dr. Indika Kahanda

10 A Systematic Review of Zoonotic Enteric Parasites in Synanthropic Mammalian Species of Florida

Jeffrey Perera and Dr. Amber Barnes

"Mammals are close neighbors to Florida residents and can transmit zoonotic enteric parasites (ZEPs), yet limited research exists beyond rats and mice. This study aimed to determine ZEP prevalence in additional synanthropic mammals and identify potential exposure risks.

In October 2022 we searched 16 databases using the PRISMA 2020 guidance and relevant search terms. Articles were screened for eligibility based on the content of the titles and abstracts. Inclusion criteria consisted of: peer-reviewed observational studies (no restriction on year) on naturally infected armadillos, opossums, raccoons, eastern moles, bats, eastern cottontails, gray squirrels, red foxes, gray foxes, coyotes, and bobcats in Florida with documented presence of ZEPs. Full-text copies were obtained for all available titles that met these criteria and were reviewed for inclusion in the final analysis.

The initial search resulted in 9,696 titles. Of these, 2,186 were either duplicates or inaccessible. The remaining 7,510 records were screened by title and abstract and 104 records underwent full-text review. Subsequent screening removed 75 records for reasons such as: non-journal articles, missed duplicates, non-ZEP parasites, reviews, incorrect species, out-of-state samples, and lab infections. Our final analysis included 29 titles. Sixty-two ZEPs were documented across all species, although most were present in raccoons (n=15). Synanthropic Floridian mammals carry ZEPs that can be transmitted to humans via food, water, soil, fomites, or direct contact. Recognizing the exposure risks for humans and other animals can lead to the creation of One Health interventions to prevent zoonotic disease transmission.

Mentors: Dr. Amber Barnes

11 Assessing the Acceptability of Wearable Technology in Physical Therapist Practice: From Patients' Point of View

Justin A. Mayorga and Dr. Raine Osborne

The economic and time constraints of modern physical therapist practice create the need and opportunity for technological advances that improve the efficiency and quality of care. One such technological advancement is the use of wearable sensors to collect movement-related data and provide real-time information to physical therapists and their patients. Wearable sensor technologies are emerging, but many questions remain regarding the best ways to collect and use the information collected by these systems. PURPOSE: This study was designed to investigate the patient's experience using a developing wearable sensor system during their physical therapy episode of care. Specifically, patients' perception of the system's useability, ease of use, and preference for use during their present and future care in physical therapy was assessed. METHODS: Within this observational study, patients who fit the inclusion criteria were provided a pre-questionnaire asking about their perception of the use of wearable technologies in physical therapy, before their initial examination. Patients and clinicians were asked to carry out their physical therapy sessions and assessments as usual, using the wearable sensor system to augment care as desired. Following discharge, patients were provided with a follow-up questionnaire to report their experience and perceptions of the wearable sensor system. RESULTS: The patient's qualitative perceptions of their experience with the sensors demonstrate that they can be useful for monitoring their own ROM progress, provide motivation during exercises, and be useful for visual feedback as the sensor system would not count a rep if the form was poor. In general, patients rated the wearable sensors useful for physical therapy about 70% on a 0-100 scale (0% = extremely useful, 50% = neutral, 100% = extremely useful). The qualitative results also demonstrated that the system did lack ease of use due to the poor adhesive and inconsistent sensor communication, hindering the sensor's functionality at times. Despite these experiences, the patients rated their general perceptions of

the sensor's ease of use a 72% (0% = extremely difficult, 50% = neutral, 100% = extremely easy) during their care. CONCLUSIONS: The results from the study demonstrate promise for the use of the wearable sensor system in physical therapist practice. Future studies are warranted to assess the effects of using the sensor system in clinical practice, across different patient populations, and with other practical activities outside the clinic where movement analysis may be warranted.

Mentor: Dr. Raine Osborne

12 Automated Health Misinformation Detection in Web Search

Prajwol Lamichhane and Dr. Indika Kahanda

Health misinformation detection is concerned with distinguishing between trustworthy and untrustworthy information and rectifying wrong information in the field of health. Retrieving misinformation can be fairly widespread in web searches, and it is especially serious when it comes to health-related queries. Hence, to solve this issue, we develop a novel information retrieval pipeline that can identify the most trustworthy answers to a given health-related query. We employ a 3rd party tool Haystack, which includes indexing as well as a search pipeline. We index a very large text corpus containing approximately 1 billion English documents to the Haystack indexing process. There are two key components in the search pipeline: the retriever and the reader. The retriever gets materials based on user queries, while the reader examines and proposes the appropriate context depending on user questions. The BM25 is used in the retriever pipeline, whereas the reader pipeline uses an advanced transformer model trained for question-answering. The output consists of the top-k recommendations for a given query, the correctness of which we plan to evaluate using the Text Retrieval Conference (TREC) Health Misinformation 2022 Track's official gold-standard data.

Mentor: Dr. Indika Kahanda

13 Ideal Knee Flexion Angle for Isometric Hamstring Strength Comparing Force Production and Electromyography Testing

Matthew Osborn, Mitchell Levine, Steven Long, Marcelo Salcedo, Nathan Phai, Nathan Karam, and Dr. Guilherme Cesar

Prior research suggests hamstring isometric training improves strength and prevention of injury2. Given the Hamstring's importance as a dynamic stabilizer of the knee joint, the ideal joint position (i.e., knee flexion angle) to create the highest strength output during rehabilitation is not yet known. Between-sex comparison of muscle performance can elude further tailoring of hamstring training since prior work indicated differences in hamstring activity1. Our goal was to contrast knee flexion force at three different angles (65°,90°,115°) along with hamstrings' electrical activity (electromyography, EMG) in both sexes. Six individuals (3 females; 24±1.79years; 169cm±11.82cm; 67kg±15.17kg) performed maximum effort manual muscle test (MMT) with Lafayette Hand-Held Dynamometer. Hamstring EMG was recorded (Iworx IX BIO4) in mV according to established guidelines (SENIAM) for sensor placement. EMG signal absolute integral was collected from the middle 3 seconds of the MMT. Wilcoxon Signed-Rank tests identified differences separately (alpha=0.05) between angles. Cohen'd effect size (ES) was calculated to demonstrate strength of differences. A significant difference (p=0.0355, ES=0.809) in force production occurred at 90°(49.43lbs±17.36) compared to 115°(37.58lbs±11.31). Between sex comparisons showed force and muscle recruitment measured in the male populations (55.81±12.52 lbs; 0.84±0.53 mV) and females (33.79±7.95 lbs; 0.33±0.13 mV). Between sex statistical significance was observed for force (p=0.004, ES=2.1) and EMG (p=0.019, ES=1.302). The significant greater force was observed at 90° compared to 115°. No significant difference was observed for the EMG values between all knee flexion angles. Sex comparisons show statistical significance in both force and muscle recruitment was greater in male participants.

Mentor: Dr. Guilherme Cesar

14 Exploring the Relationship Between Symptoms of Trauma-Related Disorders and Stigma on TikTok

Cas Campbell, Kali Robertson, Payton Galvin, Tamara Byrd, and Dr. Tes Tuason

This study aimed to assess how symptoms of trauma- and stressor-related disorders, such as post-traumatic stress disorder (PTSD), are represented on TikTok. We hypothesized that the most stigmatized symptoms would be mentioned the least in videos and have lower engagement (e.g., likes, comments, views, shares), indicating alienation of the material even in social media. Trauma symptoms were grouped into six categories using the criteria for Posttraumatic Stress Disorder in the DSM-5-TR: Avoidance, Dissociation, Event, Intrusions, Physiological, and Psychological. Quantitative data collection occurred between 03/17/23 at 8:50 a.m. and 03/19/23 at noon and assessed 120 videos under the hashtag #TraumaTok. We counted the frequency of how many videos mentioned specific symptoms (Avoidance = 7, Dissociation = 9, Event = 59, Intrusions = 8, Physiological = 24, Psychological = 38) and coded the number of likes, comments, shares, and views. We computed a one-way between-groups ANOVA comparing the overall likes on TikTok posts with different trauma symptoms. We found a significant difference among the symptoms of trauma (F(5,141) = 2.35, p < .05), and the Games-Howell posthoc test showed that posts with Dissociation and Intrusion symptoms had significantly lower like engagement than Event symptoms. No significant differences were found among trauma symptoms, views, shares, or comments. Findings reveal that trauma-related dissociation and intrusions may be more stigmatized than other symptoms—even in social media.

Mentor: Dr. Tes Tuason

15 Measuring Differences in Cortical Activity Between High and Low Self-Monitors using fNIRS

Dalia Elkhatib, Ambriel Cohen, Isabel Suazo, Dr. Christopher Leone, Hannah E. Thomas, Karli Friedman, Magnolia Lake, Emma Queener, Dalia Elkhatib, Dr. Katherine Hooper, and Dr. Paul Fuglestad

Self-monitoring is a psychological phenomenon in which individuals attempt to regulate the way they present themselves and are perceived in social situations. Self-monitoring involves emotional regulation and exists on a spectrum. At one end of the spectrum, there are high self-monitors who more strategically manage their self-presentation and emotional reactions in social situations. On the opposite end, there are low self-monitors who do not regulate their emotions or contextually adjust their behavior in social environments. The current study aims to investigate how self-monitoring affects localized neural activity in the prefrontal cortex (PFC) by using functional near-infrared spectroscopy (fNIRS), a non-invasive brain imaging technique. FNIRS uses wavelengths of near-infrared light to detect concentrations of hemoglobin, which is associated with cortical activity and cognitive effort. Participants of the current study viewed emotionally valenced images from the International Affective Picture System (IAPS) and performed the following tasks in separate blocks: inhibiting facial expressions, producing a facial expression appropriate to the shown image, and producing an expression inconsistent with the shown image (self-monitoring condition). We expected that high self-monitors will exhibit decreased activity in their PFC and be more proficient at regulating their emotions when performing the self-monitoring condition, whereas low self-monitors will have increased activity in their PFC due to emotional regulation being more difficult for them. Our data shows a trend of decreased activity in the orbitofrontal cortex for high self-monitors, and a slight increase in activity for low self-monitors when they express emotions inconsistent with the emotional valence of the image.

Mentor: Dr. Katherine Hooper

16 Metabolic Reprogramming of Glioblastoma: Targeting the Hexosamine Biosynthesis Pathway

Raegan Weil, Fudhail Sayed, Dr. Beatriz Fernandez-Gil, Dr. Andrea Otamendi-Lopez, Dr. Alfredo Quiñones-Hinojosa, and Dr. Paula Schiapparelli

Glioblastoma (GBM), is the most aggressive form of adult brain tumor, has a median survival rate of only 14 months. The current standard of care (SOC) involves a combination of resection, chemotherapy, and radiotherapy. UDP-N-acetylglucosamine pyrophosphorylase 1 (UAP1) is the final enzyme in the hexosamine biosynthesis pathway (HBP) and results in UDP-GlcNAc formation. UDP-GlcNAc plays a crucial role in a process known as GlcNAcylation, a post-transcriptional modification that drives oncogenic signals. UAP1 expression has been shown to have an

inverse relationship with GBM grade. We have developed a “UAP therapy” using two distinct strategies to inhibit UAP1: genetic knockdown using shRNAs and a proprietary small-molecule inhibitor drug, G2Bz. Our project aims to comprehend the molecular mechanism of UAP1 inhibition in GBM and to identify the interaction of “UAP therapy” with the current SOC, specifically with the drug of choice for GBM temozolomide (TMZ). Western blot analyses of various GBM cell lines indicate that G2Bz treatment decreases UAP1 expression as well as decreases UDP-GlcNAc. We found that combination of G2Bz with TMZ shows a synergistic decrease in proliferation. Surprisingly, UAP1 silencing shows controversial results on O-GlcNAc levels, suggesting a sort of downstream compensation that might be led by OGA upregulation. Further studies are needed to this end. In conclusion, the pharmacological approach of UAP therapy has shown positive results but the genetic approach needs to be reviewed.

Mentor: Dr. Beatriz Fernandez-Gil

17 Analyzing Resistance in Klebsiella Pneumoniae Cultured in Sub-MIC Concentrations of the Antibiotic Cephalothin

Abby Jacobs

Antibiotic-resistant Klebsiella pneumoniae threaten the efficacy of drug-based therapy. Low levels of antibiotics have been shown as sufficient for inducing resistance in bacterial populations. To better understand the power of sub-inhibitory antibiotic exposure as a selective pressure on resistance, three replicates of K. pneumoniae 43816 derived from a previous experiment were exposed to low concentrations of the beta-lactam cephalothin. Each replicate was exposed to a sub-MIC concentration for 24 hours, then tested via minimum inhibitory concentration (MIC) assay. After 24 hours of growth in the MIC assay, the absorbances of the replicates were measured via spectrophotometry and used to calculate MICs for 50%, 90%, and 100% reduction of normal growth. Sub-inhibitory levels of cephalothin as low as 7.5 µg/mL were sufficient to allow growth in concentrations up to 250 µg/mL, fifteen times greater than the marker for clinical resistance (16 µg/mL). However, exposure to just 1.5 µg/mL was sufficient to induce clinical resistance in all three replicate strains. In all treatment groups, the MIC values were increased when the replicates were exposed to higher sub-MIC concentrations, suggesting that the observed resistance is dose-dependent. Corroboration of these results with those of other studies suggests that pollution of antibiotics and misuse of drug treatments pose a significant risk to the induction and maintenance of strong antibiotic resistance by providing the necessary selective pressure on bacterial populations. The mechanisms behind changes in antibiotic resistance vary, and more research would be needed to elucidate the exact nature of resistance evolution in K. pneumoniae.

Mentor: Dr. Terri Ellis

18 The Impact of GBM Nutrient Availability on O-GlcNAcylation

Fudhial Sayed, Raegan Weil, Dr. Beatriz Fernandez-Gil, and Dr. Alfredo Quiñones-Hinojosa

Cancer cells optimize nutrient utilization to supply energetic and biosynthetic pathways. The Hexosamine biosynthetic Pathway (HBP) is a nutrient-sensing pathway that is activated by glucose and other nutrients and is overexpressed in cancer. This leads to an increase of O-linked-N-acetylglucosamine (O-GlcNAc), which has been related to an increase in oncogenic signals. In this study we aimed to explore the impact of nutrients availability on O-GlcNAc in Glioblastoma (GBM), the most malignant brain tumor in adults. We tested this in two patient-derived GBM cell lines, NS965 and NS612. We analyzed the effect of increasing different nutrients in O-GlcNAc levels through Western Blot, we assessed levels of glucose in the media with a glucometer, we measured proliferation (using cyquant) and glycolysis rate (measuring the Extracellular flux with Agilent Seahorse). The nutrients were added at the following final concentrations: Glucose (32mM), Glutamine (5mM), Lipid commercial mixture, 3-HB (10mM), O-GlcNAc (2mM). We found increased levels of glucose in the group supplemented with glucose. However, the glucose transporter GLUT1 is significantly increased in all the other groups. Interestingly we found that proliferation decreased in the group supplied with O-GlcNAc. Additionally, the groups supplied with glutamine and 3-HB were highly energetic with the highest levels of glycolysis. Whereas the group supplied with lipids had the lowest level in NS612. In conclusion these results highlight the critical role different nutrients play in its effect on O-GlcNAc. Further analyses on nutrient deprivations are needed. These findings provide insight in the relevance of nutrient availability on the tumor microenvironment.

Mentor: Dr. Beatriz Fernandez-Gil

19 Effects of Wave Attenuation by Pervious Oyster Shell Habitat (POSH) Units on Biofouling

Keegan Donlen

The estuarian shorelines in North Florida are extensively impacted by erosion due to the large amounts of vessel created wake energy in regions that historically has little wave activity. One of the key measures to help combat shoreline erosion is through the construction of artificial oyster reefs that will attenuate the wake energy as the waves pass through. There are several commonly used methods of constructing artificial oyster reefs that have various issues, so researchers here at UNF developed a new method of creating an artificial oyster reef substrate known as the Pervious Oyster Habitat (POSH). The current research on the POSH consists of how it is performing in the field as a reef and as a shoreline protector. What this project explores if the protection provided by the POSH structures impacts oyster and barnacle recruitment. Previous research has shown that oysters recruit worse in higher energy environments. If the protection provided by the POSH structures enhanced oyster recruitment off structure, that means it functions better overall as a living shoreline protector. Structures were deployed in regions of the shoreline that were protected by the POSH structures, and regions that were unprotected and then measuring the oyster densities on the substrate structures. It was found that while there was a trend for spat density to be higher in the regions protected by the POSHes, the difference wasn't enough to be considered statistically significant. However, given that there was a consistent trend, future exploration is warranted.

Mentor: Dr. Kelly Smith

20 Isolating Urease from Sporosarcina Pasteurii

Joana Macias, Dr. Terri Ellis, and Amar Kosovac

Sporosarcina pasteurii is a non-pathogenic soil bacterium that is known for its increased urease activity. Urease is the enzyme produced by the cell that catalyzes urea hydrolysis, leading to calcium carbonate precipitation in a process known as microbially induced calcite precipitation (MICP). Previous studies have found that when S. pasteurii, and a solution of urea and calcium chloride were added to sand, it was able to form a dense crust. This has the potential to add a protective layer to sand dunes if applied before a significant event such as a hurricane. Florida is especially vulnerable to erosion having major storm events like hurricanes that rapidly increase coastal erosion. Of the 855 miles of shoreline in Florida, almost 50% are deemed critically eroded by the Florida Department of Environmental Protection. Although promising, this ecologically friendly alternative for soil cementation has some limitations. It is unlikely that the general public will approve of bacterial treatments on the beaches. Knowing that urease is vital for the precipitation of calcium carbonate, this study aimed to isolate urease from S. pasteurii and determine its enzymatic activity. To purify the enzyme, S. pasteurii was grown in a BHI broth with 2% urea to an optical density of at least 3.0 (600nm). Samples were then centrifuged, dialyzed, microfiltered, and then filtered again using a centrifugal filter. Isolation of urease was confirmed by performing Bradford and Urease assays from each step of the isolation process. It was found that urease could be isolated into the supernatant of the samples and maintain its urease activity.

Mentor: Dr. Terri Ellis

21 (La1-yEuy)1-xSrxMnO3 Thin Films Grown as Random Alloys and Superlattices by MBE

Jacary Sapp, James Payne, Dakota Brown, and Dr. Maitri Warusawithana

Using molecular beam epitaxy (MBE), we grow single-crystalline thin films of mixed-valent manganites. Specifically, we study (La1-yEuy)1-xSrxMnO3 thin films where x is set to 1/3 and the europium substitution for lanthanum, y, is changed from 0 to ½. The starting compound with no europium (y=0), La1-xSrxMnO3, is well studied and it is understood that lanthanum and strontium are mostly ionic in the crystal forming La3+ and Sr2+ ions. At x=1/3 this material is well known for its colossal magnetoresistive properties and its highly spin-polarized ferromagnetic ground state. The addition of europium into this crystal can impact its electronic properties in three respects. The valence state of europium, which is not known can influence the doping. The ionic radii of europium can trigger additional lattice distortions that couple to the electronic structure. The f-electrons in europium can influence the spin state of the hybridized t2g and eg electrons that mediate the double exchange interaction and the resulting ferromagnetic metallic ground state. Here we study this influence of adding europium in both random alloy samples and ordered superlattice thin films. Specifically, we carry out a comparison of the electronic properties due to the addition of europium,

y=0 vs y=1/2 as well as between the random vs ordered arrangement of europium in the lattice. In both comparisons, we find the influence of europium leads to distinct changes in the electronic properties.

Mentor: Dr. Maitri Warusawithana

22 The Importance of Green Space in Urban Landscapes

Ava Allen

The Importance of Green Space in Urban Landscapes is a project to educate visitors of the Jacksonville Arboretum on the benefits of parks and green land in cities. Students utilized their time to volunteer in the Arboretum and to individually complete a document to be accessed by scanning a QR code within the park. Weekly Wednesday workdays in the Arboretum included communicating with other volunteers to coordinate tasks and complete land maintenance and landscaping. Saturday workdays with the Conservation Corp involved planning and clearing trails, invasive plant species removal, and landscape cleaning. Individual time was used to research urban parks and the effects of urban parks on individual and public health, community building, and the environment. A document outlining the benefits of parks was created to be displayed in the park through a QR code. The goal of this project was to create a more informed community, and to personally become more educated on urban planning and green spaces. Goals of volunteering in the Arboretum were to maintain the beauty and utility of the land, and to preserve the integrity of the park's natural Florida flora and fauna through the removal of invasive species. Leadership was used in the student's research, communication, and self-management in this project.

Mentor: Kelly Rhoden

23 The Role of J-Domain Protein Tid1 in the Maintenance of Mitochondrial DNA

Brandon Guerin, Tania McCormack, Dr. Grzegorz Ciesielski, and Dr. Szymon Ciesielski

Mitochondria are cellular organelles essential for a multitude of biological activities and they contain multiple copies of their own genetic material (mtDNA). Aberrant behavior of proteins involved in direct mtDNA processing can lead to mutations, deletions, or even a total loss of mtDNA resulting in cell death. Such dysfunctions of essential mtDNA have been associated with numerous human diseases, including cancer. Molecular chaperones, with Hsp70/JDP systems playing a central role, are proteins responsible for the quality control of other cellular proteins. Mitochondria contain their own Hsp70 (HSPA9) and JDP (Tid1) system, however, their involvement in mtDNA maintenance is not yet understood. Previous in vivo studies of the yeast Tid1 homologue revealed the ability of the JDP to colocalize with mtDNA required for its maintenance. Our project focuses on exploring the ability of JDPs and to characterize the mechanistic details of mtDNA binding using human Tid1. We utilized a bioinformatic approach, including multi-sequence alignment and structural data analysis, to identify residues likely involved in Tid1 binding to mtDNA. We have established an expression system for the successful production of human Tid1 by E. coli bacteria cells. As the next step, we will purify Tid1 and its variants with alterations in identified key residues to experimentally test their importance for DNA binding. We believe that a better understanding of the JDP's ability to colocalize with mtDNA is an important first step, from which we can unravel the molecular chaperone role in maintaining the integrity of the mitochondrial genome.

Mentor: Dr. Szymon Ciesielski

24 Controlling Orientation and Doping in Superconducting YBa2Cu3O7-x Thin Films Grown by MBE

Paul Christenson, Dalton Zona, and Dr. Maitri Warusawithana

We investigated the effect of substrate temperature and oxidizing conditions on the crystallizing orientation and superconducting properties of YBa2Cu3O7-x (YBCO) thin films. The films we studied were grown under ultra-high vacuum (UHV) using molecular beam epitaxy (MBE) with distilled ozone as the source of oxygen on (001) oriented lanthanum aluminate (LAO) substrates. We explored different substrate temperatures as a means to promote the growth of a-axis versus c-axis YBCO thin films (c-axis oriented along the film out-of-plane direction). In situ reflection high-energy electron diffraction (RHEED) imaging was used to monitor the film surface during growth. RHEED provided real-time feedback on second-phase nucleation due to off-stoichiometry. The resistance of the films was measured as a function of temperature using a four-point geometry; these measurements allowed us to determine the superconducting critical temperature. We find that a substrate temperature between 630°C

and 680°C with an ozone partial pressure of 2 × 10^(-6) torr is ideal for the growth of c-axis oriented YBCO films. We also find that, while a substrate temperature around 550°C promotes the nucleation of a-axis oriented films, the ozone partial pressure of 2 × 10^(-6) torr leads to over-doped a-axis samples as evidenced by electronic transport measurements.

Mentor: Dr. Maitri Warusawithana

25 Unified Approach to Electricity and Magnetism

Daniela Amalfi Ojeda, Paul Christenson, Deeyana Patel, and Dr. Maitri Warusawithana

In traditional physics education, electricity and magnetism are presented in a sequential approach, introducing electricity first and then learning about magnetism. The objective of this project is to explore an approach to electricity and magnetism in which both concepts are presented in parallel. This approach is explored because electricity and magnetism are two concepts which are related to the other, normally if one phenomenon is present the other phenomenon will be present as well. To achieve this, the concept of a field is presented, which leads to electric and magnetic fields, their source and how they compare to each other. This approach allows concepts like Ampere's Law and Gauss Law to be introduced in parallel, which is beneficial due to the similarities they have between each other. Another potential benefit of the approach is that it will be easier for students to understand the relationship between these two phenomena due to the unified approach. A textbook that will guideline the approach is being developed. The conventional method to teaching physics 2-electricity and magnetism, is based on sequentially presenting the concepts of electricity, then concepts of magnetism, and finally the interconnections between these two concepts. Here we discuss a unified approach to physics 2. The goal of this approach is to emphasize the unified nature of electricity and magnetism, and provide students with an intuitive grasp of the interconnected concepts. In this approach we begin by introducing the concept of a field and the source that gives rise to that field. As such, electric fields and magnetic fields are introduced side by side with their respective sources, an electric charge and the motion of a charge.

Mentor: Dr. Maitri Warusawithana

26 Jacksonville Arboretum Urban Forestry and Community Conservation

Maria Jose Alvarez

The Jacksonville Arboretum is an urban forest which provides many ecosystem services such as carbon fixation, climate regulation and other process which benefit the environment. It also provides many other benefits such as creating a green space for the community which helps mental health and over all wellbeing. The community also helps the Arboretum by maintaining it and keeping it protected. This project involved environmental leadership development by collaborating with the Jacksonville Arboretum to aide in the upkeep through invasive species control and grant writing. Time was dedicated to volunteer at the Arboretum where invasive plant species were identified and removed allowing for the natural flora to flourish and maintain the local biodiversity. The other aspect of this project involved acquiring funding for the maintenance and improvement of this important habitat. Getting involved in the grant writing process requiring multiple collaborations allowed for professional and leadership development using the skills learned at the environmental leadership program. The application was begun starting with the project narrative with the help of another ELP student. The expected outcome is to have a completed application by the due date at the end of the year and earned the grant. This would allow for the funding of the Arboretum for future years and for improvements in its conservation.

Mentor: Kelly Rhoden

27 Characterization of Calcium Binding and Coiled Coil Domain 1 (Calcoco1) in Skeletal Muscle

Amra Kajdic and Dr. David Waddell

Skeletal muscle atrophy results from a range of physiological conditions, including aging, cancer, disuse, and denervation. A previous study used skeletal muscles from mice following 3 days and 14 days of denervation to identify novel, atrophy-induced genes. The microarray analysis revealed that Calcoco1 is expressed in skeletal muscle and is induced in response to denervation. The cDNA of Calcoco1 was successfully amplified and cloned from cultured C2C12 cells, demonstrating that this gene is expressed in muscle cells. Quantitative PCR was subsequently conducted using RNA isolated from

proliferating and differentiating muscle cells to determine the expression profile of Calcoco1 at the transcriptional level. We observed moderate activation of Calcoco1 through myoblast proliferation and early differentiation, followed by a robust increase in expression at later stages of myotube differentiation and these results were mirrored at the protein level. To elucidate the function of Calcoco1 in muscle, we transfected cultured muscle cells with a Calcoco1 expression plasmid and then harvested the cells at timepoints ranging from proliferation through late differentiation. The cell lysates were probed by Western blot for markers of muscle cell differentiation, including Myosin Heavy Chain and myogenin, which both showed repression in response to Calcoco1 overexpression. Finally, we sought to determine the sub-cellular localization of Calcoco1 in muscle cells by fusing Calcoco1 cDNA to Green Fluorescent Protein (GFP) and expressing it in muscle cells. Visualization by confocal fluorescent microscopy revealed cytoplasmic localization in myoblast cells, suggesting that Calcoco1 likely does not participate directly in gene regulation.

Mentor: Dr. David Waddell

28 Culture by Design: A Stylistic Analysis of Punctated Ceramics at the Mill Cove Complex

Nicole Abreu

During the early Mississippian period (AD 900-1250), the Mill Cove Complex was one of Florida's most significant Indigenous civic ceremonial centers, inhabited by fisher-hunter-gatherers. Since 1999, the University of North Florida has taken part in a number of excavations, which have uncovered the most extensive and diverse collection of pottery in the area. The pottery in the collection features punctuated designs created by pressing tools into wet clay before it was fired. However, the current typology system for classifying "punctated" pottery was developed in the mid-twentieth century and is based on ceramic assemblages outside northeastern Florida. In addition, this system divides the types of punctated pottery into broad categories, which conceals essential information regarding the variability of the pottery types. The purpose of my research is to develop a type-variety classification system for punctated ceramics from the Mill Cove Complex by analyzing their temper, design pattern, surface treatment, and the techniques used to generate punctations. Because of these discoveries, archaeologists will have a better understanding of when and how punctated pottery was used in the ritual and daily life of the people who lived in Mill Cove.

Mentor: Dr. Keith Ashley

29 Why do Faculty Persist?: Designing a Survey to Assess Service-Learning and Community Engagement Motivations and Orientations

Vanessa Clarke, Dr. Dan Richard, Becca Berkey, and Heather Burk

Service learning and community engagement (S-LCE) is a form of pedagogy that pairs classroom instruction with students engaging in service in the community. Previous research has demonstrated primary motivations (student learning and community impact) and orientations (disciplinary knowledge and training and social change) towards S-LCE from faculty who have worked in the field. The current project will develop a survey that can be administered to faculty participating in S-LCE in order to discover the motivations of their work, using the past findings as guidelines. Researchers coded and rephrased statements from interviews of 29 faculty who engage students in S-LCE work at two institutions of higher education. Two independent coders identified statements to be included in the survey. The survey will comprise statements from interviews of faculty members that detail their anecdotal experiences with S-LCE and are coded to identify motivations and orientations as well as typical challenges and support experienced at institutions of higher education. Once the survey is constructed, it will be administered to faculty at different institutions to validate the survey instrument.

Mentor: Dr. Dan Richard

30 Head Start Educators' Cardiovascular Health Awareness and Perceived Health Risks

Amanda Yelverton, Bria Ferera, Katherine Herndon, and Dr. Dawn Witherspoon

Background: Understanding perceptions and intentions to change may subsequently decrease cardiometabolic health risk factors. Previous studies indicate that an increased onset of premature cardiovascular disease (CVD) was due to the individual's misleading perception of cardiovascular risk (Woringer et al., 2017).Preexisting

health conditions within Head Start educators and school staff's physical health, mental stressors, and financial disparities may impede their abilities to educate and care for children accordingly (Derscheid et al., 2014). Previous research indicates that healthy employees are more productive, and are more likely to model healthy behaviors for children (Lipscomb et al., 2022). Aims: A Health Needs Assessment was completed by participants to explore key risk factors associated with CVD, to support the creation of a community-based health program. Methods: The participants included 75 Head Start educators and staff, the majority were African American females. The data was self-reported through an online Health Risk Assessment, including The Attitudes and Beliefs about Cardiovascular (ABCD) Risk Questionnaire. The ABCD Questionnaire included four subscales Knowledge, Perceived Risk of Heart Attack/Stroke, Perceived Benefits, Intentions to Change, and Healthy Eating Intentions. Results: 21 % of participants were overweight and 66 % were obese. 41 % were Pre-Diabetic and 54 % had high blood pressure Perceived risk of heart attack or stroke was significantly greater in the obese group compared to the normal and overweight groups (p<.05). However, Health Knowledge was not related to BMI. Conclusion: The findings highlight the need for interventions concerning CVD risk factors within Head Start educators and staff.

Mentor: Dr. Dawn Witherspoon

31 Imaginary Friends: Indirect Effects of Imagined Social Support on Task Performance through Changes in Perceived Stress.

Krystiana Rego, AJ Likosar, Katie Wilkinson, Lauryn Leitner, and Nick Kilpatrick

Social support can buffer the effects of stress (Uchino et al., 1996). However, in many situations social support is unavailable, and imagining social support may help to reduce the impact of stress. Although imagined physical touch has been shown to be an effective stress buffer, little research has compared it to other types of imagined support, such as emotional or tangible support. To gain greater insight into these processes, the purpose of this project was to identify whether imagining supportive touch, emotional social support, or giving emotional support is best at moderating stress during an impromptu speech task conducted over zoom. Participants completed initial measures of life stress, personality, and social support. Next, they indicated their stress levels at baseline and after the speech task. Participants also self-rated their speech performance, and the recorded speeches were rated by research assistants. Results showed that changes in perceived stress did not significantly vary by type of support. However, the control condition had greater increases in stress compared to the support conditions as a whole. Additionally, imagined support indirectly related to speech performance through changes in stress such that support predicted lower increases in stress which in turn predicted better self-rated speech performance. Research assistant ratings of speech behavior did not significantly vary by changes in stress. As a whole, results indicate that imagined social support can be useful for dealing with potentially stressful situations.

Mentor: Dr. Paul Fuglestad

32 Effectiveness of Indirect Value Attacks on Vaccine Attitudes

AJ Likosar

This study investigated whether anti-vaccination attitudes would be more effectively challenged by indirectly attacking a broadly held social value, individualism, than through a direct attack on the target attitude. A 2x2 mixed design was employed where college psychology students (N = 169) participated in a survey measuring their attitudes on vaccination before and after a direct or indirect attack on anti-vaccination attitudes, with attack type serving as a between-subjects variable and time serving as a within-subjects variable. Attitude change was the dependent variable. Participants also indicated their party affiliation. Although in the expected direction (i.e., indirect attack being more effective), there was not a significant attitude change difference between the indirect or direct attacks among respondents who viewed vaccination negatively ($p = .059$). However, political affiliation moderated the effect of attack type ($p = .046$). Among Republicans, there was a significant increase in pro-vaccination attitude in the indirect condition versus the direct condition. Democrats were not differentially affected by attack type. More research is needed to establish these effects with a larger sample size. After more than two years of American public health campaigns surrounding vaccination during the COVID-19 pandemic and with the anti-vaccination movements shifting in a more partisan direction, these results suggest a change in messaging tactics may be more effective for vaccine advocacy.

Mentor: Dr. Paul Fuglestad

33 A Thematic Analysis of Sponsored Posts by Body-Positive Instagram Influencers.

Taylor Hurley

Body-positive posts on social media platforms, specifically Instagram, are directed to encourage viewers to take a positive stance toward how they view their bodies. In past research, exposure to body-positive posts on social media platforms has been associated with improvements in women's mood and body image. Research has also shown that young adult women spend more than two hours each day posting or sharing content on Instagram, giving plenty of time for a viewer to scan through multiple different social media influencers' photos while also reading their captions. Influencers often share posts called "fitspiration", which include photos commonly related to fitness routines, images of healthy food, or before and after photos. Other influencers base their content on body positivity, which correlates with the audience loving their body regardless of weight, height, or other common insecurities relating to the body. In this report, I researched five women-identifying social media influencers on Instagram of different races, cultures, and body types, while using a thematic analysis of their sponsored posts. These gathered posts (n = 300) are from the time frame of January 2020 through January 2023. We found five themes that are present within the influencers' sponsored posts and analyzed the differences in these themes between influencers based on body type. Implications showed that themes found in these influencers' sponsored posts vary depending on the influencer's body type.

Mentor: Dr. Rachel Riggs

34 Food Insecurity and Stress Levels Among Head Start Teachers

Bria Ferera, Katherine Herndon, Amanda Yelverton and Dr. Dawn Witherspoon

During the recent COVID-19 pandemic, Head Start school staff have endured heightened stress. Widespread health crises make individuals susceptible to increased stress, anxiety, and other psychological disorders. Crises comparable to the COVID-19 pandemic elevate isolation, physical health risks and economic troubles, which are widely discussed factors known to exacerbate stress levels (Rahman, et al, 2021). However, a potential salient inducer of this stress is the presence of food insecurity (FI), which is limited access to nutritious foods. Previous research suggests that food insecurity is also associated with poor mental health outcomes. AIMS: This study aims to examine FI and stress in Head Start (HS) educators. Participants included 75 HS staff; the majority identified as African-American females. Data from the Perceived Stress Scale (PSS), short form, and a U.S Household Food Security Survey (HFSS)- short form, and a Health History survey were used to examine the relationship between educator's demographic, health factors stress and FI during the pandemic. About 15% of participants were classified as food insecure. Employees who were food insecure reported significantly higher levels of perceived stress. Perceived stress was also related to weight/BMI, and level of education. The obese group endorsed significantly more stress than the overweight/normal groups (p<. 05). Employees with at least a college degree reported significantly less stress than those with a high school education or less (p < .05). These findings emphasize the need for intervention programs to alleviate the stress and food insecurity amongst this important group.

Mentor: Dr. Dawn Witherspoon

35 An Interprofessional Approach of a Food Forest on Cost Savings, Mental Health and Sustainability Practices

Cali Quaglia, Anna Breede, Madelyne Leveson, and Sofie Van Moorleghem

What if home-built food forests could have an economic, mental, and environmental impact in the Duval area? The two-year research study, Harvest for Health: An Interprofessional Approach of a Food Forest on Cost Savings, Mental Health, and Sustainability Practices, aspires to understand the positive effects of permaculture intervention. Gardening programs are used to encourage healthier dietary behaviors and active learning and promote sustainable practices for the community. The investigation focuses on building fifteen at-home food forests and providing supportive permaculture workshops for homeowners throughout Duval County. Rather than a 'community-based' approach to sustainability, this project targets the individual and building a sustainable food forest at their home in hopes of long-term cultivation of harvests. Chosen participants were given various planting options, including finger lime, watermelon, broccoli, and carrots. Primary outcomes from this study include a quantifiable cost savings analysis, mental health changes, and changes in sustainability practices. This study provides a foundation

for individual-level permaculture interventions with both short- and long-term influences. It can help shed light on how we can promote individual-level behavior change and contribute to the planet's global good.

Mentor: Dr. Melissa Baron

Oral Session 3

01 A Case Study on Activation Level of Rotator Cuff Muscles Using Electromyography and Associated Muscle Forces

Allyson Mitchell, Dr. AmirHossein MajidiRad, and Dr. George Pujalte

Rotator cuff tears are among the most common shoulder injuries, making them an attractive topic of study. Yet, there is a lack of clear understanding of attributes associated with deep and superficial muscles when it is intended to study the recovery progress after rehabilitation. Through a systematic approach, this project investigates the activation of rotator cuff muscles using surface electromyography (sEMG) sensors. The team developed a strategic plan to investigate the precision of the NORAXON technology that is utilized in this study to ensure that it is capable of capturing small variations in shoulder motion. This is followed by a reliability analysis to ascertain reproducibility of the experiment. The levels of muscle activities for superficial and deep muscles are monitored to explore the impact of traditionally prescribed arm movements used for the rehabilitation of rotator cuff injuries. Furthermore, an analysis of forces generated in the muscles is done to provide better insight into the activation levels of rotator cuff muscles. The results were promising, with a competent technology and acceptable correlation associated with muscle activities across all subjects. Four common arm movements were studied; scaption generated a significant response in the targeted muscles, particularly of the supraspinatus. Results were conclusive across all subjects, and simulation also supported the experiment showing high activation levels for the supraspinatus. The teres minor also showed a significant contribution when performing external rotation at 90 abduction. The outcome of this study is significant for this ongoing project as it identifies the most impactful exercises that ensure targeted muscles are being triggered. It also lays the groundwork for expanding the project to a clinical study focusing on the most effective arm movements in order to improve rehabilitation process and reduce pertinent cost.

Mentor: Dr. AmirHossein MajidiRad

02 Investigating the Roles of Two Major ECT2 Variants in Pancreatic Ductal Adenocarcinoma

Hana Kabil

Pancreatic ductal adenocarcinoma (PDAC) has a poor prognosis due to its late-stage detection, invasive nature, and resistance to therapies. Novel biomarkers for early diagnosis and therapeutic targets are needed for more effective treatment of PDAC. Epithelial Cell Transforming Sequence 2 (ECT2), a guanine nucleotide exchange factor for the Rho-family GTPases, plays a required role in cytokinesis. ECT2 expression is elevated in a variety of tumors including PDAC; but few studies have explored the role of ECT2 in PDAC transformation. Two major ECT2 variants (ECT2-Ex4+ and ECT2-Ex4-) have been shown to express in cells through alternative splicing events that include or exclude exon 4 of the ECT2 gene. In this study, we investigated the role of ECT2-Ex4+ and ECT2-Ex4- on the transformed phenotype of PDAC cells. We performed qPCR analysis to assess mRNA abundance of total ECT2, ECT2-Ex4+, and ECT2-Ex4- in a panel of PDAC cell lines. An shRNA was used to knockdown total endogenous ECT2 in PDAC cells followed by expression of vector, ECT2-Ex4+, or ECT2-Ex4- cDNAs that have been rendered shRNA resistant. QPCR and western blot analysis was performed to confirm expression of ECT2-Ex4+ and ECT2-Ex4-. The effect of ECT2-Ex4+ or ECT2-Ex4- on PDAC transformation was assessed by soft agar colony formation, invasion, and clonal expansion assays. The knockdown of total endogenous ECT2 inhibited cancer stemness and transformed growth in PDAC cell lines. Reexpression of either ECT2-Ex4+ or ECT2-Ex4- in ECT2 knockdown cells reconstituted transformed growth. Interestingly, ECT2-Ex4+, but not ECT2-Ex4- supports PDAC invasion and cancer stemness. Our study suggests a distinct role for ECT2-Ex4+ in PDAC cell transformation. Our future studies will focus on the specific mechanisms of ECT2-Ex4+ mediated transformation in PDAC.

Mentor: Dr. Justilien Verline

03 The Effects of Dasatinib, Quercetin, and Extracellular Vesicles in Reducing Senescence in Injured Renal Epithelial Cells

Tegan McDill

When administered together, dasatinib, a cancer-fighting drug, and quercetin, a potent flavonoid and antioxidant have demonstrated significant senolytic properties. In-vitro, mouse, and human studies have shown the drug combination's ability to clear senescent cells and reduce inflammation in diabetic models. However, little is known about how dasatinib and quercetin (D+Q) may interact with mesenchymal stem cell-derived extracellular vesicles (MSC-EV) to further reduce cellular senescence. EVs are small vesicles secreted by MSCs that contain mRNAs regulating transcription, cell cycle, and DNA repair mechanisms in cells. They have been implicated in alleviating acute kidney injury and reducing inflammation and reactive oxygen species (ROS). For these reasons, it was hypothesized that a combination treatment of D+Q and MSC-EV would further lessen inflammation and senescent cell burden in a diabetic human kidney epithelial cell model. A series of preliminary studies were conducted to determine the optimal EV dose. RT-qPCR analysis was performed to quantify gene expression of a host of pro-inflammatory and senescent cell markers. Senescence-associated galactosidase (SA- -gal) staining was performed to visually identify cellular senescence in each treatment/injury group. It was found that D+Q and MSC-EV had no significant effects compared to D+Q treatment alone. Nevertheless, both cells treated with D+Q and D+Q-MSC-EV showed reduced senescence burden in injured groups, suggesting senolytic activity. Further studies are needed to fully understand the therapeutic effects of EVs and how they may interact with D+Q.

Mentor: Dr. Latonya Hickson

Poster Session 2

01 Community in Protest: How Women in Argentina are Fighting Gender Violence

Lily Stone

For decades, Latin American women have confronted the issues of gender violence and have attempted to secure reproductive rights. Many of these women have united to form social movements to address the violence that surrounds them, revolutionize how the female body is perceived, and form a sense of collective identity. The cultural and political background of Latin America has shaped these initiatives and historical and geographical factors have also played a role in influencing how they develop. These factors influence not only their formation but the tactics they use to address these key matters, matters which still affect women today. The issues themselves have also evolved in diverging ways and changed drastically throughout these nations' histories. One of the most influential movements in the region is NiUnaMenos (NotOneLess) which hails from Argentina. For the movement, the life of every woman counts. This is why they have strived to stop institutionalized femicide. NiUnaMenos has made significant progress in addressing these issues and has become nationally renowned. This project examines how this movement has developed and how it may have been influenced by previous social movements in Argentina. It explores how the women in NiUnaMenos express their collective and individual identities to address this violence. Finally, it discusses how they employ protest tactics, how they harness the power of public and digital space in new ways and the collective cultural production of these protests.

Mentor: Dr. Constanza Lopez

02 Editing the Fleming Family Papers for the North Florida Editorial Workshop

Matthew Austin

As a 2023 DHI student fellow, I have worked this semester to prepare digital editions of documents in the Fleming Family Papers, held in UNF's Special Collections. The majority of these items are letters written between 1902 and 1930 and addressed to Elizabeth L. Fleming, the daughter of Francis Philip Fleming, governor of Florida from 1889 to 1893. These documents provide insight into an important family in Florida history, as well as what daily life was like in Florida and elsewhere in the United States in the early twentieth century. Working from digital images, I have transcribed the documents and encoded them in TEI-XML, the international standard for text encoding in the humanities. In order to contextualize the documents, I have also conducted research on the Fleming family. My work with these documents will be published in an open-access format on the website of the North Florida Editorial Workshop (nfew.org). The digital editions include transcriptions that are faithful to the originals and also partially regularized versions that are more accessible to today's readers. Publishing these editions online makes them available anywhere in the world, removing the need for users to consult the originals directly in the Special Collections Reading Room on campus

Mentor: Dr. Clayton McCarl

03 Judith Jarvis Thomson's Impact on the Modern Abortion Debate

Isabel Hiday

In the year 1971 the philosopher Judith Jarvis Thomson wrote the paper "A Defense of Abortion" she argued that pregnant people should have the ability to remove themselves from a situation in which they do not want to have their body used against their will. With this she crafted a newer and more complex argument why abortion should be morally permissible. Much of the political abortion argument centered around the fetal right to life. Thomson's argument was that based around the idea that abortion should be a legal right afforded to those who can get pregnant even presupposing fetal personhood. Thomson reframed the issue, instead of arguing against those who are anti-abortion she created a new argument. From Thomson's perspective the more important piece of the argument was the self-determination of women. So how did this argument create influence the modern abortion debate? Although anti-abortion advocates still place their emphasis on the idea of fetal personhood, those who are currently trying to solidify abortion protections into law are utilizing Thomson's thoughts. Thomson's argument is a successful work of applied

ethics although the modern abortion debate goes on Thomson's argument added a new layer to the debate. The modern abortion debate has taken this argument in stride. The current state of applied ethical philosophy and the way this argument is taken into the current abortion debate shows that Thomson's argument is clear and logical, with a kind of staying power and cultural influence that many philosophers never achieve.

Mentor: Dr. Jonathan Matheson

04 How to be a Sage?

Nathanael Coronado

How to be a sage? The Master (Confucius) [Kǒng Fūzǐ] said "Why stop at authoritative conduct? This is certainly a sage (Sheng)". (6.30 The Analects) Using Confusius' explanation along with commentary from his peers we can establish a rubric of what defines a sage. We can use the hierarchy of esteemed types of people from top to bottom that is laid out in the analects. We have a "scholar apprentice" (shi) then an "exemplary person"(junzi) and most importantly the "sage". This is a person who is of the highest discipline. The discipline not being subject to one field. This could be martial arts, religion, or botany, just a few diverse examples. We also can use the thoughts of confucian students and similar philosophers to evaluate their positions on the processes needed to work towards being a sage. This would be someone like Mengzi, Lao Tzu and Im Yunjidang to see where we can approach the method of becoming a sage. The issue of today's society is how to move towards sagehood when classical Chinese traditions are not nowadays societal norm. The niche aspect of classical Chinese philosophical sagehood creates a problem for itself in that it cannot diversify through many fields of study. This is where the 'sophist' can help. Using a western philosophical understanding to help translate Sage-hood into western ideas. Using this information we can find out what it means to be a sage and how we can work towards obtaining that goal in modern ways.

Mentors: Dr. Jonathan Matheson and Dr. Sarah Mattice

05 What is Love? Exploring the Philosophical Dimensions of the Concept of Love

Cheyenne Burlingame

Love is a complex concept. Many philosophers throughout history have tried to understand what love is. Two contrasting views on love can be found in Sartre and Aristotle. Sartre argues that love is a fundamental aspect of human existence and is inherently intertwined with freedom. We are free to choose whom we want to love, but once we make that choice of love, we become responsible for maintaining that person's happiness and well-being and, consequently, their ability to love. Sartre sees love as not a feeling but more of an active option. However, Aristotle considers love a virtue that is essential to leading a fulfilling life. Love is a combination of passion, friendship, and commitment. Passion is the initial attraction that draws us towards someone, while friendship involves sharing common goals and values. Friendship is meant to outlive the fleeting feeling of passion through loyalty. Loyalty can be introduced through commitments, the decision to remain faithful and loyal to the loved one. Aristotle sees love as an emotion, a state of being that requires intentional action and dedication to one's partner. Although these two accounts of love look to be dramatically different, in this paper, I argue that there is a way to combine the insights of both Aristotle and Sartre. In doing so, we get a richer picture of love. Which allows us to understand and help define a better perspective of what love may be to us.

Mentor: Dr. Jonathan Matheson

06 Sustainability In Businesses

Veronica Francis

The business community has turned to sustainability as a focal point. Sustainability is characterized by meeting current needs without compromising future generations' ability to meet their own. Since businesses have significant influence over both society and nature, they must operate sustainably - this implies considering environmental, social, and economic outcomes of operations. Companies could lower waste production through recycling initiatives or greener packaging while donating surplus food-

stuffs locally; installing renewable energy sources like solar panels would minimize electricity consumption also investment in environmentally friendly equipment & devices are equally important for reducing pollutions caused due to high emission from non-renewable resources such as fuels etc.; alternatively using sustainable materials- recycled elements or bamboo can dramatically reduce carbon footprint when producing goods too. Moreover, companies need be aware of their impact on local communities before taking action that may harm them with limited retribution despite being profitable otherwise prioritizing employees' welfare alongside ensuring ethical products/services will aid overall success since customers often apply moral values during purchasing decisions thus it's critical component toward having thriving modernized businesses practices focused around 'People,' 'Planet', and "Profit". One of the most important factors is the need for a long-term perspective, as sustainability requires a commitment to ongoing improvement and adaptation.

Mentor: Kelly Rhoden

07 Green Team: Educating About Sustainability at The Players Championship

Skyler Carlson

The community partner I worked with was the PGA Players Championship tour. The PGA created a new volunteer branch focused on helping the PGA be more sustainable. The Green Team was posted at high-traffic areas close to food and drink areas to ensure spectators were properly recycling and disposing of waste. Although the PGA was planning to sort through all the waste, they wanted to educate guests on the importance of recycling and why the PGA is working to be more sustainable. The PGA's effort will hopefully be seen by other major sporting events and encourage them to follow in their footsteps and work to be more sustainable. The PGA wanted the Green Team to be mainly high school or college students because involving the younger generations is the best way to work towards a sustainable future. We had 35 volunteers who were students from various high schools and colleges in the area. These schools included Atlantic Coast High School, Ponte Vedra High School, the University of North Florida, Flagler College, international students, Jacksonville University, and Beaches Go Green. Due to the work of the Green Team and the volunteers who sorted the waste, we were able to ensure the proper disposal of the waste and recycling. We hope the PGA's effort to be sustainable encourages others to do the same!

Mentor: Kelly Rhoden

08 An Analysis of the Rolling Bending Fatigue Behavior of M2 and M42 Steels

Carlos A. Hernandez Ortiz

Molybdenum high-speed steel is a common material used to make tools for shaping (i.e., cutting or forming) a material into a part/component. When in use, these tools are typically subjected to significant loadings that are applied in a cyclic, rapid fashion. Therefore, their mechanical behavior under cyclic loading (i.e., fatigue) should be carefully characterized to ensure their durability and performance. This study investigates the fatigue behavior of two types of Molybdenum high-speed steels, including M2 and M42. It is hypothesized that M42 steel, with higher hardness, has better fatigue resistance than M2 steel. The experiment is conducted using a rotating-bending fatigue tester at various stress amplitudes. The number of cycles to failure is recorded for each material type and stress amplitude. The stress-life (S-N) curve, commonly used for the design against fatigue failure, is subsequently generated for M2 and M42 steels. The experimental results of M2 and M42 steels in this study will be used as baseline data to investigate the effects of surface coating on the materials' fatigue behavior in a future study.

Mentor: Dr. Jutima Simsiriwong

09 Predicting Cis-Regulatory Regions in Humans using Deep Learning

Jett Baxter

Previously considered junk DNA, non-coding regions have been found to control gene expression through cis-regulatory regions. Identifying these regions and understanding their functional impact is critical for advancing our understanding of gene regulation. Recently, the development of machine learning technologies has made it possible to predict the purpose of cis-regulatory regions. This research focused on analyzing data from multiple sources, including the Encyclopedia of DNA Elements (ENCODE) and the Functional Annotation of the Mammalian Genome (FANTOM) projects, to train various

machine learning models. Specifically, we have categorized cis-regulatory regions from eight distinct human cell types into classes based on their functionality, distinguishing between active and inactive regions, and promoter versus enhancer functionality. These categorizations have been used to develop multiple supervised binary classification models, that use deep sequencing features as input, aimed at accurately distinguishing between these different functional classes. Our preliminary findings suggest that Random Forests and Support Vector Machines effectively predict the functional class of cis-regulatory regions based on these features with an average accuracy of 96.1\% and 94.9\%, respectively. Moving forward, we are working on developing Deep Neural Networks and Transformer models including DNABERT, that take DNA sequence data as input, in order to further improve the accuracy of our predictions.

Mentor: Dr. Indika Kahanda

10 Non-Markovian Noise Characterization of Quantum Circuit Errors Using Deep Learning and Experimentation

Nazmul Kazi and Dr. Zornitza Prodanoff

Output noise in quantum circuits limits the usability and reliability of current quantum hardware, termed Noisy Intermediate-Scale Quantum (NISQ) devices. Quantum gate optimization is the current typical approach to reducing noise by finding the most efficient set of gate operations to implement a quantum computation, aiming to minimize the resources required while maintaining the fidelity of the computation. Most existing quantum circuit noise models are based on an underlying memory-less (Markovian) quantum channel assumption that is rooted in the similar information theoretical concept. In addition, classical Machine Learning (ML) and Deep Learning (DL) techniques have been utilized as unconventional methodologies to predict and optimize noise, formulate device-specific noise-resilient circuits, detect bit-flip and phase-flip errors as well as to uncover their correlations, and more. This brief study confirms, through experimentation, the feasibility of more realistic noise characterization of quantum circuit errors using DL. We generated 1,000 quantum circuits with random gate configurations and for each circuit, we created a family of 16 circuits with additional random gates to increase the diversity while maintaining similarity within the families. We built a dataset of 240,000 circuit pairs by pairing the circuits within their family and used 80%, 10%, and 10% of the dataset for training, validation, and testing, respectively. We encoded the circuit pairs as 12-channel images and our results, obtained through execution on the 5-qubit IBM device (Belem), indicate that the difference in output noise between two circuits can be modeled successfully by using Convolutional Neural Networks.

Mentor: Dr. Zornitza Prodanoff

11 Enhancing Access to Multicomponent Behavioral Interventions for Obese College Students

Erica K. Flamm and Meredith D. Simmons

Introduction: Thirty-seven percent of college students are overweight or obese (BMI 30 or greater). In Florida, only 36% of adults are considered a healthy weight, and > 60% of adults are either overweight or obese. The United States Preventive Services Task Force has endorsed a grade B recommendation for clinicians to offer and/or refer adults with a BMI of 30 or higher to intensive, multicomponent behavioral interventions to improve the health of the patient. Methods: This evidence-based quality improvement project was based on the Advancing Research and Clinical Practice Through close Collaboration Model (ARCC). The setting was a college student health center at a University in Northeast Florida. The total number of clinical visits during the project time frame was 1590. The convenience sample (n=130) was selected based on a positive screening of a BMI of 30 or higher. A multicomponent referral system was built into the electronic charting system by the computer coordinator and the primary investigators for patients with a BMI of 3trs0 higher. Medical providers in the clinic were trained on the evidence supporting the referral, how to create a referral, and complimentary services offered at the referral agencies on campus, including nutritional counseling, exercise evaluation and recommendations, and counseling services. The project intervention/PICOT question was: “Will providers (P) in a student health clinic prescribe on-campus multicomponent behavioral services (I) that help students engage in healthy behaviors (O) over sixty days (T)?” Results: No referral baseline data was available as the referral process was new to the clinic. A retrospective chart review was completed sixty days post-referral implementation to determine if providers prescribed the multicomponent referral. Of the 130 patients who screened positive for a BMI of 30 or higher, 35 or 26.9% were referred to multicomponent interventions by the medical providers.

Mentor: Dr. Julie Baker-Townsend

12 Analysis of Experiential Versus Informational #mentalhealth TikTok Posts- Which is More Interacted With?

Abhilasha Kumar, Ansley Hitson, Sam Nelson, Mesody Ben Moha Paz, Ash Pitts, and Dr. Tes Tuason

The content related to mental health on TikTok can contribute to the negative effect that increased social media use has on an individual (Hooper, 2022; Boer et al., 2021). The current study aims to investigate if there is a difference in interactions between informational and experiential posts on TikTok which contain #mentalhealth. In early February, the first 100 videos in English on TikTok under #mentalhealth were observed. The number of views, likes, and comments of each of these videos were recorded. The videos were categorized as informational, defined as sharing knowledge or resources, or experiential, including personal experiences or entertainment. An independent samples t-test comparing the interaction between informational and experiential TikToks found no significant difference for likes, t(161) = -0.72, p < .05, comments, t(148) = -1.13, p < .05, or views, t(153) = -1.33, p < .05. Additionally, a constructivist paradigm guided the qualitative research on the content of the videos and data was analyzed using consensual qualitative research methods. Preliminary analyses revealed that experiential videos contained themes such as past experiences or skits and informational videos contained themes such as symptoms or advice. The results of the current study indicate that regardless of the nature of the post, there is no difference in the way individuals interact with them. Counselors using TikTok to effectively contribute to the topic of mental health and use this as a means to inform the public can present the information in either format. Future research needs to explore themes of TikToks further.

Mentor: Dr. Tes Tuason

13 Systematic Review of Balance-Related Interventions for Children with Cerebral Palsy: Kinetic Outcomes

Shekinah Mitchell, Abby Camacho, Mia Cruz, Abigail Hildreth, Mira Ghali, and Irene Mamea

This systematic review focused on mobility-related interventions to improve balance control in children with cerebral palsy (Gross Motor Function Classification System I-V). Database searches occurred through March 2023 in CINAHL, Google Scholar, Medline, PubMed, and Sportsdiscus using a combination of the major keywords cerebral palsy, interventions, mobility, balance exercises, balance control, center of pressure, and kinetics. Inclusion criteria included balance outcomes assessed via force plate variables (i.e., kinetic outcomes: center-of-pressure sway, center-of-pressure velocity, center-of-pressure area), subjects ages 2-17 years old, and experiments reported in the English language. No restriction was applied to publication date. Eleven studies published between 2003 and 2018 fulfilled the inclusion criteria with a total of 211 children receiving mobility-related interventions. These interventions involved treadmill and robotic-assisted gait training, Nintendo-Wii balance board and exercise programs, functional taping, moveable force plates, virtual reality, horse riding simulators, balance training with dynamic tasks, and manual therapy. The interventions included in this systematic review were beneficial as they provide a range of mobility interventions with potential enjoyable alternatives for children to facilitate functional changes regarding balance control. This review also identified relevant information about the contents and limitations associated with enhancing balance control for children with cerebral palsy. Further research is needed to elucidate further gaps in knowledge to highlight innovative opportunities for kinetic outcomes to improve mobility and postural stability in children with cerebral palsy.

Mentor: Dr. Guilherme Cesar

14 Perceived Stress In 1st Year DPT Students; A Cross-Sectional Retrospective Study

Elizabeth VanDeMark, Juliette Smetana, Gianna Forte, Kaitlyn Witzel, Marissa Williamson, and Hallie Hunt

Background For healthcare graduate students, stress affects their daily lives as a result of the demand to keep up with the rigorous coursework of an ever-changing healthcare system. Objective Explore stress levels and perceived stressors of Doctor of Physical Therapy (DPT) students reflecting on the first semester of graduate school. Methods Cross-sectional retrospective study using a questionnaire (via Google-Form) to survey twenty-seven first-year DPT students regarding different psychosocial aspects of stress levels during Fall 2022. The questionnaire had 28 items with a 0-5 Likert scale (zero, no stress at all; five, most stress ever felt). Results Participants included 8 males and 19 females (ages 23±4 years) from

6 undergraduate majors: Health Science (47%), Applied Physiology (14.8%), Athletic Training (11%), Kinesiology (11%), Biology (2%), and Exercise Science (2%). Average stress level was 2.7/5 with four contributing factors: Academics (74%), Finances (11%), Personal Health (11%), and Relationships (3.7%). Stress levels from academics averaged 2.93/5. Other contributing factors included 3.4/5 on feeling stressed or anxious, eating a well-balanced diet (80.5%), prior diagnosis of mental health disorder (29.6%), average of 6.4 hours of sleep, and spending 12.6 hours of screen time. Lastly, 62.9% of the participants engaged in stress-reduction strategies, with the majority engaging in consistent exercise. Conclusions DPT students reported mild-moderate stress, with academics as the largest influence. Students reduced stress by participating in exercise. It is suggested that PT students participate in stress-reduction programs and have a stable support system to facilitate better personal health.

Mentor: Dr. Guilherme Cesar

15 Hand Held Dynamometer Predicts Athletic Performance in Graduate Students

Emily Costabile, Shannon Jessup, Michael MacGillivray, Hailey Miller, Blake Penley, and Dr. Guilherme Cesar

Vertical Jump (VJ) is a widespread athletic task that represents one's overall athleticism1. When considering predictors of athletic performance, literature suggests several similar tasks involving the lower extremity, such as broad jump2 and 10-yard sprint3. While handgrip strength has been associated with a person's overall strength and health, literature is scarce regarding the association between handgrip strength measures and overall athleticism4. Our goal was to determine whether handgrip strength could predict overall athletic performance. Eleven individuals (6 females; 23.1±1.8 years; 1.7±0.1m; 71kg±16.3; 24.0±2.6 BMI) performed the countermovement VJ and handheld dynamometer (Lafayette). A linear regression model was used to investigate the relationship of the dependent variable (handgrip strength in kg) on the independent variable (VJ height in cm). Handgrip strength (44.0±15.7 kg, range 29–78 kg) significantly (p<0.001, F = 58.08) explained 85.3% of the variance in VJ height (51.1±16.1 cm, range 35.6–78.3 cm). Handgrip strength is typically not considered a predictor of athletic performance, however, our study showed a strong relationship between them and can be used in the future to predict athleticism. References 1. Davis DS, Briscoe DA, Markowski CT, Saville SE, Taylor CJ. Physical characteristics that predict vertical jump performance in recreational male athletes. Physical Therapy in Sport. 2003;4(4):167-174. doi:10.1016/S1466-853X(03)00037-3 2. Heather M. Macdonald, Minsoo Kang. (2022) Refining the FitnessGram with criterion-referenced Standards for Musculoskeletal Fitness. Measurement in Physical Education and Exercise Science 26:4, pages 267-275 3. Marques, M. C. & Izquierdo, M. (2014). Kinetic and Kinematic Associations Between Vertical Jump Performance and 10-m Sprint Time. Journal of Strength and Conditioning Research, 28 (8), 2366-2371. doi: 10.1519/JSC.0000000000000390. 4. Minasian RA, Kuschner SH, Lane CS. A Review of Handgrip Strength and its Role as a Herald of Health. The open orthopaedics journal. 2022;16(1). doi:10.2174/18743250-v16-e2201100

Mentor: Dr. Guilherme Cesar

16 An Analysis of Basigin Expression in Mouse Intestines Exposed to an Inflammatory Stimulus

Taha Izhar and Bianca Opdenbosch

Basigin is a transmembrane glycoprotein expressed on epithelial cells and blood vessel endothelial cells throughout the body. These types of cells often form barriers, like the blood brain barrier (BBB). A recent study by this laboratory indicates that Basigin gene expression on BBB endothelial cells increases in adult mouse brains in response to a prolonged inflammatory stimulus. Epithelial cells of the intestines also form a barrier. It is possible that Basigin expression may be altered by inflammatory stimuli in this location as well. The purpose of the present study was to determine if the expression of Basigin in mouse intestines is influenced by an inflammatory stimulus. It was hypothesized that Basigin expression in adult mouse intestines would increase in response to treatment with lipopolysaccharide (LPS), a component of the outer membrane of Gram negative bacteria. Intestines from 6-month-old mice were isolated and the contents were removed. The samples were incubated in culture medium containing LPS (10 g/mL) or saline for 24 hours at 37oC with 5% CO2. RNA was isolated and subjected to quantitative reverse transcription polymerase chain reaction (q-RT-PCR) using primers specific for Basigin. Expression of Basigin was normalized to that of 18s rRNA. Preliminary data suggest that Basigin gene expression is not influenced by LPS, as no significant difference in expression was observed between the LPS and saline treated samples. At present, the hypothesis is not

supported. The data suggest that Basigin expression is influenced differently in intestinal epithelial cells and blood vessel endothelial cells.

Mentor: Dr. Judith D. Ochrietor

17 Pulses, Packets, and Protocols: A Comparative Study of the Frequency Content of IR Signals, Sensors, and Signal Processing in NEC and Samsung Protocols

Samuel Olunuga

Infrared (IR) radiation was first discovered by Sir William Herschel in 1800. However, it wasn't until the late 20th century that it began to be used as a tool for communication and has found many applications in various fields, including consumer electronics, industrial automation, and medical imaging. A variety of IR protocols have been developed and this project investigates the mathematical principles underlying two common IR protocols, NEC and Samsung, using an Arduino microprocessor and an infrared sensor. The initial packet size of the two IR protocols, NEC and Samsung, is investigated in this project. The IR signals, with a wavelength between 750-790 nm and a frequency between 38-40khz, are decoded using an infrared sensor and an Arduino microprocessor. The resulting data is then converted from binary to hexadecimal and decimal for further analysis. The NEC protocol employs pulse distance encoding, which determines whether the transmitted bit is a logical 0 or 1. Data is sent in packets that include an address, a command, and inverted codes for error checking. The Samsung protocol also employs pulse distance encoding, but with a distinct bit encoding algorithm and packet structure which contains a special code and footer. Further study will be done to investigate the mathematical principles underlying Near Field Communication (NFC) and Radio Frequency Identification (RFID) protocols and their comparison with IR protocols

Mentor: Dr. Dennis Perusse

18 Mapping For Conservation

Molly Templin

I worked with White Oak, which is a conservation center that works to help grow the population of different species. It also informs people of the values and ethics that go into conservation work. In order to do this they have a lot of property; acres of land for the animals, facilities for education as well as equipment, and the untouched Florida landscape. With over 17,000 acres of land, it can get confusing to navigate to different locations around the property, and a person can easily get lost. (I learned this from experience.) Therefore, I partnered with Indie Lewis to make a more updated and efficient map. We tried multiple methods that would work, including photoshop, and even tracing over a google map, but we came to the conclusion that using the GIS mapping system is the best system we could use, despite it being more challenging. We joined a zoom with Robert Richardson, a GIS specialist at UNF that helped us define our goals for the project and explained how GIS would be useful for them. After getting GIS set up, we talked to the different teams that manage areas across White Oak to get locations and coordinates that would be useful to have on the map, especially for new interns that need to know certain buildings and gates to go to, and began to draw up a map. We drove to each of those locations to get the coordinates using a phone and then put them into GIS. This created a point that we could name, and thus began the begging of the new map. The product probably will not be finished by the time this project ends, but it should look like an app that members at white oak can use to get from their location to wherever they want to go at White Oak.

Mentor: Kelly Rhoden

19 Quantitative Phase Imaging Provides New Insights Into Diverse Morphologies In Cell Lines and Their Behavior In Response To Alternative Cancer Treatments

Rida Khan

Quantitative phase imaging (QPI) allows for non-invasive measurements of cell dry mass and the ability to track cells for long periods of time with minimal damage, making it most beneficial for research on cancer treatment. Research with this enhanced method of observation can decipher various morphologies present in specific cell lines and show how each cell responds differently to provided signals. In this study, we observed N2a murine myoblasts, MDA-MB-468 breast adenocarcinoma and HCT116 colon carcinoma cell lines using Telight's Q-Phase microscope that utilizes QPI technology for label-free time-lapse monitoring. Cells were able to survive in the optimum conditions for up to 96 hours without any appreciative loss of viability. With the emergence of phytochemicals being

used as alternative cancer treatments, specific pigments in saffron have shown therapeutic effects against cancer tissues such as apoptosis and decreased carcinogen presence. A microanalysis of the effects of saffron on reducing the invasion potential, viability, and tumorigenicity of cancer cells line was performed. Using QPI technology, cell lines were observed for 58-hour periods for changes in mass, movement, and replication. The quantitative data showed a reduction of projections from saffron treatment but did not show any significant reduction in cell movement over the 58-hours. Further analysis showed that saffron treatment inhibited cell motility, migration, and invasion. This research proposes the chemical properties of saffron as a potential therapy for cancer. By using QPI technology, cellular processes can be quantified and analyzed to observe the success rate of innovative drug functions to treat cancer.

Mentor: Dr. Fatima Rehman and Dr. Albina Mikhaylova

20 Evaluating the Temporal and Spatial Distribution of Sindbis Virus in Aedes Aegypti

Katie G. Peters

Sindbis virus (SINV) generates foci of infection within the midgut (MG) of female mosquitoes. SINV moves via cell-to-cell spread and will disseminate out of the MG into the surrounding hemolymph and permissive tissues. Dissemination allows for the mosquito to transmit the virus during subsequent blood meals. The aim of this study is to characterize the temporal and spatial distribution of SINV in the vector mosquito Aedes aegypti. Viremic blood-fed mosquitoes are evaluated at days 5, 7, 10, 18, and 30 post-infection. MGs are dissected and viral infection is detected using the reporter gene GFP in combination with fluorescent antibody staining. The results of this study will detail the replication of an arbovirus in a vector species, allowing for a better understanding of the relationship between virus and vector.

Mentor: Dr. Doria Bowers

21 The Role of Molecular Chaperones in Cancer Proliferation

Sarah Taylor

Cancer is a common disease that results in an uncontrolled division of aberrant cells in the body. This unregulated cellular behavior is triggered by mutations in their genomic DNA, resulting in abnormal protein function, and ultimately leading to broad proteotoxic stress. The natural cellular defense from such stress is the network of molecular chaperones, which are proteins that control and maintain the structure of other cellular proteins. A subset of these molecular chaperones, named Hsp70s, play a central role in this network, along with their obligatory partners, JDP's. It has been shown that cancer cells can take advantage of Hsp70/JDP system's protective role in tumor progression. In this study, we are exploring the possibility that cancer patient genomic mutations could be directly altering the activity of molecular chaperones, specifically Hsp70/DNAJB1, to tailor them for cancer needs. I searched through genetic information from major cancer patient genomic databases. By using bioinformatic analysis, I identified three individual point missense mutations in DNAJB1with the potential for structure and/or function alterations. To explore the effect of selected mutations experimentally, I first focused on purifying DNAJB1 protein and its cancer variants. We hope that further investigation of these mutated variants will provide new insights into the role of chaperones in cancer proliferation.

Mentor: Dr. Szymon Ciesielski

22 Landscape Database Project

Andres Granados Serrano

This study focuses on using the North Florida Land Trust document management system and Landscape, a platform that offers spatial data and analysis tools for land conservation planning, to fill in data gaps and boost organizational effectiveness. The research emphasizes the advantages of employing landscape in planning for land conservation, including increased efficacy, efficiency, and decision-making based on facts. The Landscape system was used to streamline reporting and querying activities by filling in missing data points and creating benchmarking and performance management indicators. To close data gaps and improve organizational performance with GIGO, the research also underlines the significance of strong document management systems. The study's findings demonstrated that data cleaning greatly increased data quality, which led to better record keeping and allowed the North Florida Land Trust to concentrate its conservation efforts more on actual land preservation than internal document management. In conclusion, this study emphasizes how crucial it is to use cutting-edge technological tools and effective data management systems for effective land conservation planning.

Mentor: Kelly Rhoden

23 Analysis of Basigin Expression in Mouse Intestines Using Fecal Samples

Gabriella Khazal

Basigin is a transmembrane glycoprotein expressed on epithelial cells and blood vessel endothelial cells throughout the body. These types of cells often form barriers, like the blood brain barrier (BBB). A recent study by this laboratory suggests that Basigin gene expression on BBB endothelial cells is affected by an inflammatory stimulus. Epithelial cells of the intestines also form a barrier. It is possible that Basigin expression may be altered by inflammatory stimuli in this location as well. The long-term goal of the project is to evaluate humans, which means that a measure of Basigin using intestinal samples is not appropriate. Therefore, the purpose of the present study was to determine if fecal samples provide a non-invasive sampling method to indirectly measure Basigin expression in the intestines. It was hypothesized that Basigin in mouse feces would correlate to Basigin expression in intestines. Colorectal samples from male and female mice at various post-natal ages were obtained and the contents were removed and served as the fecal samples for analyses. It was determined that Basigin in mouse feces correlates with that in mouse intestines at specific ages. Specifically, samples from mice at 21- and 28-days old (comparable to human adolescents) and 180-days old (comparable to human adults) had significant correlation values, whereas the samples from 14-day old (comparable to human children) and 56-day old (comparable to human young adult) animals did not. The data suggest that fecal samples are a useful non-invasive method for measuring Basigin expression in the intestines.

Mentor: Dr. Judith D. Ochrietor

24 Projections for Rubin Observatory Legacy Survey of Space and Time (LSST) Telescope's Detection of New Milky Way Satellite Dwarf Galaxies

Rebecca Robinson Rey

The annihilation of weakly interacting particles (WIMPs) produces energetic particles including gamma rays. Dwarf galaxies are a great target for indirect dark matter detection since they have high concentrations of dark matter and low astrophysical background. In this project we will predict the amount of satellite dwarf galaxies in our Milky Way that the Rubin Observatory Legacy Survey of Space and Time (LSST) telescope might detect for indirect dark matter detection. This will be achieved by modeling the telescope's survey using a Monte Carlo. To perform an accurate modeling, we will first simulate the discoveries made by the Sloan Digital Sky Survey (SDSS), Dark Energy Survey (DES) and Pan-STARRS1 (PS1).

Mentor: Dr. Chris Kelso

25 Indigenous Rights in Newly Democratic Brazil

Taylor Weatherly

Despite centuries of protest and rebellion, indigenous peoples still remain unable to reclaim ownership of their ancestral lands due to the legal and economic blockades that their colonizers continuously implement. Through a third-party intervention by the United Nations, indigenous groups of Brazil may eventually mend and reoccupy their ancestral lands. By exploring the cultural backgrounds and histories of Brazil's indigenous groups, such as the Guaraní, indigenous land struggles are put into context, thus allowing for a better understanding of Brazil's indigenous land rights crisis. A cross-comparison of the Guarani's socio-cultural circumstances and the United Nation's Universal Declaration of Human Rights will emphasize areas of injustice and specific legal infringements. Cultural and legal analysis attempt to rectify the ongoing conditions challenging indigenous populations in modern Brazil. Brazil's history from initial colonization until the 21st century may be eluded from this essay in order to focus on modern legal circumstances as they coincide with cultural genocide. The indigenous rights crisis started centuries ago and still continues developing in Brazil. Indigenous groups such as the Guaraní have been relocated on numerous occasions resulting in the disconnection of the people with their sacred lands. Living conditions on indigenous reserves contribute to population decline and inhibited cultural participation. Indigenous Rights in Newly Democratic Brazil demonstrates t United Nations' International Declaration of Human Rights provides sufficient evidence of the injustices committed against Brazil's indigenous groups. Moreover, the need for a proper human rights intervention between the Brazilian government and indigenous groups becomes evident through a cultural analysis, historical review, and application of foreign policy.

Mentors: Dr. Alison Bruey and Dr. Jenni Lieberman

26 The Role of Institutional Commitment in Fulfilling Communal Goals

Sadana Sree Mukundan, Jessica Ashley McKay, Xylie Miller, Dr. Elizabeth Brown

In our study, we examined the possible factors that explain the relationship between perceptions of institutions endorsing communion in STEM and the importance students place in fulfilling communal goals in their future careers. Two hundred and forty- four undergraduate students (205 women, 179 white) rated the types of experiences they were involved in at their high school and college, their perception of communal endorsement by their educational institutions, the perceived importance their institutions placed on communal fulfillment, and the kind of goals they wanted to fulfill in their future careers. Using Mplus, Model 1 & 2 analyzed a path from institutional communal endorsement to students' perceived importance of communal goal fulfillment in careers that was mediated by the perceived importance institutions place in communal fulfillment. Model 1 further tested whether academic and extracurricular experiences mediated the first half of the relationship between institutional endorsement of communion and institutional importance in communal goal fulfillment. The types of experiences did not significantly predict the other variables. Instead, Model 2 was a better fit. The perception that their institutions endorse communion was a significant predictor of students placing importance in communal goal fulfillment in their future careers, further this relationship was mediated by the students' perception that their institutions place importance to fulfilling communal goals. The results of this study can shed light on how students perceive the types of goals they want to fulfill in their careers. Specifically, to what extent do students' school choice can influence future career goals.

Mentor: Dr. Elizabeth R. Brown

27 The Search for Happiness: Identifying Neural Correlates of Optimism, Agency, and Connectedness using fNIRS

Sydney Pell, Taylor Dessoffy, and Hannah E. Thomas

Functional near-infrared spectroscopy (fNIRS), a non-invasive brain imaging technique, uses two different wavelengths of near-infrared light to quantify concentrations of oxygenated hemoglobin as a direct measure of cortical activity. Previous research using fNIRS has shown that depression is correlated with reduced activity in the left prefrontal cortex when completing a verbal fluency task (VFT). Consequently, successful treatment of depressive symptoms is associated with increased activity in the same region and better performance on a VFT. Many studies have examined depression levels, but few have utilized fNIRS to measure happiness. We aim to identify biomarkers for happiness by focusing on three major components: optimism, agency, and social connectedness. Participants will first complete multiple scales that will assess their happiness levels, optimism, agency, and connectedness. Then, participants will complete a VFT that consists of four randomized and counterbalanced blocks with a baseline between each. For the baseline, participants will list as many words as they can that start with a specific letter. The other blocks ask participants to list as many words as they can think of for situations that center around optimism, agency, social connectedness, and happiness. Neural responses in the prefrontal cortex will be recorded as they complete the VFT. We expect that happier individuals will have more activity in the left prefrontal cortex and better performance on the VFT compared to those who are less happy. We also expect to find the brain regions associated with optimism, agency, and social connectedness individually.

Mentors: Dr. Tracy Alloway and
Dr. Katherine Hooper

28 Colorism in the Latinx Community and it's Negative Effects in Society

Korie (Gigi) Novaton

Colorism in the Latinx community has negatively impacted the opportunities, lively-hood, representation, and inclusion of people within the Latinx community. Colorism, when assessed, is essentially the practice of prejudice or acts of discrimination towards individuals or a group of individuals within the same racial or ethnic group based on the skin color of an individual. Within the Latinx community, colorism has caused a division, from a generalized standpoint, when there's supposed to be unity and pride as a whole and not from a select group within the community. From the perspective as an Afro-Latina(x), it's crucial to evaluate how and why colorism continues to be a negative influence, ideology, or a striving force for creating division within the Latinx community. The ideology of colorism stems from the history of colonization inflicted upon Latin countries. Colonization, together with the influences of

racism and political ideologies, such as “blanqueamiento” (whitening), has contributed to the development of the ideology “mejorar la raza” or “better/improve the races.” The purpose of the presentation is to discuss the origins of colorism in Latin America and how colorism has created a negative stigma within the Latinx community. With the findings from the history of colorism, in addition, it intends to analyze the politics of “blanqueamiento” and the development of the “mejorar la raza” ideology. Finally, it’ll explore how colorism negatively impacts modern society and media representations of Latinx.

Mentor: Dr. Constanza Lopez

29 Off with Their Heads: Effects of Empathy-Inducing Meat Reduction Messages

Natalie Clum and Dr. Heather Truelove

Conservatives are more likely to consume meat and respond with more reactance to persuasive messages than liberals. Past research has shown the effectiveness of empathy in reducing reactance, but it is unclear whether empathy-based messages affect individuals differently based on political affiliation.This study tested these open questions. 758 participants (54% Democrat, 23% Republican, 23% No Party Affiliation (NPA)) were randomly assigned a meat reduction persuasive message with either a picture of a headless pork roast (low empathy, n = 381) or headed pork roast (higher empathy, n = 377). Participants then indicated their feelings of empathy toward the animal, perceived threat to freedom (PTTF), reactance, and attitude toward eating meat. We ran regressions for each outcome with message type, political party, and their interaction as predictors. Empathy levels were higher for the headed (vs. headless) message and for Democrats (compared to NPAs). Republicans and NPAs showed more PTTF and reactance than Democrats. Furthermore, although the empathy message (headed pork roast) led to more empathy among Democrats, Republicans responded to the headed message with less empathy and more positive attitudes toward eating meat than the headless message. Our study revealed that empathy-inducing messages can lead to unplanned outcomes, causing increases in meat consumption, especially for those affiliated with the Republican party.

Mentor: Dr. Heather Truelove

30 BIPOC Code-Switching in Higher Education

Enderna Macsime

This qualitative research project explores how Black, Indigenous, and People of Color (BIPOC) students attending a Predominately White Institution (PWI) transition to the culture of higher education through the act of code-switching (CS) with a specific focus on factors that influence CS during communication. CS takes many forms but is defined as the alternation between two or more languages or language varieties when speaking (Gardner-Chloros, 2009). CS can take on performative standpoints when presented as a form of aligning power structure. Inclusion initiatives are fairly recent in Florida higher education; ie. African American students were first admitted to FSU in 1962 (Dinkins et al., 2021) and to UF in late 1958 (UF African American Studies, 2023). Through linguistic anthropological methods and ethnographic surveying, this project analyzes how BIPOC students infer the reasons for initiating CS to navigate the culture of higher education. Colleges may not offer sufficient equitable support for BIPOC audiences it proactively recruits for the sake of inclusion and diversity while still upholding a white standard (Lewis & Shah, 2021). The findings will illustrate ways that BIPOC initiate CS as a sign of comfort or assimilation towards preexisting standards for ethnic and racial majorities in higher education.

Mentor: Dr. Jessica Chandras

31 Moral Obligation and Ending Poverty

Vanessa Marin

Poverty is a world-wide crisis that requires urgent attention. As of 2022, about eight percent of the world’s population live in extreme poverty leaving those individuals making about $2.15 per day (Schoch et al., 2022). This is a crisis that needs to be thoroughly investigated as the problem will only continue to get worse over time. If we do not interfere now, other social injustices can stem out of this resulting in the middle class to only grow smaller and those in the upper class to remain unscathed. Considering the clear crisis at hand, are we morally obligated to help those in poverty or are those better off allowed to enjoy their own wealth? In this paper I will argue that it is a moral obligation to help those who we know are in need due to us having the resources to help them without too much personal sacrifice. I will support this thesis by looking at

the resources we have available, demandingness, the moral obligation of the state and individual person, and systems we can put in place to prevent and aid current crises. I will also be exploring the objections of following moral obligation to support those in poverty and how we can prevent negative long-term effects.

Mentor: Dr. Jonathan Matheson

32 Good Grief! How Different Religious and Non-religious Groups Respond to Grief on Reddit

Sabrina Ahmed, Christina Diley, Nicholas Signorile, and Elizabeth Smalley

Grief reactions vary based on factors such as religion, culture, support systems, or other psychological factors (Bonanno & Kaltman, 2001). Our study sought to determine how religious (Christianity, Islam, & Judaism) and non-religious (Atheism) communities respond to grief, specifically investigating the common methods of coping in an online community. We utilized Reddit posts within each community's forum and used the search terms "grief", "death", "loss", or "grieving" and selected 44 posts with at least one comment. Using a mixed methods approach, we analyzed N = 176 posts and from the comments, we identified the prevalent themes for coping with grief and also recorded the number of comments and upvotes. Quantitatively, we used a One-Way ANOVA to analyze the differences between each group and the results show that there was a significant difference in the number of comments for each post between the groups, and there was a marginally significant difference in the number of upvotes. Using Consensual Qualitative Research for qualitative data analysis, we found that the Atheist community had references to secular media and leaving legacies; the Islamic community largely referenced God, Quran, and prescribed prayers; the Jewish community referenced scripture and prescribed prayers in addition to the "Shiva" (a prescribed mourning period); the Christian community felt challenged with their faith and sought support with fellow members in addition to referencing the Bible. Research results have implications for counseling practice, specifically in providing insight into the popular coping mechanisms with grief among religious and non-religious groups. References Bonanno, G. A., & Kaltman, S. (2001, July). The varieties of grief experience. ScienceDirect, 21(5), 29. https://doi.org/10.1016/S0272-7358(00)00062-3

Mentor: Dr. Tes Tuason

33 A New Mindset: The Effects of Strategic Mindsets on Women Under Stereotype Threat

Jessica Ashley McKay and Dr. Elizabeth R. Brown

Women completing math tasks under stereotype underperform and experience increased negative outcomes compared to women under no threat. While previous interventions for stereotype threat focus on self-affirmation or role models to relieve women of pressure performance, the current study examines whether using a strategic mindset to increase self-reflection mitigates the negative effects of stereotype threat on women in math. Undergraduate women (N=149) were randomly assigned to read an article about the benefits of having a strategic mindset or taking cold showers. Participants were then randomly assigned to a stereotype threat condition (women perform worse than men on a modular arithmetic task), or a no threat condition (men and women perform similarly on a modular arithmetic task). Participants under stereotype threat expected to perform worse on the task than women under no threat, but participants' actual performance on the modular arithmetic task did not differ. An interaction between strategic mindsets and stereotype threat emerged such that under no threat, those in the strategic mindset condition experienced less anxiety more than those in the control. Likewise, an exploratory analysis filtering participants who used a calculator revealed an interaction such that those in the control condition and under stereotype threat had lower accuracy on the practice problems than other women in the control under no threat. In the strategic mindset condition, women under stereotype threat and those under no threat performed similarly on the practice problems. Further research should examine how women's confidence and the stereotype threat effects change with practice.

Mentor: Dr. Elizabeth R. Brown

34 The Telerobotic Experience: Learning and Development Through a Screen

Avery Glenn, Kayla Haywood, Mikaila Mangubat, Dahnine McCune Moyer, and Sarah Masters

The unprecedented pandemic, COVID-19, changed the face of education and classroom experiences across the globe. Many educators adapted their teaching styles by resorting to interactions via telecommunication. This created several complications for students and staff. To

find a solution, researchers used Omni telepresence in the form of an autonomous robot, which allows students to remotely move around the classroom to interact with peers and instructors, to evaluate the technology and measure the strain of distance learning on education. Researchers at the University of North Florida surveyed participants in the Brooks College of Health in select classes who were offered to use the robot to attend class remotely. Students were presented with the opportunity in their classes and asked to join the study if they had a day that they knew they would miss class. Participants were then trained in the workings of the robot and given pre and post surveys to examine their experience. The study found that the telepresence robot did not Offer much more than the previously used room application. Researchers found multiple issues with the robot such as internet connection, microphone, accessibility, etc. They believe that the study can be improved by increasing sample size and instruction or the use of the robot to participants.

Mentor: Dr. Melissa Baron

35 Annual Trends in Oyster Spat Density and Settlement Preference at Kingsley Plantation

Victor Ritz

The Eastern Oyster, (Crassostrea virginica) is an important reef-building bivalve native to the estuarine coasts of North America. The species faces threats including but not limited to a reduction in water quality, habitat loss, and disease. The standard strategy for the monitoring of oyster reef health and development of new reef is the oyster string method for collecting spat (juvenile oysters). Shells were strung onto galvanized wire and suspended adjacent to four different landmarks: the oyster reef, reef balls, the POSH, and the beach. This process was repeated monthly for a year, from February 2022- January 2023. Shells were brought back to the lab and total spat count along with largest size of spat were taken. It was shown that the groups placed adjacent to the oyster reef had the highest relative counts in total (n=2472). The groups placed adjacent to the POSH (n=1782) had higher counts than those near the reef balls (n=1534), but both were found to have lower counts individually than the beach control group (n=1856). Seasonality is also a major deciding factor on presence, as spat are primarily only seen in the spawning months of April through October. The highest count average was seen in July, during the peak of the spawning season in the POSH group (Avg=38.6 spat/shell). These findings suggest that the POSH may be a more efficient alternative to the commonly used reef ball in attracting larval oyster settlement, along with the creation of new oyster reef.

Mentor: Dr. Kelly Smith

Oral Session 4

01 The Impact of Cultural Diversity and Perceived Employee Psychological Safety on Absenteeism, Turnover and Project Success.

Destiny Cole and Dr. Paul Fadil

The main purpose of this paper is to integrate the numerous disjointed variables surrounding psychological safety. There are many studies that explore various specific independent variables that influence on psychological safety, but a conceptual framework showing the relative impact of these factors is lacking. Perceived psychological safety is the authentic freedom one feels to reveal one's true self without fear of negative consequences or judgments that will negatively impact one's future status or career. Higher levels of cultural diversity play an integral role in accepting the contributions, suggestions, and ideas of all organizational members regardless of their cultural backgrounds. Stronger degrees of voice and trust lead to a greater level of participation and engagement from employees, which, in turn, solidifies a higher extent of perceived psychological safety. This psychological feeling of security leads to a more inclusive leadership style by supervisors in the organization, thereby increasing motivation, decreasing employee absenteeism and turnover, and positively impacting project success. A review of the psychological safety literature will be undertaken and a new conceptual model will be presented. This model will create a viable theoretical foundation upon which future empirical studies are based. The impact of this model for managers is discussed and propositions are delineated.

Mentor: Dr. Paul Fadil

02 Pandemic Bambini

Katherine Herndon

School shutdowns during the Covid-19 Pandemic disrupted young children's learning. Like many others, Montessori schools attempted to continue their students' education through distance learning. At the time, there was scarcely any research on how the students would function when returning from these extended periods of social isolation. After returning, I began noticing unexpected behaviors while in practicum and wondered if primary classrooms outside of the U.S. were experiencing similar or different changes. I then began an international examination of the pandemic's effects on 3-6-year-olds' behaviors through a study abroad in Italy. This study used unstructured non-participant observations of children, self-study, personal notes, reflections, and interviews with various individuals to collect data focused primarily on markers of executive function. Back in face-to-face settings, students in American Montessori classrooms tended to disrupt other students' work often or leave their work unfinished. Most Italian Montessori primary students put away their work after completion and showed sustained intent on their task. However, both groups expressed wanting to socialize with the other students in their classroom more than they did before distance learning. Children in American and Italian Montessori schools longed for social interaction when they returned, yet seemed to approach their needs differently. This cross-cultural comparison provides a glimpse of young Montessori students' coping during a transitional period of the Covid-19 Pandemic. Additionally, it ponders what factors of the Italian model contributed to young children's ability to build post-pandemic resilience for executive function and how we can apply it in the future.

Mentor: Dr. Katrina Hall

03 The Search for Happiness: Identifying Neural Correlates of Optimism, Agency and Connectedness using fNIRS

Hannah E. Thomas, Taylor Dessoffy, Sydney Pell, Dr. Tracy Alloway, and Dr. Katherine Hooper

Previous research using functional near-infrared spectroscopy (fNIRS), a non-invasive brain imaging technique, has shown that depression is correlated with reduced activity in the left prefrontal cortex when completing a verbal fluency task (VFT). Successful treatment of depressive symptoms is associated with increased activity in the left prefrontal cortex and better performance on a VFT. These studies have examined depression levels, but little research has utilized fNIRS to measure happiness. fNIRS uses two different wavelengths of near-infrared light to quantify concentrations of oxygenated hemoglobin, a direct measure of cortical activity. We aim to identify biomarkers for happiness by focusing on three of its major components: optimism,

agency, and social connectedness. Participants complete scales that measure these constructs to determine happiness levels, then neural responses in the prefrontal cortex are recorded as they complete a VFT that consists of four blocks. The baseline is a basic VFT where participants come up with as many words as they can that start with a specific letter. The next three blocks ask participants to list as many words as they can think of when it comes to situations that center around optimism, agency, or social connectedness. We expect that happier individuals will have more activity in the left prefrontal cortex and better performance on the VFT compared to those who are less happy. We also expect to find the brain regions associated with optimism, agency, and social connectedness individually.

Mentors: Dr. Katherine Hooper and Dr. Tracy Alloway

Poster Session 3

01 "The Others Resumed Their Normal Lives": Peruvian Campesinos, the Church, and Sendero Luminoso in the 1980s

Stephanie Baskin

While some campesinos joined Sendero Luminoso in the 1980s-90s, many more fought against it. Peruvian campesinos were, in a sense, fighting on two fronts: against Sendero and all its violence, and against dismissal and prejudice from urban Peruvians. The government had long distrusted campesinos – poor, indigenous, and with little reason to be loyal to the state itself. The growing power of Sendero eventually pushed the state to support the lesser of the two threats. Campesinos, as well, made a choice when aligning (if not allying) themselves with the state. The Church and its officials, while not necessarily state-aligned, were largely urban-based and well-educated. This, despite good intentions, meant that they were susceptible to the same biases and anti-indigeneity that ruled the state. This project examines the relationship between the Church and campesinos during the conflict, particularly the ways in which the Church understood campesino life and actions, both religious and secular. Both urban Peruvians and Sendero itself misunderstood campesinos' relationship to religion; on one hand, urban priests found rural communities lacking in their faith. On the other, Sendero, as very literal Maoists (many very well-read in Communist theory and discussion) dismissed the same communities as too religious. Despite this, as other scholars have demonstrated, campesinos were able to use both state and church fears of Sendero to get what they wanted: guns, in a very practical sense, but also more local church officials, Quechua-language holy books, and promises to repair damaged churches and financially support local communities.

Mentor: Dr. Alison Bruey

02 Examining Differences in College Students' Academic Self-Concept, Implicit Theories of Intelligence, Goal Orientations, and Academic Success.

Sydney Barrett

Nationally, approximately 40% of students drop out of college, with one third of all college freshman dropping out before they enter their second year (Hanson, 2021). Previous research (van der Zanden et al., 2018) has examined predictors of student success that range from institutional variables (e.g., policies, academic supports) to student characteristics (e.g., academic preparation, emotional well-being, motivation, self-evaluation). The primary goal of this research was to gain more insight into the variables that might affect academic success by examining differences in college students' implicit theories of intelligence, achievement goals, academic self-concept, and academic success among different groups of student experience (comparing those in STEM vs. Non-STEM majors). A total of 240 participants were recruited from a mid-sized public University in the Southeastern United States that received and completed a survey from the Office of Institutional Research which included the Theories of Intelligence Scale for Adults, Achievement Goal Questionnaire, Academic Self-Concept Scale, and a self-report measure for academic achievement. This study utilized correlational analyses, multivariate analyses of variances (MANOVA), and mediational analyses to examine the relationships between the variables of interest among students enrolled in STEM vs. Non-STEM majors. Correlational analyses revealed associations between non-STEM majors and higher levels of academic performance and academic self-concept, and participants with high academic self-concept also reported better academic performance. In addition, holding more of a growth mindset was significantly correlated with higher mastery goal orientation, and both mastery and performance goals were associated with academic self concept and academic performance.

Keywords: Growth Mindset, Goal Orientation, Academic Self-Concept, Academic Success

Mentor: Dr. Susan Perez

03 The Sephardic-Mizrahi Moment: Cultural Renewal, Jewish-Arab Rapprochement, and Zionism in the 1920s

Boaz Israel Levy

This study examines the Sephardic-Mizrahi nationalist strategy in the British and French mandates of the early 20th century. Scholars including Abigail Jacobson, Moshe Naor, and Yitzhak Bezalel indicate this community developed a third nationalist strain between Palestinian

nationalism and Ashkenazi Zionism. Utilizing Alex Winder's conceptual framework for violence, Yehuda Shamir's conceptual framework for culture, and Rashid Khalidi's analytical framework, this study broadens the research on Sephardic-Mizrahi communities, the development of 20th century nationalism, and the origins of the Arab-Israeli conflict. Drawing on correspondences, reports, and newspapers, this paper argues a Sephardic-Mizrahi Moment opened by 1925, employing institutions—such as activist organizations and the press—to simultaneously achieve cultural renewal, Jewish-Arab rapprochement, and Zionism. By 1929 the Sephardic-Mizrahi Moment ended, with the Western Wall Riots signifying that institutions ironically wrought cultural decoupling, Jewish-Arab violence, and the defeat of Sephardic-Mizrahi Zionist organizations. While the brief rise of the Sephardic-Mizrahi Moment represented the diversity of early 20th century nationalism, its fall symbolized the closure of possibilities for Jewish and Arab nationalists. This study of the Sephardic-Mizrahi Moment is also relevant for diversifying popular history, mitigating problematic popular discourse, and galvanizing new possibilities for Israel-Palestine.

Mentor: Dr. Christopher Rominger

04 Efficient Practicing for Musicians and More

Megan Herrman and Grace Raper

Musicians have a limited amount of time to learn large amounts of music that is required to be a successful musician. It is essential to implement efficient practice methodology into our everyday routine. Past research has shown that efficient practicing can reduce the amount of time required to learn a difficult passage of music. Efficient practicing involves breaking passages of music down into small sections and linking them together with different exercises. This process reduces the amount of time required to learn the music. Fifteen minutes of efficient practicing can be as effective as an hour of mindless practicing which does not produce efficient results. The amount of time spent on something does not necessarily associate with the quality of the work done. How can the same concepts of efficiency practicing be applied to athletes, professional environments, students, and everyday life? The concepts can be applied though simply having intentional goals in mind when completing any task. Intentional goals can be met through focused short, intervallic sections instead of long unfocused sessions. Unfocused sessions can lead to lost hours of unproductive time. The principles of efficient practicing for musicians can open a gateway of success for athletes, professional environments, students, and everyday life.

Mentor: Dr. James N. Curry

05 Gender Equity: The Status of Women in Higher Education

Whitney Washington

The presentation aims to provide insight into the status of women in higher education, explicitly insights on pay equity and pathways to leadership. Informed by feminist theory, this work details factors contributing to women's status and related impact on well-being in higher education. Factors for this study include family structures, negotiations, mentorship, equal access, and ambition. The status of women in higher education is critical to examine because it is essential to ensure that institutions of higher education are not creating inequities based on gender and race. For decades women have experienced sex discrimination, the glass ceiling, and the glass cliff. The experiences of women in higher education are not monolithic; some women experience motherhood and some women are partnered, but each woman brings their identity to their career, and these identities impact their status and well-being.

Mentor: Dr. Elizabeth Gregg

06 Running the Gauntlet: Barriers for Black Female Academics in Higher Eduction Research Productivity

Crishana Dionne Benton

Internationally, departmental research productivity bears significance for an institution's overall research ranking, therefore I wanted to explore if and how current measures of research productivity might inherently act as structural barriers. Many previous efforts surrounding faculty issues have centered on research productivity (e.g., Ramsden, 1994). However, with the emerging need to ensure representation with diverse faculty populations, I reimagine Ramsden's initial definition of productivity. Even greater significance for this study is held in a time of diminishing faculty positions which remain to be occupied mainly by white men. In this study, I developed priori categories for cultural taxation by using literature (Padilla, 1994; Canton, 2012) and expert interviews, adapted from Moustaka's (1994) method. I analyzed both faculty Google Scholar data (total publications, citations, h-index, and i10-index)

then created a survey which asked participants about perceived affordances and barriers and their influence on research activity. This information was then analyzed using a multilinear regression (MLR) model to understand to what degree does cultural taxation and an academic's race/gender intersect regress upon research productivity. This study contributes to the literature on faculty issues for Black female academics and fills in a knowledge gap about research productivity and its potential to perpetuate racist practices. Lastly, the study posits practical ways departmental leaders can support minoritized academics and foster a more equitable scholarly environment.

Mentor: Dr. Dan Dinsmore

07 Designing a Study of Beginning Teacher Preparation Regarding Multi-Tiered Systems of Support (MTSS)

Andrea K.W. Smith

Multi-Tiered Systems of Support (MTSS) is the way of work expected in most U.S. schools today. MTSS is the umbrella under which schools provide instruction and intervention in academics, behavior, and social-emotional learning. Instruction is provided to all students in Tier 1, while Tier 2 intervention is given to those students who struggle, and Tier 3 is offered to the students who need the most support. MTSS requires careful progress monitoring, problem-based decision-making, fidelity of implementation, and collaboration for student success. Considering that MTSS is integral to the operation of most schools, it stands to reason that we would want to prepare pre-service teachers and those in alternative certification programs to implement MTSS effectively as beginning teachers. Even though MTSS is embedded in the operation of schools and is not a new initiative, it is not included in the Florida Educator Accomplished Practices. Therefore, it is not consistently emphasized in teacher preparation. I am interested in learning more about how colleges of education, Educator Preparation Institutes, and alternative certification programs address MTSS. Studies on this topic are extremely limited thus far. In preparing to analyze if and how well MTSS is taught in these programs, I have multiple options including surveys and syllabi review. This project examines the advantages and disadvantages of each option, as well as the practicality of completing each type of study. It addresses questions of how to get the most valid and complete information and from which sources this information should be sought.

Mentors: Dr. David Hoppey and Dr. Pamela Williamson

08 Influence of Heat Treatment on Fatigue Behavior of Wrought 17-4 PH Stainless Steel in the VHCF Regime

Jade Welsh

This study investigates how heat treatments effect the very high cycle fatigue (VHCF) performance of wrought 17-4 precipitation hardened (PH) stainless steel (SS) conventionally fabricated using subtractive manufacturing. Cylindrical bars were fabricated to have an hourglass geometry and were either in the annealed state or heat treated to the H-1025 condition. Ultrasonic fatigue tests were conducted on the hourglass specimens using uniaxial fully reversed cycles to reveal the VHCF performance of the material. Results showed that specimens given a heat treatment of H-1025 had longer lives at high and low stress levels when compared with specimens that were not heat treated. The size of the defect inducing failure was found to be larger on average for the specimens subjected to H-1025 heat treatment over ones in the annealed state. The type of defect inducing failure in the ultrasonic specimens was inspected using a scanning electron microscope (SEM) and found to be independent of the heat treatment, having either pores or inclusions inducing crack initiation. Energy dispersive spectroscopy (EDS) was used to characterize the elements present in the inclusions inducing failure and any intermetallic defects found in the surrounding matrix. Electron backscatter diffraction (EBSD) was also implemented to reveal the grain orientations and size of the two different specimen groups.

Mentors: Dr. Jutima Simsiriwong and Dr. Paul Eason

09 HIPIMS and the Improvement of the Structure-Zone Model for Thin Film Deposition of TiN

Andrew Miceli

Thin film growth, or sputtering, of metals is a method of manufacturing thin films of metals via energetic plasma erosion in vacuum. Sputtering is a process that has been ingrained in product manufacturing over the last several decades with a market size for metal coatings showing a steady drive from an estimated 12.22 billion dollars in market size to a projected size of 16.46 billion by 2026. Lean manufacturing, or the reduction of waste and maximization of productivity, has shown to increase

revenue and bring products to market faster, cheaper, and better than companies that don't adopt this model. Implementing a relatively new process to thin film growth known as High-Power Impulse Magnetron Sputtering or HIPIMS, these metal coatings can be made denser, harder, and with smoother coats, only with slower deposition rates than the typical process used in industry, such as Direct Current (DC) Magnetron Sputtering. Conventional processes in industry can be improved using the HIPIMS method if another method, called a positive "kick-pulse", is added after the initial pulse controlled by the HIPIMS unit. This kick-pulse can improve the process of conventional sputtering by allowing all the benefits of the HIPIMS improved coating but also increasing deposition rates of the sputter. The research shown here suggests this technique can be used to not only validate literature stating improved performance of thin film coats, but also to increase rate of manufacture, leading to a scalable production technique of advanced manufactured Titanium Nitride thin film coating for industrial use.

Mentors: Dr. Stephen Stagon and Dr. Daniel Santavicca

10 Automatic Short-Answer Grading Using Transformer-based Large Language Models

Nazmul Kazi

Automatic short-answer grading (ASAG) is a crucial element of any intelligent tutoring platform. Machine Learning (ML) has shown great promise for ASAG. However, this task remains challenging even for Deep Learning (DL) approaches and Large Language Models (LLMs), requiring semantic inference and textual entailment recognition. The SemEval-2013 Task 7, The Joint Student Response Analysis and 8th Recognizing Textual Entailment Challenge, is a benchmark widely used for research on ASAG. The SciEntsBank data included in this collection contains nearly 10,000 answers to 197 assessment questions in 15 different science domains. Despite the popularity, only a few researchers have explored the potential of DL or LLMs for this task. In this project, we explore the effectiveness of RoBERTa Large MNLI, an LLM trained on an extensive text corpus for language comprehension and fine-tuned on the Multi-Genre Natural Language Inference (MNLI) corpus for semantic inference. By fine-tuning the model on SciEntsBank dataset focusing on the 3-way labels of correct, incorrect, and contradictory, we achieved an accuracy of 77%, 72%, and 72% on unseen answers, questions, and domains, respectively, outperforming the state-of-the-art (SOTA) in all three test sets. Notably, our model significantly improved upon the most challenging test set, unseen domain, (72% vs 65%). In the future, we plan to evaluate the performance of the model on the 5-way labels, where the categories of "partially correct but incomplete", "irrelevant", and "non-domain" will be distinguished from each other, as they are combined into the "incorrect" category in the 3-way labeling scheme.

Mentor: Dr. Indika Kahanda

11 Effectiveness of Resistance Band Warm-Up in Force Production of Gluteus Medius in Young Adults

Josephine Kaidy, Jade Conklin, Lauren Green, Taylor Monger, Kaylee Poirer, and Kelly Wallace

Background: The purpose of this study was to support current evidence that pre-exercise warm-ups with resistance bands (RB) increase force production (FP) and muscle electrical activity during exercise. Objective: To investigate whether pre-exercise RB warm-ups can enhance gluteus medius (GM) FP. This study gathered GM electromyography (EMG) on certain participants to further explore the relationship between GM FP and the muscle's motor unit recruitment. Design: Cross-sectional. Methods: Sixteen participants (11 females; 22.8 1.6 years; 170 10.3 cm; 161.9 38.6 lb) performed maximum effort right hip abduction manual muscle test (MMT) isometrically (at 15°) while GM force was recorded with a handheld dynamometer (Lafayette) positioned four inches above the right lateral malleolus. After MMT measurement, a one-minute rest was allowed followed by GM activation warm-up with RB (hip external rotation, extension, abduction). Post-workout, subjects actively rested (walked) for 60 seconds and then repeated GM MMT. EMG activity was recorded (n=5) with Iworx (IX BIO4) and the signal's absolute integral was collected from the middle 3 seconds during MMT. Statistics: Wilcoxson Signed-Rank test identified differences between conditions at set at 0.05. Confidence interval (95% CI) was calculated to further describe findings. Results: A significant (p=0.001) 9.2% increase in lb of force was observed on average from pre (CI 42.7±8.3, 34.4–51.0) to post (CI 46.6±8.1, 38.5–54.7) RB warm-up. Significant difference was not observed for EMG data (p=0.62). Conclusions: Findings support that the use of RB improved muscle FP. EMG findings indicated that motor unit recruitment was more efficient after use of RB.

Mentor: Dr. Guilherme Cesar

12 Benefits of Interprofessional Learning Among Post-Professional Learners in Healthcare

Katlyn Sharpe

Two competencies that are foundational to healthcare are teamwork and collaboration. Interprofessional education is built on four key competencies: values and ethics, roles and responsibilities, interprofessional communication, and team-based care. By nature, all these competencies require collaboration, working together to make decisions and formulate plans for patient care. The fourth competency, teamwork, differs from collaboration in that it is a group of individuals working together to achieve a common goal while collaboration involves individuals of different expertise working together to solve a problem. Collaboration requires creativity and a willingness to compromise in order to be successful. As health professions education evolves to focus on improved quality of care, a crucial gap is the lack of interprofessional education (IPE) among post-professional learners. This period in a healthcare professional's education lays the foundation for future interprofessional collaboration and practice patterns. Current research on IPE for healthcare learners focuses on the population of pre-professionals. The lack of IPE interventions among post-professional learners can be attributed to their learning environments outside of the traditional classroom. This can limit the ability to gather learners for IPE interventions due to conflicting schedules and locations. The need for research that evaluates the impacts of IPE intervention on the post-professional learner's communication and collaboration skills can explain how to effectively implement these interventions in order to improve teamwork and collaboration. To address this need, we conducted a mixed-methods study to evaluate the effects of a virtually-delivered IPE intervention on post-professional learners' understanding of other health professionals' roles, the likelihood to refer patients to other health professionals, and changes in perspective on future collaborative practice. The study included learners from the nutrition and dietetics, occupational therapy, physical therapy, mental health counseling, and family medicine professions. Each learner was participating in a post-graduate program such as a residency or internship. Findings from the study indicate that after attending the virtual IPE program, learners felt significantly more confident in their ability to recognize the roles of other health professionals and an increased likelihood of patient referrals to other professionals. Learners also indicated a positive effect of the virtual IPE intervention on future collaborative practice. Demonstrating that a virtual-delivered IPE intervention can have positive effect on post-professional learners is an important step towards increasing the availability of IPE interventions to post-professional learners. Future research should further evaluate the changes in the perspective of learners towards other professions and how this affects post-professional education practices and quality of care. Specifically, research should view the long-term impacts of IPE interventions on collaborative practice including how it changes rates of collaborative care and how it affects the quality of care for patients. Future research on this topic can help to identify a potential change in teamwork and collaboration amongst healthcare professionals using IPE interventions.

Mentors: Dr. Raine Osborne and Dr. Kristen Hicks-Roof

13 Poor Diet Quality is Associated with Cognitive Impairment in Older Adults.

Paige Courtier, Anna Waterman, Dr. Corinne Labyak, Dr. Cynthia Williams, and Dr. Andrea Arikawa

Background: Diet quality is found to differ in those with versus without cognitive impairment. The purpose of this study is to determine the relationship between cognitive function and diet quality by assessment of participants' Healthy Eating Index (HEI) and Montreal Cognitive Assessment (MoCA) scores. The HEI tool measures diet quality in alignment with the Dietary Guidelines of Americans- the average American's HEI score being 58 out of 100. The MoCA is a tool used to assess cognitive health status; MoCA scores of 25 or lower are indicative of cognitive impairment. Methods: Participants (N=53), 60 years of age and older (M=18, F=35), completed a 24-hour dietary recall (ASA24) to assess dietary intake and were administered the MoCA to evaluate cognitive function. HEI scores were determined by analyzing the dietary intake of participants based on their ASA24 responses. Results: There was a significant positive correlation, $r = 0.33$, 95% CI [0.065, 0.551], $p = 0.016$, between HEI and MoCA scores. Those with cognitive impairment had a significantly lower mean HEI score of 50.6 ± 4.1, compared to those without cognitive impairment who had a mean HEI score of 63.8 ± 2.2, $p=0.006$. Total consumption of fruits, green vegetables, beans, seafood, and plant proteins was much

lower in those with cognitive impairment. Conclusion These results suggest that poor diet quality is associated with cognitive impairment. With this knowledge, Registered Dietitians (RD) should work to educate older adults on meeting dietary guidelines; particularly as it relates to foods such as healthy fats and whole grains.

Mentors: Dr. Corinne Labyak, Dr. Cynthia Williams, and Dr. Andrea Arikawa

14 The Ecological Significance of Willow Branch Park

Savannah Hoover

The Willow Branch Park is a site of historical importance through the protection of human rights via the LBGTQIA+ community and creating an outlet for artistic expression by music/art. The Riverside Avondale Preservation's goal is to maintain and flourish the rich history of Riverside as a whole. However, the ability to better preserve this park has been a struggle for years involving government help. Through the use of limnology and environmental conservation research of this project, there is a better possibility to ensure that there are policies in place to protect both the history and the entirety of Florida's ecosystems. By testing the water for chlorophyll A, sediment, and pH it allows for a comparison of urbanized waterways vs. Florida's natural limnology. The comparison will force the government that there is a dire need to protect the environment and that preservation is necessary to increase health standards of Florida. This project enables the Jacksonville community to gain an increase in research-based health literacy. This leads to empowerment of the community to live healthier lives through the conservation of Willow Branch Park. With literacy comes change and with that creates knowledge for both the community and government to understand the importance of the Willow Branch Park and it's ties to health.

Mentor: Kelly Rhoden

15 The Usage and Impact of Incorporating a Water Activity Instrument in the Food Lab

Leo Muniz Trejo, Jared Nice, Lightson Paul, and Matthew Jaramillo

Water activity is broadly used and accepted in the food industry. Water activity measurement is helpful to food science and nutrition professionals for product development, quality control, and food safety. With an awarded technology grant, the food science lab in the Department of Nutrition and Dietetics has purchased a water activity instrument. In Spring 2023, the instrument technology was incorporated into a new recipe innovation/product development project in which students measured the water activity of foods and food preparation. For example, our group modified the standard recipe for Funfetti® Cake Batter Rice Krispies® Treats. The purpose of modifying the recipe was to make it a healthier choice by lowering its overall fat and sugar content. The changes included replacing the salted butter with the extra virgin olive oil, substituting regular marshmallows with sugar-free marshmallows, and substituting regular cake mix with sugar-free cake mix in the modified recipe. After modifications to the standard recipe, the water activity level was raised in the final product (standard recipe 0.56 vs modified recipe 0.60). The basis for this change in water activity levels is due to the decrease in sugar content. The findings verified one important food science principle: the lower the sugar content, the higher the water activity of the food, and potentially the faster microbes and molds grow. Implementing a water activity instrument has allowed an excellent learning demonstration explaining this relationship between sugar and water to students in the nutrition field. Furthermore, teaching and student learning have been positively impacted by incorporating this grant-funded instrument in the food science lab.

Mentor: Dr. Zhiping Yu

16 Massive Star Clusters as Potential Sources of Galactic Cosmic Rays

Ashley Meglino

Cosmic rays are particles with very high energies, and their origin is a fascinating puzzle in astronomy that has yet to be solved. Currently, the leading candidate for the origin of Galactic cosmic rays (cosmic rays that originate within our galaxy) is supernova remnants, where a supernova is the death of a massive star through a spectacular explosion. However, there are several notable problems with this hypothesis, thus providing reason to believe that there are other sources of cosmic rays. Massive star clusters represent a promising alternative source and therefore serve as the focus of this research project. We created a catalog of massive star clusters and are using the Fermi-LAT gamma-ray space telescope to search for gamma-rays. Some star clusters coincide with high-energy gamma-ray sources, suggesting they may be producing cosmic rays. Comparing the properties of these star

clusters with their gamma-ray luminosities, spectra and morphology helps to constrain theories for the acceleration of cosmic rays. For clusters without detectable high-energy gamma rays, upper limits can still constrain cosmic ray production. Thus, whether we are able to detect high-energy sources within these clusters or not, much can be learned about the origins of Galactic cosmic rays from this research project.

Mentor: Dr. John Hewitt

17 Effects of GABAAR Targeting Compounds on Neuro-Transcriptional Profiles in Zebrafish

Alexander Bartkowiak

GABAA receptors are the main fast inhibitory neurotransmitter type in the mammalian brain and have been the target of compounds for applications ranging from the treatment of anxiety disorders to use as anesthetics and management of insomnia. Current screening methods for neuroactive compounds rely on receptor binding assays which preclude the contributions of cell signaling. Cell culture approaches capture cell signaling mechanisms with high throughput methods but undersurvey complex neuronal interactions. We pursued methods for screening neuroactive compounds in zebrafish to maintain complex cell networks while maintaining a high throughput. In our pilot study we screened several GABAAR acting compounds including: propofol, ivermectin, and PTZ. We isolated neuronal and non-neuronal cell populations from NeuroD-GFP zebrafish using flow cytometry to assess cell-type specific drug effects. We then performed bulk-RNA sequencing to determine the expression profiles of each population. Downregulation of the GABAergic synapse pathway was noted in both ivermectin and propofol exposures. Principal component analysis for all tested compounds separates neuronal and non-neuronal compartments accounting for > 68% of the variance among our samples (69% ivermectin, 90% propofol, 89% PTZ). PC2 begins to distinguish by drug effect: Propofol and ivermectin both exhibited separation among neuronal transcripts (16% ivermectin, 5% propofol, 6% PTZ), whereas PTZ surprisingly distinguished only non-neuronal transcripts. Future work will include an expanded analysis of the GABA pathway for all populations in addition to screening compounds that possess GABAAR subtype specificity.

Mentor: Dr. Marie Mooney

18 Taxol®-Induced Apoptosis is Increased in Cancer Cells using the p53 Pathway

Waheed Khalili and Zachary Coughlin

In the United States, one of the most prominent and leading causes of death is cancer. The term cancer refers to a collection of diseases characterized by the uncontrollable growth and replication of abnormal cells. Cancer cells can metastasize and destroy various regions of body tissue. Along with the ability to metastasize, cancer cells lack apoptosis. The p53 protein regulates cellular division by preventing uncontrolled growth and proliferation of cells. If the DNA in a cell becomes damaged, the p53 protein plays an integral role in determining whether the DNA is repairable or if the damaged cell must undergo apoptosis. Taxol, also known as paclitaxel, is a chemotherapeutic agent used to treat a variety of cancers. Over a million patients worldwide have been treated by Taxol. Apoptosis is induced in cancer cells by Taxol through the stabilization of microtubules leading to cell cycle arrest at the G2/M phase. The purpose of this review paper is to evaluate and analyze the effects of Taxol-induced apoptosis on cancer cell lines using the p53 pathway. Several prominent cancer cell lines will be examined and compared as part of this paper, with the breast (MDA468) and colon cancer (HCT116) cell lines being specifically highlighted. Taxol-induced apoptosis's anticancer effects will be analyzed by comparing the effects on cell viability and growth and DNA expression/fragmentation within in-vitro and in-vivo cell lines.

Mentor: Dr. Fatima Rehman

19 Hypermobile Ehlers-Danlos Syndrome and Hypermobile Spectrum Disorders: Identifying Enriched Biological Pathways and Gene Sets

Jessica Fliess

Ehlers-Danlos syndrome (EDS) is a heritable connective tissue disorder characterized by skin hyperflexibility, joint hypermobility and fragile tissue. The 13 subtypes of EDS have variation in symptoms and different mutations in collagen essential to distinguishing between the syndromes. Hypermobile EDS (hEDS) and Hypermobility Syndrome Disorders (HSD), are most common form of EDS, are the only subtypes that cannot be confirmed with genetic testing due to the unknown genetic etiology. Patients who receive a diagnosis of hEDS and HSD are

often found to possess at least one comorbid disease, including mental health disorders, Postural Orthostatic Tachycardia Syndrome (POTS), mast cell activation syndrome (MCAS), and fibromyalgia. Diagnosing hEDS/HSD, POTS, and MCAS present a challenge due to the complex patient profiles caused by lack of genetic understanding, frequently changing criteria, and overlapping symptoms of these diseases. These complications result in prolongation of diagnosis and contribute to exacerbation of symptoms in individuals trying to obtain a proper diagnosis. The aim of this study is to identify enriched biological pathways and gene sets in RNA-sequencing datasets when comparing hEDS/HSD patients to control patients that were seen in the EDS Clinic but were not diagnosed with either hEDS or HSD. Building a pathway interaction network will convey similarities or interaction amongst these pathways. An increased etiological understanding of the immune response in hEDS/HSD will help to determine the pathogenesis of disease and identify potential treatments that could be used to reduce symptoms and comorbid conditions in these patients.

Mentor: Dr. Terri Ellis

20 Elucidating How TRPC6 Inhibition Modulates Mitochondrial Dynamics in Doxorubicin-Induced Cardiotoxicity

Thien Duy Nguyen, Damian Di Florio, and Dr. Brian M. Necela

Dose-dependent cardiotoxicity significantly limits the clinical application of doxorubicin (DOX) as a chemotherapy agent with symptoms ranging from arrhythmias and pericarditis to cardiomyopathy. Since doxorubicin simultaneously induces several regulated cell death pathways within cardiomyocytes, the molecular mechanisms behind doxorubicin-induced cardiotoxicity have yet to be fully understood; however, reactive oxygen species (ROS) production and mitochondrial dysfunction are well established as key events that lead to cardiomyocyte cell death. Recently, TRPC6 N338S has been implicated as a gain-of-function genetic mutation that may contribute to DOX-induced cardiotoxicity by increasing intracellular Ca2+ concentration within cardiomyocytes. In a previous study, TRPC6 inhibition has been shown to improve markers of cardiac damage in an in vivo mouse model of DOX-induced cardiotoxicity. In this study, H9c2 rat ventricular cardiomyocytes were treated with GsMTx4, a spider venom peptide responsible for inhibiting cationic mechanosensitive channels from the TRP and Piezo channel families. Acute doxorubicin treatment was applied for a 24-hour period, followed by staining with fluorescent probes and confocal imaging analysis. Inhibition of TRPC6 with GsMTx4 was found to attenuate DOX-induced changes in mitochondrial membrane potential and ROS production, suggesting that TRPC6-mediated modulation of mitochondrial microdomain events may play a role in DOX-induced cardiotoxicity. Future studies could measure other mitochondrial parameters and/or utilize specific inhibitors to further elucidate the role of TRPC6 in DOX-induced cardiotoxicity.

Mentor: Dr. Nadine Norton

21 Phytoplankton Monitoring at Kingsley Plantation

Matthew Connor Myers

Over the course of 12 weeks phytoplankton samples taken from Kingsley Plantation via net tow were observed for a relative abundance of harmful algae which can in large numbers produce toxins that can kill fish and harm humans. Data were collected bi-weekly from Kingsley Plantation, along with the net tow for the phytoplankton sample other data were taken such as air temperature, water temperature, salinity, weather conditions, and wind. The net tow was done with a 10-micron net for three minutes, after the sample was taken the water level in the collection bottle was halved to ensure a high level of plankton in the sample. Once all the data was collected the sample was taken back and observed under a gridded slide to measure the relative abundance of the target phytoplankton species. Identified species were photographed for record and the data was compiled and then sent to NOAA for review. If harmful levels of certain species were found the sample was preserved and shipped to NOAA for further review. Once the data was confirmed it was entered into the phytoplankton monitoring network database. Over the course of the 12 weeks, no algae blooms or elevated levels were detected but some harmful species were found and some samples were sent to NOAA for further review.

Mentor: Kelly Rhoden

22 Exploring the Essential Role of Human DNAJB1/HSP70 Molecular Chaperone System

Cameron Young

Proteins are complex biomolecules that act as cellular machines whose functionality arises from their structure. The loss of native structure not only perturbs protein function but can also lead to aggregate formation as observed in diseases like Alzheimer's and Parkinson's. Consequently, a system of cellular proteins referred to as molecular chaperones oversees protein folding and facilitates the degradation of protein aggregates. One of the central molecular chaperones is Hsp70, whose function is mediated by a group of obligatory protein partners known as J-domain proteins (JDPs). Two main classes, A and B, have been identified with class B JDPs found to be essential for cellular viability. Recent studies of human chaperones identified an intramolecular interaction present only in the class B JDP, DNAJB1, between its J-domain and a segment of adjacent Gly-rich region. Our previous studies using DNAJB1 yeast homologue, Sis1, suggest that the same Gly-rich region segment may serve as a so far unknown, new binding site with Hsp70 elucidating the unique functionality of class B JDPs. The aim of this project is to investigate if a similar interaction occurs in the human Hsp70/JDP system. For this purpose, we use a bacterial host system to express and then purify DNAJB1 and HSP70 to then study their mutual interactions using NMR. With this experimental setup, we hope to better understand the correlation between the structure and function of JDPs and their essential biological roles.

Mentor: Dr. Szymon Ciesielski

23 Local Farms and Produce

Mary Spicer

This year for my 2023 Environmental Leadership Program, I partnered with Ms. Ashantae Green regarding her 2 companies Green Legacy Farms and Farmey Jax. Generating local farms and produce in a community is essential to contributing to health satisfaction, economic opportunities, and assisting to decrease environmental impact. Local farming benefits the environment with sustainability, clean water, biodiversity, and energy conservation. With local farms on hand that means less traveling via air and land which helps eliminate greenhouse gas emissions and contribute to enhancing our carbon footprint. Local farms and produce will also strengthen the rural economies, keep taxes down, builds the community and is investment into the future. I have researched and executed advertising, marketing plans, sales plan for value agriculture product subscription, launch plan and press release. I contributed to 50 hours of community involvement to give back and make a difference in our community. I first participated in the Florida Black Expo at TIAA Bank Stadium on February 11,2023 that was black excellence event that supports economic success in entrepreneurship, health, wealth creation, jobs, education, history, and culture is presented. On February 18, 2023, I attended the Mardi Gras event with live music, dancing, and food where the community has access to various venders and information. Lastly, my last event was a Farming Day for women on March 18, 2023, which was a community Farm Day and tour where women and girls are encouraged to participate for Women's History Month in farming, prepping, starting new garden rows, and harvesting vegetables.

Mentor: Kelly Rhoden

24 Identification of the Human Equivalent to Mouse Pancreatic YM1+ Macrophages

Jeffrey Perera, Dr. Alicia Fleming-Martinez, and Dr. Peter Storz

In mouse animal models for pancreatic cancer, a subpopulation of macrophages has been identified that organizes fibrosis and immunosuppression around cancerous lesions. These alternatively-activated macrophages (AAM) in mice are characterized by the expression of typical M2 markers and the expression of YM1 Our lab has shown that targeting the YM1+ AAM population in mice reverses fibrosis and increases the presence of activated cytotoxic T cells in the tumor areas suggesting a potential opportunity for developing novel therapies for human patients. However, the human equivalent to the YM1+ mouse AAM population has not yet been identified. Our study aims to identify and further characterize the functional human equivalent of the YM1+ AAM in mice. To investigate the functional role of YM1+, we treated SM3 (precancerous) and KPC1(cancerous) pancreatic murine cells with YM1 in transwell migration assays to assess its impact on tumor cell migration, 2.5D culture experiments to observe its effects on duct formation, and qPCRs against PD-L1 to assess its role in cancer progression. By utilizing Immunohistochemistry and

Immunofluorescence techniques on 6 potential candidates, including chitinase-like proteins, we were able to identify two promising targets, Chitinase-3-like-1 (CHI3L1) and Chitinase 1 (CHIT-1). These proteins displayed double-positive staining for markers CD68 (pan-macrophage) and CD163 (M2 macrophage), in and around Pan-IN lesions and the tumor stroma of human pancreatic tissue samples. Our findings display promising progress in evaluating the therapeutic potential of targeting a subtype of macrophages for the treatment of pancreatic cancer.

Mentors: Dr. Alicia Fleming-Martinez and Dr. Peter Storz

25 The Green Team: Promoting Sustainability at the Players Championship

Klesia Xhaferllari

The ultimate aim of the formation of the Green Team was to promote and encourage sustainability by assisting spectators with making the best decision on how to dispose of their waste at our on-course receptacles. Green Team volunteers were overseen by me and Skyler Carlson and worked a minimum of two, four-hour shifts each throughout tournament week which took place the week of March 7-12. As Green Team co-chairs, we were there every day in order to support our volunteers and assist in aiding fans to make sustainable choices. Volunteers were stationed at high-traffic areas where they could best assist patrons with making the proper choices to dispose of either their waste or recycling. The volunteers were rotated regularly, giving them a chance to experience the tournament as well. Recycling can be an overlooked part of sustainability and we feel as though we succeeded in spreading the word about the Green Team. It is wonderful that a major sporting event such as THE PLAYERS Championship has made a committed effort to reduce their environmental impact and thoroughly showcase the importance of recycling. Volunteers really felt as though they made an impact, and the PGA tour is looking into providing Green Teams for future events as well.

Mentor: Kelly Rhoden

26 Diversity is Differences and Equity is Equality: Publicly Perceived Definitions of Diversity, Equity, and Identity from a DEI Museum Exhibit.

Ziena Baker, Sadana Sree Mukundan, Mallory Wood, and Dr. Elizabeth R. Brown

Many organizations utilize a mission statement that defines and emphasizes the importance of diversity, equity, and inclusion (DEI), but these definitions vary wildly from being broader to highlighting specific minority groups and outcomes. These organizational definitions might reflect differences in the general public's understanding of DEI. They might also reflect differences in individual identity perception. The current study examines whether the general public's understanding of DEI and identification (DEId) is different depending on attendance of a diversity-related educational museum exhibit on implicit bias. Jacksonville Museum of Science and History (MOSH) members and Bias Inside Us exhibit attendees (N=31; 51.6% women; 41.9% white, 16.1% Black, 16.1% more than one race/ethnicity; 40 median age) completed a survey of three open-ended response questions about DEId (i.e., "What does diversity mean to you?", "What does equity mean to you?", and "What is your identity?"). Two trained coders categorized each response into four diversity categories, six equity categories, (both subsets ranging from surface-level understanding to all-inclusive, dictionary-definition understanding) and three identity categories (demographically, personally, or globally). Implicit bias exhibit attendees were more likely to define diversity as being exemplified by surface-level differences than non-attendees. Attendees were also more likely than non-attendees to define equity as equality and use personal identifiers rather than global or demographic identifiers. Evidence suggests a need for revisions to DEI programs' standardized definitions to better public engagement. Future studies should explore relationships between diversity programs, knowledge, and DEId definitions in other populations such as University students.

Mentor: Dr. Elizabeth R. Brown

27 Litter Prevention Of the St. Johns River

Dravyn Hill

This project examines the issues of trash in our waterways and the best ways of prevention. The St. Johns River reaches over 9,000 square miles throughout Florida. Home

to hundreds and thousands of animals. It is essential we take care of it by not allowing trash into these waterways. The St. Johns Riverkeeper hosts monthly cleanups publicly and weekly private cleanups, working to remove as much litter from the river as possible. To ensure it will not reach the water and become dangerous to marine life. Areas of smaller populations known for fishing had more trash rather than highly populated areas. While attending these clean-ups I found large amounts of fishing lines, plastics, glass, cardboard, styrofoam, and cigarette butts that are toxic to marine and land animals. Many trash cans were damaged, resulting in the trash that was disposed of properly, ending back up in the water. I've concluded the best way to reduce the amount of trash in the waterways is to reduce the amount of waste I create as an individual. Waste can be found at restaurants that use single-use plastics or to-go containers, in our everyday trash cans if something rips or is not closed, and when throwing away trash in public if the trash can is not contained and picked up properly. It is important that we care for our waterways as it provides and cares for us.

Mentor: Kelly Rhoden

28 Aspirin Has a Bacteriostatic and Growth Attenuation Effect on Some Species of the Human Gut Microbiome, While Levothyroxine Does Not

Wyatt Greenbaum, Garrett Greenbaum, Anna Spiezio, and Brian Coughlin

Aspirin has a bacteriostatic and growth attenuation effect on important human gut microbiome species, while Levothyroxine does not. The human gut microbiota can benefit the human body impacting immunity, metabolism, homeostasis, and acquisition of nutrients, but the impact of commonly prescribed FDA approved pharmaceuticals on these organisms' growth and survival has not been thoroughly studied. This experiment's objective was to test the effects of Aspirin, a commonly used medication, and Levothyroxine, a prescription medication for hypothyroidism, on two members of the healthy gut microbiota, Bacteroides fragilis, and Akkermanisa muciniphila. Our hypothesis was that these drugs would attenuate the growth of these species in a dose-dependent relationship and there would be a differential impact of the drugs on the growth patterns of the bacteria. This was measured by spectrophotometry of time courses showing bacterial growth patterns in isolated Hungate tubes containing scaled concentrations of the medications. Results showed that there was a significant decrease in A. muciniphila and Bacteroides fragilis growth rates for some aspirin concentrations in a dose dependent pattern, but not for Levothyroxine concentrations on Bacteroides fragilis. It can be concluded that aspirin does have a differential bacteriostatic growth attenuation effect on Akkermansia muciniphila and Bacteroides fragilis growth, while Levothyroxine does not have this effect on Bacteroides fragilis. It is important to know the effects on the gut bacteria of medications commonly taken throughout the world for health management and there may be a trade-off for those who take aspirin for cardiovascular disorders and also struggle with gastrointestinal disorders.

Mentor: Professor Brian Coughlin

29 What Community Leaders and Members Think Prevent Latinos from Participating in Scientific Research?

Lizbeth Vera Murillo, A. Collie, I. Delosreyes, H. Brody, and Dr. Jody Nicholson-Bell

The Latino/Hispanic population is substantially growing in the U.S.; however, they are underrepresented in research. The current study describes the perspectives and attitudes about research barriers in a Latino/Hispanic community of North Florida through qualitative interview questions of community leaders(n=7), members (n=14), and a quantitative survey (n=105). Barrier-related qualitative questions included: "What are the obstacles that you think researchers have when trying to recruit members of the Latino / Hispanic community?", "What are your concerns about participating in research?" and "What are some things you think are preventing the Latino community from participating in research?". The quantitative survey included a question in which participants self-selected barriers from a list: I would not be likely to participate in research studies if. Our hypothesis follows previous literature in which barriers have been mistrust, cultural differences, and resource availability themes. Results indicated that the most mentioned barriers among groups were mistrust, time, and communication barriers. Community leaders and survey respondents reported resource availability as a barrier (e.g., the location and access to the research are difficult). Both community members and leaders mentioned immigration as a barrier. Only community members reported the lack of inclusion of Latinos diversity as a barrier, and only community leaders reported a lack of research knowledge as a barrier. Researchers and institutions must consider what barriers

affect their surrounding community when creating research implementation because it can negatively impact health equality, knowledge, and future medical and research applicability in historically marginalized groups.

Mentor: Dr. Jody Nicholson-Bell

30 Eye of the Tiger: Does Cultural Mismatch Affect Evaluation of Graduate Program Brochures?

Roshonda Bissainthe

U.S graduate programs have seen an increase in enrollment over the past 10 years. While first-generation college students (FGCS) are enrolling in graduate school at the same rate as continuing-generation students (CGCS), FGCS earn graduate degrees at a significantly lower rate. We examined whether the independent culture encouraged at many U.S universities clashes with the culture of FGCS. Do FGCS versus CGCS differ in their perception of a graduate program that is framed as requiring independence or interdependence? The aim of this study was to neutralize the effects of cultural mismatches by incorporating either interdependent or interdependent cultural values into graduate program brochures. We hypothesized an interaction between generational status and brochure type such that reading when participants are randomly assigned to read the independent focused brochure, FGCS compared with CGCS will report a lower tendency to seek college resources, self-efficacy, and persistence. Additionally, when participants are randomly assigned to read the interdependent focused brochure, FGCS compared with CGCS will report a higher tendency to seek college resources, self-efficacy, and persistence. There were 174 participants (60 FGCS, 107 CGCS; ages 18 to 49 (median age = 26.5); 143 women, 20 men, 4 non-binary, 11 Asian Americans/Pacific Islanders, 16 Latinx, 107 white, 25 African American/Black, 8 multi-racial/multi-ethnic). FGCS and CGCS were exposed to an independent or interdependent focused ecopsychology graduate program brochure and then indicated their expectations for success, tendency to seek out college resources, academic self-efficacy, academic fit, and their satisfaction/willingness to persist in the graduate program Interest in ecopsychology, recycling, and the environment significantly positively predicted motivation to pursue ecopsychology, student's expectations for attending an eco-psychology program, students' academic self-efficacy, and students' academic fit with ecopsychology. However, it did not predict students' expectations for attending an eco-psychology program and students' tendency to seek out college resources. No significant interactions emerged between generational status and brochure type regarding students' career/personal motivations for attending an eco-psychology program students' expectations for attending an eco-psychology program, tendency to seek out college resources, academic self-efficacy, and academic fit with ecopsychology. Future research should examine cultural mismatches in graduate program by considering variability of interdependent and independent self-construal's in the FGCS population.

Mentor: Dr. Elizabeth R. Brown and Dr. Dan Richard

31 Ceramics at the Mill Cove Complex: An Analysis of the Distribution and Function of St. Johns II Pottery

Victoria Hayes

The Mill Cove Complex is an archaeological site located in northeastern Florida that was inhabited by an Indigenous fisher-hunter-gatherer community during the St. Johns II period (AD 950-1250). Situated along the St. Johns River, this geographically unique site is spread across high riverfront bluffs and relict dunes. Within the site are two mortuary mounds (Grant and Shields) as well as multiple refuse piles, whose excavations have yielded copious amounts of local and exotic materials, indicating domestic and ritual activities. Throughout its 20-years of excavation, the site has produced a diverse ceramic assemblage of more than 22,000 pottery sherds that serve as the study's database. Focusing on 13 excavation areas, I analyze the frequency and distribution of Indigenous pottery across the site searching for potential relationships among pottery types, surface decorations, and vessel functions such as cooking, serving, and ritual.

Mentors: Dr. Gordon Rakita and Dr. Keith Ashley

32 Environmental Conservation in Duval County

Carly Smith

The goal of the Duval County Soil and Water Conservation District is to deliver natural resources conservation technology and education to local landowners and users and to promote the wise use of land and best management practices that will conserve, improve and sustain the natural resources of Duval County. I served as their district aide by maintaining all communications between board members, volunteers, and the residents of Duval County, ensuring that

the board followed all regulations stipulated by Floridaâ€™s Sunshine Law. Under this, I assisted the board in setting up community outreach events with outside organizations. These events included educational workshops, K-12 environmental science initiatives, and celebrations for members of the public engaging in conservation efforts. Additionally, I attended board meetings twice a month, taking notes and engaging with Duval County residents in attendance. Finally, I attended conferences on behalf of the board, communicating back to them what other conservation efforts were happening in Florida.

Mentor: Kelly Rhoden

33 Adults Can Automatically Process Frequently Encountered Fractions.

Samuel J. Pearle and Dr. Charles J. Fitzsimmons

Fraction knowledge is crucial for success in advanced mathematics and everyday life. Unfortunately, children and adults often have a hard time understanding the approximate magnitude of many fractions. However, U.S. adults may automatically process fraction magnitudes that they have encountered frequently in education and daily life (e.g., ½, ⅓, ⅔, ¼, ¾). In the current study, adults will complete a numerical-Stroop task in which they select the physically larger fraction while ignoring the numerical magnitude. Participants will complete congruent (i.e., the physically larger fraction is also numerically larger), neutral (i.e., both fractions are the same magnitude and only the physical size varies), and incongruent (i.e., the physically larger fraction is numerically smaller) trials. If fractions are automatically processed, then we expect participants to be slower and less accurate on incongruent compared to congruent trials. However, because people have more experience with integers than fractions, we hypothesized that adults may need recent experiences with fractions to show interference effects. Thus, we will randomly assign adults to complete either a fraction magnitude warm-up or a neutral mental rotation warm-up task. We expect greater interference after people have had recent experiences with fractions because recent experiences may activate people's fraction knowledge. If common fraction magnitudes lead to interference in a numerical-Stroop task, that suggests people can directly represent some fractions as magnitudes. Thus, people may be able to automatically reason about other fraction magnitudes if practiced enough which may help them succeed in mathematics.

Mentor: Dr. Charles Fitzsimmons

34 The Neural Correlates of Political Ideology: An fNIRS Study

Alexandro Gonzalez, Bailey Rawlinson, Edward Spiezio, Dr. Sean Freeder, and Dr. Katherine Hooper

Political ideology is associated with many factors, including culture, socioeconomic status, personality traits, education, and genetic and neurobiological factors (Feldman & Johnston, 2014). A growing body of evidence suggests that a more pronounced reactivity to negative stimuli may be one neurobiological factor that distinguishes those who lean conservative from those who are more liberal. Structurally, Mendez (2017) suggests the existence of a "conservative complex" in the right anterior portion of the brain because right frontotemporal damage sometimes leads to a liberal shift in political perception. Evidence from fMRI indicates that along with subcortical structures, the anterior and ventromedial prefrontal cortices are engaged by political information and reflection (Knutson et al., 2006). To further examine the neural correlates of political ideology, we used functional near-infrared spectroscopy (fNIRS). Using fNIRS, we measured cortical activity in response to the photographs of modern American politicians and other positive, negative, and neutral imagery in participants who self-identified as having specific political ideologies and moral perspectives. Participants completed a symbolic ideology scale, a party identity scale, and affective measures of American politicians and political parties to measure political ideology. Along with personality traits and trait anxiety, we examined several other factors influencing political ideology, such as conspiracy beliefs, resistance to change beliefs, and cognitive flexibility (Sutton & Douglas, 2020; White et al., 2020; Buechner et al., 2021). In this brain imaging study, we hope to elucidate the roles of particular prefrontal cortical structures and individual traits on various elements of political ideology.

Mentors: Dr. Katherine Hooper and Dr. Sean Freeder

35 Role of Child Temperament, Parenting Styles, and Parent Stress on Family Mealtime Structure and Quality

Lindsay Baker, Dr. Dawn Witherspoon, and Dr. Anita Fuglestad

Family mealtimes, characterized by routines and rituals, provide a consistent time and structure for families to gather and communicate. The manner in which mealtimes

impact children, the mechanisms, and the inter-individual differences in parents and children must be considered in order to understand the impact family mealtimes have on child development. The current study examined how child negative affect (NA), parental stress (PS), and parent feeding style (responsiveness and demandingness) impact family mealtimes. We hypothesized that NA and PS would be negatively associated with mealtime quality and structure, and this relationship would be mediated through parental responsiveness and demandingness. Next, we predicted that child NA would increase PS, which would decrease parental responsiveness, leading to poorer mealtime quality and structure. A sample of 150 parents of children ages two to six years (M=4.75) were recruited through Amazon MTurk as part of a larger study. Measures included the Children's Behavior Questionnaire Very Short Form, Perceived Stress Scale, Caregiver Feeding Styles Questionnaire and The Meals in Our Household Questionnaire. Child NA and PS were associated with poorer mealtime quality and structure, although demandingness was only a mediator for PS, while responsiveness was a mediator for both. Last, NA negatively predicted mealtime structure and quality through the serial mediation of PS and responsiveness. These results emphasize the dynamic relationships between child temperament, parent stress, and parenting styles that occur within mealtimes. This is important to understand family mealtime dynamics and inform interventions aimed at creating positive mealtime interactions between parents and children.

Mentors: Dr. Anita Fuglestad and
Dr. Dawn Witherspoon

Oral Session 5

01 The Tent Maiden: La Dame à La Licorne and Gender Representation in Courtly Romance

Velanna Dondina-Doolan

Of the Musée de Cluny's famed La Dame à la Licorne tapestries, the iconic À Mon Seul Désir is perhaps the most enigmatic and elusive. Final in the sequence, À Mon Seul Désir is named for the text it bears within its image, contained as an inscription on the tent which encloses the figure of the Lady. This tent, although belonging to a broader apparatus of medieval courtly imagery, has not yet been recognized as a key iconographic motif. The visual relationship between the tent and the Lady intentionally places this tapestry within the context of a prevalent chivalric archetype: the 'tent maiden'. The inclusion of the tent, especially as an attribute of the prevalent 'tent maiden' archetype, sublimates the implicit erotic themes of La Dame à la Licorne into the refined visual language of courtly romance. The 'tent maiden' is a typical fixture of late medieval romance, appearing both textually in romance narratives and as a visual invention in the margins of manuscripts. The image of the tent was morally ambiguous—emblematic of chivalry and courtly love—but also desire, adultery, betrayal, and violence. In spite of its ubiquitous character, scholars have forgotten the significance of the tent as a crucial setting and social symbol in late medieval art, with its own unique semiotic function as a site of social performance.

Mentor: Dr. P. Scott Brown

02 "The Beefcake, St. Sebastian, and Art History"

Gabriel Melson

Bob Mizer skirted the limits of obscenity laws by appropriating the conventions of bodybuilding and athletic magazines in his mid-century photography, which depicted images of the Beefcake type: athletes, bodybuilders, and actors. However, his impact as an artist who deeply influenced a host of later 20th-century artists has received less attention than the controversial reception of his work. Mizer's work features not only familiar gay archetypes but also photographic subjects projecting sophisticated, historically codified iconographies. These include references to iconography present in Renaissance-era art. My primary example of interest is a photograph of 'Ed Fury,' a Californian actor, model, and bodybuilder. The photograph's iconographic and compositional treatment bears significant resemblance to the canonical Renaissance subject of St. Sebastian. Hagiography accounts for St. Sebastian's role as a martyr during the Roman Empire's Diocletianic persecution of Christians, while Bob Mizer's queer intellectual and artistic focus on St. Sebastian's martyrdom offers a reflection on the pathos and struggle of being gay through an emblematic lens. In this paper, I closely examine Mizer's photograph of Fury as an exemplar for the broader art historical phenomena of artists emblematizing and codifying gay subjects through the application of historicizing iconographies.

Mentor: Dr. P. Scott Brown

Oral Session 6

01 Significance of Danio Rerio Assays for Neurodevelopmental Research

Sydney Pell

Danio rerio, commonly known as zebrafish, are a model organism for research on neurodevelopment and behavior due to their homology with other vertebrates such as humans, the ability to observe their neurological changes throughout key developmental stages, and the opportunity for genetic modification in order to identify altered phenotypic responses in mutant fish. This study aims to distinguish certain intellectual and motor disabilities of different zebrafish genetic models through a multitude of behavioral assays. A swim test and endurance test will be used for motor testing, while latent learning, associative learning, and conditioned place preference test will all be used to measure intellectual ability. Wildtype fish will be used in each maze first and their behavioral and intellectual output will be measured across all mazes. Experimental fish with genetic modifications for genes with congenital disorders of glycosylation (CDGs) will then be tested in each maze. In humans, CDGs are known to disrupt the functions of multiple organs and tissues, causing severe symptoms such as epilepsy, intellectual disability, myopathy, neuropathy, stroke-like symptoms, and severe congenital malformation. We expect to find a correlation between genetic mutation, decreased motor function, and intellectual disability. We also expect to see an increase in latency and errors across all mazes for the experimental fish.

Mentor: Dr. Marie Mooney

02 The Roles of SPAK/OSR1 in Glioblastoma Biology

Yetzali Claudio Medina

Glioblastoma (GBM) is the most aggressive primary brain tumor in adults, with a median overall survival of 15 months. GBM's high recurrence rates are due to the extensive migration and invasion patterns of GBM cells. Itâ€™s believed that GBM cells utilize a hydrodynamic model to migrate, which enables them to dynamically change their cell volume to fit through the narrow structures of the brain. The kinases SPAK/OSR1 help regulate the cell volume by activating and deactivating ion channels. Longer patient survival times have been correlated with low expression of SPAK/OSR1. Recent work has shown that SPAK/OSR1 regulate the activity of the inflammasome in immune cells (microphages and microglia) but itâ€™s not known if these kinases have a role in tumor inflammation in GBM. To understand the role of SPAK/OSR1 in the expression of pro- and anti-inflammatory cytokines, we measured the expression of these cytokines (IL-1Î², IL-6, IL-8, CXCL1, CCL2, G-CSF, and GM-CSF) in patient-derived cell lines that were treated with lentiviral particles carrying an empty vector (EV) or shRNAs to double knockdown (KD) SPAK/OSR1. Then, we measured the expression of the cytokines in EV and KD cells stimulated with IL1Î± and interferon- Î³ to mimic the pro-inflammatory tumor microenvironment. We found that there is a differential expression of cytokines between the EV and KD cells. When the cells were stimulated with IL1Î± and interferon- Î³, the KD cells had a significantly higher expression of the cytokines, showing a higher activation in the pro-inflammatory microenvironment.

Mentor: Dr. Paula Schiapparelli

03 APOE4 on Meningeal Lymphatic Vasculature in Alzheimer's Disease

Racquelle Schrader, Sandro Da Mesquita, Sofia P Das Neves, Nicolette Delivanoglou, Megan Barber, Guadalupe Sanchez, and Shanon Rego

The meningeal lymphatic vasculature (mLV) system is important for fluid drainage, to take toxins away from the brain. There are three meningeal layers that wrap around the brain and spinal cord: pia mater, arachnoid layer, and the dura mater. Lymphatic vasculature is also seen in mammalian meninges, making mice studies a viable source of human representation of deficits in humans. The vessels of the mLV system regulate the neuroimmune response in the CNS, making it a potentially vital system in neurological diseases. Aging and other deficits in mLV drainage affect brain cleansing, brain immunity, and cognitive function. Some of these deficits are hallmarks of Alzheimer's disease (AD). AD has shown to have genetic components that can increase the risk of developing Alzheimer's, such as APOE4. We took knock-in APOE 3 and knock-in APOE4 mice of both young (2-4 months) and old (11-12 months) ages, and looked at the mLV. Male APOE4 showed an abnormal expansion of meningeal lymphatic vessels. The knock-in female mice did not show this abnormal expansion. Knock-out mice were also tested and showed

that the loss of APOE did not affect the morphology. Women do have a higher risk of developing AD so we are left wondering if the abnormal expansion in the male mice was a neuroimmune response that could be decreasing the risk of development of AD. We are also left wondering if the abnormal expansion in the male mice is decreasing or increasing the drainage of the mLV.

Mentor: Dr. Terri Ellis

Poster Session 4

01 The Ship of Theseus and Aristotle's Four Causes

Kinsey Gabree

In my paper, I discuss the thought experiment of The Ship of Theseus. The thought experiment essentially is this: if every single piece of Theseus' ship has been replaced gradually over time during its travels, is it still the same ship? I argue that we can find an answer to this question using Aristotle's four causes. The four causes are the material cause, the formal cause, the efficient cause, and the final cause. Each of these contribute to what makes something itself; in this case, the ship. The material cause is what the ship is made out of; the "stuff," essentially. The formal cause is the blueprint of the ship; the shape, or appearance. The efficient cause is who or what created the ship. The final cause is the ultimate goal of the ship; what is its purpose? With this understanding of the four causes in mind, we will understand why the ship of Theseus is indeed not the same ship after its voyage. Some say the ship of Theseus is the same ship because the efficient cause and the final cause remain the same. In my paper, I respond to these opposing views in detail.

Mentor: Dr. Jonathan Matheson

02 Russia-Ukraine Cyber Warfare Impact on United States Homeland Security

Ella Markovsky

As we pass the one year mark of Russia invading Ukraine, it is important to analyze the worldwide effects. The invasion of Russia's military front has been captured, but it is challenging to visualize the headway Russian cyberwarfare has made. Russia's use of advanced hybrid warfare is setting an example for offensive cyber wartime operations. Russia's historical use of cyber strategies to advance through Ukraine will be analyzed, specifically during the annexation of Crimea through the NotPetya attacks. By analyzing the previous global effects of Russian cyberattacks, current implications can be predicted and mitigation strategies can be developed. A specific region of impact analysis is the United States. During the persistent Russian cyberattacks in Ukraine from 2013-2017, the United States homeland security was inadvertently breached due to network connections in Ukraine. It is important to map these cyberwebs and prevent attacks in Ukraine from disrupting U.S. national security. By analyzing the United States connections with Ukraine, it is possible to prevent major cyberattacks in both countries. As Russian technology develops, the Kremlin has developed techniques that make computer attacks lethal in the physical realm. As the war progresses, analyzing Russia's cyber strategy becomes important to protecting national security and civilian prosperity.

Mentors: Dr. Jenni Lieberman and Dr. Alison Bruey

03 A Spring 2023 Internship with Editing the Eartha M. M. White Collection

Janaya Ferrer

Editing the Eartha M. M. White Collection is an ongoing collaborative digital textual editing project that engages UNF students, faculty, and staff in the effort of creating accessible and valuable primary sources of Jacksonville's African American history. The project highlights personal correspondence and other archival materials relating to Eartha M. M. White (1876-1974), a local philanthropist and civil rights activist known for founding the Clara White Mission and being a leader of Jacksonville's African American community. As a DHI student intern in Spring 2023, I lead a weekly digital textual editing workshop series where participants learn how to transcribe materials from the collection and encode them using TEI-XML for publication on the project website (unfdhi.org/earthawhite). As part of this role, I explore new methods and technologies to improve the workshop process. Aiming to increase project visibility and build a community of digital editors, I focus on community outreach and promotional campaigns in social media and on campus. To improve the accessibility of the edited materials, I work on standardizing metadata, XML markup, and item tags across the collection of all items edited to date. Also, I help to lead an editing workshop in the community as part of the Spring 2023 Justice Sessions. The process of creating editions for the digital repository calls into question the dynamics of race, power, and class. To better represent the African American experiences in Jacksonville in the early twentieth century, I am attempting to diversify the materials in the digital repository by featuring content that reflects African American achievements and successes.

Mentor: Dr. Clayton McCarl

04 The Legal Permissibility of Abortion

Justin Seagull

For almost 50 years people who need to terminate their pregnancy have had the right to do so. In western society, there has been a fluctuation of support for abortion in the last couple of decades to the point where the supreme court has redacted federal law on abortion protection and deemed it up to the states to decide. America is one of few countries that has decided to make abortion not federally protected (Barry, E. 2022). In fact, America might become the only modern western country with specific states where abortion is banned altogether (Barry, E. 2022). It raises the question of whether abortion should be legally permissible. In order to understand this question we must first understand the polar sides of pro-choice and pro-life, the nature of America's legal system, what the nature of America's legal system should be, and the philosophical and legal implications of both allowing or banning abortion in the United States. In discerning these questions we will find the flaws of America's legal system that stem from a divided political system. We will find that the nature of law should be utilitarian with the aim of maximizing freedom. We will also propose a new system of law that supports the legality of abortion. Lastly, we will find that abortion must stay legal because its potential legal ramifications if made illegal, could allow for some serious limits on bodily autonomy.

Mentor: Dr. Jonathan Matheson

05 Eu So Menor De Idade (I Am A Minor)

Hannah Glaser

Eu So Menor De Idade (I Am A Minor) is the continuation of a research project I began as part of my senior thesis, which focuses on the sexualization of minors on the basis of gender presentation. Minors are sexualized either by the fetishization of youth or mature portrayals of children in sexualized clothing and actions, particularly that of "kid influencers." This is worsened by the intersection of the fetishization of race, forcing children to confront this objectification based on their gender presentation and ethnicity at a vulnerable point in their lives. When looking at clothes marketed to children, there is a clear gender disparity. For children assigned female, the enforcement of gender performance and sexualization is greater. This research project is the documentation of similar findings during my trip to Salvador, Bahia, Brazil. I documented children's clothing stores, and made note of what the kids we volunteered with wore. I also researched kid influencers of Brazil, the ages of these influencers and what fashion they sponsored. My response is a book created using techniques learned in Brazil, with three paper dolls inside of unspecified gender identity, and clothing I documented during the trip. The doll motif carries over from my original I'm A Minor series, as objects one controls the design of and elicits a sense of nostalgia. An audience member can analyze the items available and consider how gender plays a role in what is being marketed, and how much control children have in their presentation and sexualization.

Mentor: Professor Sheila Goloborotko

06 Benefits and Challenges of Support Facilitation in an Inclusive Classroom

Lily Miller and Sydney Williams

The purpose of this inquiry was to determine the benefits and challenges of support facilitation in an inclusive classroom. In order to answer our inquiry questions, we (UNF ESE teacher candidates) collected data on general education teachers and the varying exceptional teachers perception of support facilitation at Coastal Middle School through surveys, observational walkthroughs, and teacher interviews. From the data, we discover benefits and challenges in four overarching categories: teachers' perceptions, collaboration, instruction, and student engagement themes. As a result of the data, we recommend Coastal Middle School outline clear and explicit roles for both the general education teacher and the special education teacher during the co-planning and co-teaching process, train the teachers on how to co-plan together, inform them of co-teaching methods they can use, and create a schedule where the VE teacher only needs to focus on one class during each period.

Mentor: Dr. David Hoppey

07 Education and the Environment: Bringing the Outside into the Classroom

Grace Barnwell

2023 Spring Symposium Abstract Grace Barnwell Surveys identify that "interest in environmental sustainability is high… [but] in most schools, environmental education

takes place outside the classroom," (nais.org). These surveys also indicate that "almost all school-based environmental education curriculum development is initiated by teachers (92 percent); only a few schools have professional development in environmental education (very great/great extent: 15 percent)," (nais.org). Statistics like these show that interest in environmental education is high, though the resources and curriculum are not currently aligned to support it. The purpose of this project is to develop a set of curricula that the North Florida Land Trust can implement in schools. This curriculum cross-references the Florida B.E.S.T. Standards and the mission of the North Florida Land Trust to promote a holistic approach to environmental education. In the process, landowners are informed of how they can contribute to the North Florida Land Trust to help protect native ecosystems. The goal of the curriculum is two-fold: to educate students on environmental science and to have them go home and discuss what they have learned with those around them. In doing so, we are able to generate interest in the North Florida Land Trust and protect wildlife by building corridors (like the Ocala to Osceola- O2O corridor) so that humans become less of a predator to natural environments. By educating students of all ages, we are able to interest more young minds in science and bridge future educational gaps.

Mentor: Kelly Rhoden

08 A Case Study on Activation Level of Rotator Cuff Muscles Using Electromyography and Associated Muscle Forces

Allyson Mitchell, Dr. AmirHossein MajidiRad, and Dr. George Pujalte

Rotator cuff tears are among the most common shoulder injuries, making them an attractive topic of study. Yet, there is a lack of clear understanding of attributes associated with deep and superficial muscles when it is intended to study the recovery progress after rehabilitation. Through a systematic approach, this project investigates the activation of rotator cuff muscles using surface electromyography (sEMG) sensors. The team developed a strategic plan to investigate the precision of the NORAXON technology that is utilized in this study to ensure that it is capable of capturing small variations in shoulder motion. This is followed by a reliability analysis to ascertain reproducibility of the experiment. The levels of muscle activities for superficial and deep muscles are monitored to explore the impact of traditionally prescribed arm movements used for the rehabilitation of rotator cuff injuries. Furthermore, an analysis of forces generated in the muscles is done to provide better insight into the activation levels of rotator cuff muscles. The results were promising, with a competent technology and acceptable correlation associated with muscle activities across all subjects. Four common arm movements were studied; scaption generated a significant response in the targeted muscles, particularly of the supraspinatus. Results were conclusive across all subjects, and simulation also supported the experiment showing high activation levels for the supraspinatus. The teres minor also showed a significant contribution when performing external rotation at 90 abduction. The outcome of this study is significant for this ongoing project as it identifies the most impactful exercises that ensure targeted muscles are being triggered. It also lays the groundwork for expanding the project to a clinical study focusing on the most effective arm movements in order to improve rehabilitation process and reduce pertinent cost.

Mentor: Dr. AmirHossein MajidiRad

09 Contradiction Detection in Biomedical Literature Using Deep Learning

Molika So

In biomedical literature, there are many contradictory claims published on the same topic, which can be a major issue for researchers. Being able to effectively identify contradictory claims would allow practitioners to make better decisions with their experiments. To investigate this, data from the Manual Contradiction Corpus (ManConCorpus) was used. The corpus contains an annotated list of 259 abstracts and includes research queries, claims that answer each query, and a corresponding assertion value (yes or no) for each claim. Each claim from the corpus was preprocessed using the Natural Language Toolkit (NLTK) so that semantic properties could be extracted. To find the technique that could better identify contradictions within the corpus, various deep neural network models, including the feedforward neural networks, bidirectional Long Short-Term Memory (LSTM), and gated recurrent unit (GRU) models, were explored. Comparing the F1 scores for these models, the bidirectional LSTM model performed the best, with a score of 0.66. These promising preliminary results show that using deep learning is feasible for contradiction

detection and could be potentially improved through the use of more advanced neural network techniques such as Transformers, augmented data, and comprehensive hyperparameter tuning.

Mentor: Dr. Indika Kahanda

10 The Impact of Limited Weight Room Access on College Pitching Metrics

Karie Abel, Mackenzie Kennon, Brennen Hogan, Colin Corcoran, Dr. Charles C. Williams, and Dr. Jacob Gdovin

BACKGROUND: Strength and conditioning professionals work with sport coaches to develop programs to ensure pitchers maintain or improve arm health and throwing velocity. Therefore, the purpose of this study was to determine how eliminating a structured strength training program alters pitching and performance metrics during an 8-week fall season in collegiate baseball pitchers. METHODS: Twelve NCAA division-I male baseball pitchers who completed the 8-week fall season participated in the study. Each participant completed every bullpen session during the 2021-2022 season. To determine pitcher readiness prior to data collection, all participants had to be pitching bullpen sessions >90% of their spring season in-game intensity which was determined by the pitching coach. Athletes did not have access to their weight-room facility due to the COVID-19 pandemic forcing the team to conduct their conditioning programs on the field with minimal equipment limiting a traditional strength training program. All pitching data were collected using the PULSE Throw Workload Monitor (Driveline Baseball, Kent, WA, USA). Preseason testing took place prior to the start of the fall season and post-testing occurred 72 hours after the fall season concluded. Participants completed their pre-game warm-up routine with no restriction on time. After throwing no more than 10 sub-maximal pitches on a dirt mound to a catcher positioned 18.39m away, all pitchers threw 2- or 4-seam fastballs into the strike zone with maximal effort separated by 20s. Total pitch count progressively increased each week based on the throwing program designed by the pitching coach which did not exceed 50 maximal effort pitches/week. Five of those pitch trials were selected with the average of the three highest ball velocities used for analysis. A paired samples t-test, with an alpha level set at p < 0.05, was conducted for the two variables of interest. RESULTS: There was no significant difference (p = 0.57) in elbow valgus torque between pre-test (66.86 ± 15.54Nm) and post-test (64.53 ± 13.61Nm) conditions. However, there was a significant difference (p < 0.001) in ball velocity between pre-test (37.70 ± 2.01m/s) and post-test (34.89 ± 2.16m/s) conditions. CONCLUSION: Limiting access to resistance training equipment and a structured strength program negatively impacts ball velocity even with a designed throwing program.

Mentor: Dr. Charles C. Williams

11 The Benefits of the RD Mentorship Program for Mentees Participating in the Dietetic Internship Match

Karin Gulick, Paige Courtier, Kat Desheva, Bailee Chavez, Breanna Chavez, Dr. Karen Beathard, and Dr. Kristen Hicks-Roof

This research aimed to observe the benefits of a mentorship program on mentees applying to a dietetic internship (DI) and a deeper look into the characteristics attributed to success, such as developing strong professional skills. The RD Mentorship Program is a national, project-based mentoring program that virtually matched dietetics students with registered dietitians (RDs). The data included those who completed the post-survey (mentees =114; mentors=139). Matched partnerships met at least once per month (virtually or face-to-face) from September 2021 to April 2022. Descriptive statistics were completed to analyze the data. Of mentees in the RD Mentorship, 50% (n=57%) participated in the 2021-2022 DI match. Mentees reported the RD Mentorship program made them more competitive applicants (96%). Successful outcomes included matching in the first round (81%) and second round (9%). Over one-third (37%) of mentees received a letter of recommendation from their mentor. Most mentors (73%) guided the mentee during the DI match. Nearly one-quarter of mentees applied to a distance DI program, and 60% secured at least one preceptor via the RD Mentorship Program. These findings indicated that the mentorship between a nutrition student and an RD in a mentoring program benefited their success in matching to DI. Students reported that their work with their mentor made them more competitive applicants for the DI through their gained experience and feedback from their mentor. Further research should continue to analyze the benefits of the RD Mentorship program on a student's success in matching to DI.

Mentors: Dr. Kristen Hicks-Roof and Dr. Karen Beathard

12 Examining Sprint Demands During The Competitive Season In Collegiate Men's Soccer Players

Evan D. Kilby

BACKGROUND: The sport of soccer is characterized by bouts of intense sprints and high-speed distance running. Sprint and workload demand of players such as total sprint volume (TSV) provide implications for athletic personnel prescribing appropriate training loads reflective of the individual within a sport over competitive seasons. PURPOSE: Examine TSV differences over a full competitive season in collegiate male soccer players. TSV was measured by collecting sprint metrics of distance traveled ≥5.14 meters per second (m/s) for all practices and matches. Sprint count (SPC) was defined by the Titan sensor algorithm as the occurrence of an athlete reaching a minimum speed threshold during a session (≥5.14m/s for ≥1.5 seconds). METHODS: Twenty-one (age:19.6±1.2years, height:180.7±8.3cm, mass:75.6±7.4kg) Division I collegiate male soccer players were monitored using wearable Global Positioning Systems (GPS) using a 10Hz Titan +1(2"x1.5"x.25") sensor (Houston, Texas, United States) that was secured by a jersey resting between the scapulae of each participant for every training session and match across the competitive season (pre-season: 2 weeks, in-season: 10 weeks). A series of Paired samples t-tests with an alpha level set at p<0.05 were used to compare differences in sprint outcomes between pre-season and in-season time periods. RESULTS: Paired samples t-tests revealed significant differences between pre-season TSV (878.4±655.9m) vs. in-season TSV (1179.6±737.3m) (p<.01). Significant differences in total SPC were also observed between pre-season (41.9±30.2) vs in-season (54.9±34.7) (p<.01). CONCLUSION: This study provides athletic personnel with workload reports that can aid in the development of training programs based on the demands of soccer.

Mentors: Dr. Jacob Gdovin and Dr. Charles. C. Williams

13 Accuracy of Wearable Activity Monitors for Estimating VO2max

Andrew Gomez, Evan D. Kilby, and Shirin Zahra

Purpose: Maximum oxygen consumption (V̇O2max) represents cardiorespiratory fitness and is inversely related to all-cause mortality and the risk of developing cardiovascular disease. Assessing V̇O2max requires vigorous exercise using complex laboratory equipment and a team of well-trained individuals, making this important health variable out of reach for many. To make this measurement more accessible, activity monitor manufacturers have created algorithms for predicting V̇O2max. However, these assessments have not been rigorously externally validated. Therefore, the purpose of this study was to compare V̇O2max estimated by consumer-grade activity monitors to laboratory-measured V̇O2max. Methods: Individuals who owned a consumer-grade activity monitor with a predicted V̇O2max were included in this study. Participants (N=5, 21.6 ± 3.1 yrs) completed a V̇O2max test using a treadmill-based ramp protocol in the Exercise Science Lab. The treadmill protocol included walking or running at a constant speed while the grade was increased 1% every minute. Participants were encouraged to sustain exercise until volitional fatigue. V̇O2max was assessed with a metabolic gas analyzer (CardioCoach); oxygen consumption (ml·kg−1·min−1), ratings of perceived exertion, and heart rate were recorded each minute. A paired samples t-test was used to compare the monitor-predicted V̇O2max to lab-measured V̇O2max. Results: On average V̇O2max estimates from consumer-grade monitors were 8.8 ml·kg−1·min−1 lower than lab-measured V̇O2max (P=.02). Conclusion: In this small sample of ongoing research, V̇O2max assessed with consumer-grade activity monitors was significantly different from lab-measured V̇O2max. This variation between estimated and measured V̇O2max should be taken into consideration when assessing cardiorespiratory fitness.

Mentor: Dr. Lindsay Toth

14 Evidence for Inclusive Clinical Practice and Research to Reduce Weight Stigma among LGBTQ+ Young Adults

Jacey Poole, Alexandra Hajek, Dr. Cassandra M. Johnson, Dr. Jenifer Ross, and Dr. Lauren Butler

Background: Structural and social inequalities contribute to higher prevalence of eating disorders among lesbian, gay, bisexual, transgender and queer (LGBTQ+) adults. LGBTQ+ adults living in large bodies experience intersecting discrimination that may increase weight stigma and body image concerns leading to eating disorder development. This study aimed to determine whether weight stigma or body image, differed between LGBTQ+ persons and their heteronormative counterparts. Methods:

Cross-sectional study utilizing survey data from a sample of University of North Florida students (18-35 years old) (N=255). Measures included the Weight Self-Stigma Questionnaire, a measure of weight-related self-stigma, and the Body Appreciation Scale-2, a measure of positive body image. Means and differences in outcomes between LGBTQ+ subgroups and the heteronormative group were determined using Analysis of Variance (ANOVA). Differences among those living with a BMI ≥ 25 kg/m2 were identified using ANOVA including an interaction term for sexual orientation and BMI. Results: Nearly half of respondents (45.5%) reported LGBTQ+ community membership. Most respondents (58.24%) reported cis-gender, heterosexual orientation followed by bisexual (17.58%), and queer (6.23%) sexual orientations. Within subgroups, body appreciation scores were lower among those reporting bisexual (3.15 ± 0.13; p=0.03) and polysexual (2.86 ± 0.23; p=0.01) orientations compared to heteronormative persons (3.48 ± 0.07). Among those living with BMI ≥ 25 kg/m2, weight stigma scores were higher for bisexual or polysexual orientations (39.59 ± 1.45; p=0.031) compared to heteronormative respondents (35.67 ± 1.12). Conclusion: These findings provide evidence for inclusive clinical practice and behavioral nutrition research to reduce weight stigma among young adults.

Mentors: Dr. Jenifer Ross and Dr. Lauren Butler

15 Plasmonic Metamaterials for Non-Linear Optical Applications

Austin Anderson

Advancements in the field of optical meta-materials within the past few decades has led to the development of enhanced nonlinear optical functionalities with an increasing level of control over electromagnetic fields in nanostructured systems. The core of meta-material design is in the manipulation of the fields dispersion through careful geometrical nanostructuring. These meta-materials are thought to have potential applications in major fields including energy management, medical diagnostics, and military and national defense industry. In this project, we are observing plasmonic forming meta-materials using finite element method (FEM) simulations and identifying the modal contributions to the optical response of these materials.

Mentor: Dr. Gregory Wurtz

16 Effects of Dietary Protein Quality on Fecundity and Longevity in Grasshoppers

Emma Kordek, Yip AM, and Horton AM

Dietary protein quantity increases animal reproduction but decreases lifespan. This reproduction vs. longevity trade-off may be broken by editing dietary protein quality, thus providing sufficient levels of all essential amino acids but not excessive levels of any amino acid. A diet with amino acid composition similar to yolk protein enhances growth and reproductive output without compromising lifespan in Drosophila. Similarly, in lubber grasshoppers, dietary amino acids can be matched to the composition of the precursor to egg yolk protein (vitellogenin; Vg). Adult females force-fed a liquid diet matched to Vg had increased reproduction and storage. This project uses agar-based diets with specific amino acid compositions, fed ad libitum. We test fecundity and longevity of grasshoppers using four diet treatments: high-quality protein (Vg-matched), an isonitrogenous low-quality diet, lettuce (positive control), and a negative control. Here we present direct comparisons of reproduction by the high- and low-quality diet groups. At least two clutches were laid by a greater percentage of grasshoppers on high-quality diet than those on low-quality diet (chi-square; P=0.04). Of those that laid, these two groups showed no differences in clutch timing or size (MANOVA; all P>0.05). During the second clutch, grasshoppers on high-quality diets weighed more, but did not eat statistically more, than those on low-quality diets, suggesting greater somatic storage. Protein quality may increase laying frequency and somatic storage in early adulthood.

Mentor: Dr. John Hatle

17 Exploring Bacterial Genomes for the Discovery of Novel Diketopiperazines

Elise Ballash, Jessia Rahe, and Dr. Amy Lane

Actinomycetes bacteria excel at producing small molecules that are important in drug discovery. Some natural products contain diketopiperazine (DKP) groups. DKPs are structurally diverse molecules that have a variety of biological functions. The formation of DKP scaffolds are catalyzed by cyclodipeptide synthases (CDPS) which form an amide bond between two aminoacyl tRNAs (aa-tRNAs). For this research, the expression of three cryptic gene clusters from Actinomycetes resulted in production

of DKPs. LC-MS and HPLC data indicate that the gene clusters' CDPS catalyze the formation of cyclo(L-Trp-L-Trp) and/or cyclo(L-Trp-L-Phe) as the DKP scaffold. These precursors are further modified into the final decorated DKP.

Mentor: Dr. Amy Lane

18 Correlation vs. Causation: A Heat Map Of Jacksonville

Kai Nilson

Previously, the Parks Department had had a Shape File created that showed different temperatures across Jacksonville. The idea was to create a file that can show where many places with higher temperatures correlate with areas that have a higher concrete to greenery ratio and areas with the opposite. This project has many layers and requirements. The Shape File became the base layer. To that file, a diagram of the major roads and highways of Jacksonville (Figure 1), a diagram of the St. Johns River and the Timucua Reserve (Figure 2), and markers for many of the important places of Jacksonville (Figure 3) were added to assist in the causation argument. Luckily, the initial project was not a tough job and we had time to finish three other maps. The first is of the Losco running guide (Figure 4). The second is the Ortega River Paddling guide (Figure 5). And the last is the Rondette State Park (unfinished). What is ArcGIS Pro? ArcGIS Pro is a desktop computer software, notable for its 64 bit architecture, 2D, 3D, and 4D support, and the ability to share your work in ArcGIS Online or the ArcGIS Enterprise Portal. Why ArcGIS Pro? This software is highly flaeible in the presentation of information. Users can add layers that they can then turn on and off to assist in finding correlations.

Mentor: Kelly Rhoden

19 Investigation of the Segment Polarity Network in the Tardigrade Hypsibius Exemplaris

Taylor Harrison

Organ systems most likely evolved segmentation independently in Panarthropoda. We will presently discuss segmentation as it relates to trunk segments and their associated appendages. The genes most conserved across the panarthropods that show a segmental pattern are the Segment Polarity Genes (SPG). In arthropods, engrailed is seen in a reiterated pattern at the posterior of each segment coexpressed with hedgehog (Patel et. al. 1989, Ketle et. al. 2003, Simmonet et. al. 2004). Wingless is expressed directly anteriorly to engrailed (Janssen 2012, Ingham 1993). Cubitus Interruptus is expressed anteriorly to engrailed across the rest of the segment (Motzney and Holmgren 1995, Janssen 2012). These patterns set up segment boundaries as well as pattern segments. This pattern is conserved in Onychophorans. However, their temporal expression is not conserved (Franke and Mayor 2014, Eriksson et. al. 2009, Janssen 2013). One species, E. kanangrensis, shows segmental expression of only engrailed before segments appear. Another species, E. rowelli, does not express any SPGs before segments have formed. This suggests that segment boundary formation was not regulated by SPGs in the Panarthropod common ancestor. Tardigrades can bring insight into this time discrepancy as the probable sister group to Onychophora and Arthropoda. Tardigrades have been shown to have stripes of engrailed before segment boundaries are present (Gabriel and Goldstein 2007). This suggests engrailed could have set up segment borders in the Panarthropod common ancestor, however, functional studies would need to be done to confirm this outside of arthropoda. Alternatively, SPGs would not have had a role in setting segment boundaries and instead only patterned segments and segmental features.

Mentor: Dr. Frank Smith

20 I'll Believe It When I See It: Using Microscopes and Tiny Tardigrades to Shed Light on Biological Mysteries

Raul Chavarria, Mandy Game, Taylor Harrison, and Dr. Frank Smith

Microscopes have been around since the 16th century and have changed the way we understand the natural world. Modern microscopes help us visualize biological processes in remarkable detail and are instrumental in deciphering biological mysteries. One of these mysteries is the evolution of the diversity of body plans seen throughout the animal kingdom. Here we show images gathered using differential interference contrast (DIC) and laser scanning confocal microscopy that have shed light on the evolution of the compact body plan of the microscopic tardigrade, Hypsibius exemplaris. By using these imaging techniques on both wild-type and genetically manipulated specimens, we can better understand genetic mechanisms that shape the development of tardigrades. DIC microscopy offers high contrast to specimens that would otherwise appear transparent. DIC can be coupled with live imaging to see developmental processes in vivo. Laser confocal

microscopy is used to visualize fluorescence probes that can be inserted into embryonic or adult specimens. This includes mRNA probes to visualize gene expression, and immunohistochemistry to label the nervous system and muscles. Additionally, we use DAPI staining to visualize nuclei and take advantage of the autofloresence properties of tardigrades to visualize organ systems. This unprecedented view of tardigrade biology has helped to reconstruct the molecular evolutionary history associated with complex organ systems such as eyes and the miniaturization of the tardigrade body plan.

Mentor: Dr. Frank Smith

21 Doped La1-xSrxVO3 Thin Films Grown as Random Alloys and Ordered Superlattices Using MBE

Nathan Bairen

Using molecular beam epitaxy, we grew samples of strontium-doped lanthanum vanadate, La1-xSrxVO3 (or LSVO) with x ranging from 0 to 1. The samples were grown on (001) oriented SrTiO3 substrates at substrate temperatures around 700 °C and partial oxygen pressures of 5E-8 torr. We found this low oxygen partial pressure to be key to stabilizing the perovskite (ABO3) structure of LSVO. We have explored doping our samples both as random alloys (where La and Sr atoms randomly occupy the A-site) as well as LaVO3/SrVO3 ordered superlattices. We found LSVO to grow in a phase-pure perovskite phase with our growth parameters, although in-situ imaging using reflection high-energy electron diffraction reveals interesting behaviors during the growth of LSVO superlattices. We probe the temperature dependent electronic properties of these films and explore how these properties compare between random alloy and ordered superlattice samples.

Mentor: Dr. Maitri Warusawithana

22 Mangroves and the Marsh

Eleanor Sand

In spring of 2022 I attended a symposium and saw National Park Service (NPS) Ranger Ches Vervaeke present how they are tracking mangroves growth patterns and noticing a trend of the species moving north due to changes in the climate. A few years ago, the park rangers discovered a clump of mangroves for the first time in Timucuan Ecological and Historical preserve, containing what could be the most northern mangrove in North America. With warmer winters, mangroves that normally would not have survived the frosts are starting to take root here in northern Florida. This can have long term effects if the mangroves choke out the marsh which could be serious if a freeze then kills off the mangroves leaving the shoreline vulnerable to storm surges. This project will take a statistical look at what conditions are optimal for mangroves to grow in order to help Timucuan Ecological and Historical Preserve combat this new issue as well as discuss whether or not we should amend mangroves protected status in the state of Florida.

Mentor: Dr. Elena Buzaianu

23 Assessing Catch Efficiency of Bottomless Lift Nets on Artificial Oyster Reef Structures

Gabbie Nelson

This study aims to test bottomless lift nets' efficiency on two different oyster reef restoration methods at Wright's Landing. Grass shrimp, Palaemonetes, were gathered from Guana Lake, dyed, and released into the raised lift nets. Dip nets were used to sweep around the enclosed area and recapture the marked shrimp. Clearly marked shrimp were recorded and released. Shrimp that could not be clearly identified as marked were taken back to the lab to be inspected under a microscope. Once the data was consolidated from the field and lab analysis, the recapture rates for each of the treatments were calculated. The data was tested for normality using a Ryan-Joiner test. A single-factor ANOVA was conducted and found that there was no significant difference in catch efficiency of the two treatments.

Mentor: Dr. Kelly Smith

24 Identifying Natural Products for Use as Potential Antibacterial Drugs

Hana Kabil and Noah Khosrowzadeh

Antibiotic resistance has become a major public health issue. Bacteria are growing more resistant to medications and microbial infections are increasing globally. To defend against these threats, the bacteria Nocardiopsis has been a source of intrigue due to its diverse applications in antimicrobial related research. Natural products from Nocardiopsis sp. can be the key to potential new antibiotic drugs. Alpha pyrones are an example of natural products

in a novel marine strain of Nocardiopsis sp. that potentially exhibit strong antimicrobial activity. In this project, Isolation and determination of five new alpha pyrone structures is in progress to test their potency against different strains of gram-negative and gram-positive bacteria in hopes of garnering new methods to combat the eminent threat of antimicrobial resistance.

Mentor: Dr. Amy Lane

25 Crystal Structure, Dielectric and Optical Properties of Aurivillius-type: Bi3-xLaxFe0.5Nb1.5O9

Amanda Jessel

Bi3-xLaxFe0.5Nb1.5O9 (from which x has a range from zero to one) was synthesized using conventional solid-state techniques and its crystal structure was refined by the Rietveld method using X-ray powder diffraction data. This mixed metal oxide presents an Aurivillius-type structure adopting an A21am orthorhombic lattice, in which the lattice parameters changed anisotropically with increasing x. Hypotheses include a phase change from orthorhombic to tetragonal above x equal to 1. Dielectric constant and loss show a tunable and increasing trend as x increases. The band gap energy was extrapolated spectrophotometrically using diffuse reflectance data as 2.3-2.32 eV, presenting a yellow color. Current research is focusing on an unknown orange discoloration in higher x values. Preliminary measurements indicate no photocatalytic activity at low x values, however, further studies will include determination of photocatalytic activity throughout the series. Further studies will also include determination of relative permittivity and resistivity as a function of temperature to indicate if there is a ferroelectric phase transition.

Mentor: Dr. Michael Lufaso

26 The Mask of Masculinity: Exploring Men's Emotions-Related Content on Tiktok

Ashley Smith, Desteny Shehata, LeTrenna Mosley, and Briggitte A. Chavez Falla

Research has established that societal norms have created expectations in regard to gender-role ideologies, specifically that of masculinity. The pressure to adhere to "masculine traits" has been shown to have an influence on how men perceive their emotions and seek support. However, little is known about the reactions to TikTok content related to men's emotions. We aimed to examine how the topic of men's emotions are received on TikTok. The data was collected using the following hashtags: #menwillbemen, #mensemotionsmatter, #menemotions, and #menhaveemotionstoo. The video metrics collected included likes and shares as well as whether the videos showed positive or negative content. Using a thematic analysis method, each video was then categorized by the following themes: educational, experiential, humor, and judgment. We hypothesized 1) that there would be more positive perceptions of men's mental health 2) that the majority of the posts would be in the form of educational content. The sample contained N = 140 videos; the top 35 videos that came up from the hashtags used. Using an independent sample t-test, the results did not support hypothesis 1 as the content portraying men's mental health negatively received more likes with an average of 78500.3542. However, the thematic analysis did support hypothesis 2 as the majority of the videos were in the form of educational content at 39%. Our study revealed that negative portrayals of men's mental health receive the most engagement on TikTok which lends to the lack of social and cultural acceptability of men's emotions.

Mentor: Dr. Tes Tuason

27 Parent Feeding and Preschooler Emotion Regulation: An fNIRS Study

Emma C. Queener, Lindsay Baker, Dr. Anita Fuglestad, and Dr. Katherine Hooper

During pre-school years, there is a shift from undereating to overeating in children which indicates factors such as parent feeding styles could be in play. Emotional eating, the act of eating in response to emotional arousal, may be one of several negative effects of more controlling parental feeding styles along with lack of emotional and behavioral regulation skills. The current study looks to investigate the relationship between parent feeding practices, pediatric emotional regulation, and emotional eating in 5-year-old children. In study one, we hypothesize that using food as a soothing tool will lead to lower emotional regulation and predict higher emotional eating rates. Mothers of the children will complete MTurk questionnaires to assess coercive control, regulation abilities, and emotional overeating to be later analyzed through correlations and mediation analysis. Study two will explore activity in the child's dorsolateral prefrontal cortex (DLPFC) during an emotion regulation task and in relation to previously

assessed parental feeding styles, regulation skills, and emotional eating. This activity will be measured through functional near-infrared spectroscopy (fNIRS), which measures oxygenated hemoglobin levels in the cerebral cortex of the brain. Higher oxygen levels show more localized activity in the respective brain region. We hypothesize that lower activation of the DLPFC, one of the main emotion regulation centers of the prefrontal cortex, will be correlated with higher coercive control and higher emotional overeating. Using questionnaire and fNIRS data, we will run correlations to determine the relationship between the DLPFC and emotion regulation, emotional eating, and parent feeding styles.

Mentors: Dr. Katherine Hooper and Dr. Anita Fuglestad

28 Green Legacy Farm: Addressing Food Insecurity and Community Outreach

Katie Jones

Green Legacy Farm is a local, sustainable farm that focuses on regenerative agriculture. Their goal is to take care of the planet while informing the public about the importance of organic farming and gardening. With my project, I am working to advance these initiatives and connect the farm to the local Jacksonville community. This will be accomplished through a farm box subscription service that aims to address food insecurity, as well as the introduction of several educational programs. These programs include organic gardening workshops, online courses, and more. The farm box subscription is an example of community-supported agriculture, and our proposed system will establish a circular economy. This is possible because we will create reusable, compostable materials that our customers will continue to use, and our farm will compost any waste in order to return nutrients back to our soil. As a result, this will benefit the community, the Earth, and Green Legacy Farm as a whole. In terms of operation, our farm box subscription service will have three modes of outreach: local farmers' markets, pop-up markets at our store location, and delivery services specifically in places that have limited access to healthy foods, also known as food deserts. In conclusion, this project is an example of how communities can come together to make a difference, solve a problem they are facing, and help the planet along the way.

Mentor: Kelly Rhoden

29 Composting Mentorship with Apple Rabbit Compost

Caterina Camp

The purpose of the Apple Rabbit and I's composting mentorship is to promote Tiffany's business by bringing in new customers and to educate anyone, through workshops, who are interested in composting. Our main goal is the advocating composting as a way to reduce food waste. To find people who may be interested, I made flyers as a call for participation. These flyers were posted on social media and emailed to students whose majors were relevant to composting. Tiffany and I set aside a month to find participants. Ultimately, we had four interested participants, all from different backgrounds. To begin, I created a survey to get to know our participants. Questions included how they would describe their diets, their home style, and what they wanted to learn about composting. Once the surveys were completed, Tiffany and I analyzed their responses to determine which composting method best suited their lifestyles. We hosted our first workshop, Introduction to Composting, to give participants the science behind composting. We wanted to ensure participants were well-equipped with the knowledge of composting before we sent them off to do it independently. From there, we would host individual composting method workshops to investigate the specific methods we assigned to participants more in-depth. Tiffany made composting bins with buy-in payments to promote her business. After the workshops, participants were given bins to begin their composting journeys at home. Results are yet to come. After a month, we will host a Drawbacks/Success stories workshop to hear about their journeys and aid them if they are struggling.

Mentor: Kelly Rhoden

30 Isoquant Quandary Quickly Quelled - a Query of the Quixotic Cobb-Douglas Production Functions

Elly Ben Simon

The Cobb-Douglas production function was used and tested by Charles Cobb and Paul Douglas between the years of 1927 and 1947. This function portrays the ratio between two or more inputs and their effect on output and productivity, ceteris paribus. The Cobb-Douglas production function is of the form P=ALaKb, where A, a, b are positive constants and the variables labor (L) and capital (K) are the inputs in question. Increasing, diminishing, and constant

returns to scale are defined and the conditions for a and b in each case are determined. Additionally, a general form of the function P = f(L, K) is examined along level curves to define the marginal product of labor, marginal product of capital, and the marginal rate of technical substitution. Using the data from the original research done by Cobb and Douglas in 1928, we analyze and test examples in order to break down and understand the production function and its relation to isoquants. Although the production function has important implications in several fields, we specifically discussed future research regarding using the production function to look at the overall health of society as an output and the factors that affect that as the inputs.

Mentor: Dr. Dennis Perusse

31 The Implications of Social Synchronization In the Development of Juvenile to Adult Gouldian Finches.

Gabriel Springer

In organisms that form complex social groups, becoming socially competent is a key indicator of survival and reproductive success. The ability to navigate interactions with multiple individuals and respond appropriately to cues and contingencies is essential for success in most social groups. This requires the ability to coordinate activities with others. Nonetheless, we know very little about the development of social coordination and its relationship with later measures of social competence. In this study we seek to investigate the developmental consequences of individual differences in social coordination. In birds, individuals often coordinate preening behaviors, by preening at the same time in close proximity. Here we use the Gouldian Finch – endangered Lady Gouldian finch from Australia – to investigate if early differences in preening coordination occurring after fledging predict the development of socially competent behavior and social network positions upon entering a larger flock, and during adulthood. Preening as a coordinated behavior provides the essential social promotion that birds need to live and move in flocks. A higher occurrence of coordinated preening amongst individuals in a flock often results in a more competent flock for group survival and reproductive success compared to a socially uncoordinated flock. The methods being used to investigate this, and present preliminary findings will be discussed.

Mentor: Dr. Gregory Kohn

32 Elementary Students Perceptions of Scientific Concepts after Exposure to Week-Long STEM Event

Sarina Starling, Dr. Elizabeth R. Brown, Dr. Kim Cheek, and Dr. Ryan Shamet

When students have educational experiences in science, they have more opportunities to develop a scientific interest (Schiefer et al., 2019). However, students attending Title 1 schools (40% or more of the students are from low-income households) tend to have fewer educational opportunities (Clayton, 2010). This study examined the impact of a week-long educational event for fourth and fifth-grade students. We examined students' understanding of scientific concepts and their beliefs about whether these concepts are important. There were forty fourth and fifth graders ranging in age from 8-11 that participated in the activity. They responded to four questions before and after learning about scientific concepts such as erosion, deposition, weathering, and the transferring of natural elements. The responses to these questions were coded under the categories of Understanding (how deeply the students understood the concepts), Explanation (how in-depth their responses were), Importance (if they expressed an importance in science or not), and Sources of Information (the type of knowledge they used to support their responses) by two trained independent coders. Disagreements were resolved through discussion. Analysis for this study is ongoing. The results from this study are important to know so that we can determine if implementing scientific education opportunities in Title 1 Schools influences the students' perceptions of science. Students who come from a background of poverty can attain higher-paying jobs through these educational advancements and, in turn, break the cycle of poverty within their communities.

Mentors: Dr. Elizabeth R. Brown, Dr. Kim Cheek, and Dr. Ryan Shamet

33 How Does the General Public View Alternative Healing Interventions?

Andrea Cadavid, Grace Cryderman, Maddox Fillmer, Andrew Lovelady, Sarah Roberts, and Dr. Tes Tuason

Existing literature suggests a positive correlation between engagement in alternative healing interventions and reported well-being. Alternative interventions include those related to expressive arts like painting, pottery,

and drawing, exercise such as yoga, cardio, and sports, and outdoor activities such as hiking, mountain biking, and gardening. The present study examined individual experiences of alternative healing interventions in relation to wellbeing as reported on sub-Reddit community boards. Using a One-Way ANOVA, we analyzed N = 108 posts whether there would be differences between the 3 categories of alternative healing interventions, art, exercise, and outdoor activities in the number of upvotes, likes, and comments. Results show that the 3 categories did not significantly differ. Although the quantitative data did not show significance, the qualitative data collected confirmed the importance of all researched alternative healing interventions as impactful to reported well-being. Using a phenomenological design as qualitative research methodology, we analyzed the common themes in each alternative healing intervention particularly what individuals found as positive benefits from each. Some common themes found in many of the alternative healing method subreddits included increased self-worth, relaxation, and an achieved sense of satisfaction. This information is significant to counseling, as future mental health professionals can use this data to potentially implement alternative healing methods in their clinical practice and with clients. In the future, the study could be expanded upon through the addition of a neutral healing method to be compared against the more well-established positive alternative healing methods discussed in the current study.

Mentor: Dr. Tes Tuason

34 Computational Methods for the Determination of Analytical Ground-State Solutions to the Heisenberg Hamiltonian

James Taintor, Avadh Saxena, and Dr. Jason Haraldsen

Using a combination of computing methods and a Heisenberg Hamiltonian, we can rapidly iterate and determine ground states for a â€Œlattice. One of the main problems identified in the development and research of spin waves is the calculation of ground states for a â€Œspin configuration of a lattice. There are currently very few methods to analytically solve for the ground state of a lattice without computing the solution manually. The goal of this program is to automate this labor-intensive process so spin wave researchers can spend less time computing equations. The program takes an input through a file that describes the characteristics of each unique site on the lattice. Once this data has been read, we can manipulate the equation using a combination of symbolic computation and iteration to visualize and generate analytical solutions for ground states of the lattice. Since interactions between unique sites are given, we can extrapolate sites outside of the â€Œlattice with the same interaction energy. This allows us to visualize the lattice past the data that was given to the program. This is a useful tool for anyone looking to see extrapolated patterns. In addition, the equations that we found for the lattice can then be combined and plotted to determine the validity of the analytical ground state. The ability of the program to rapidly iterate through lattice configurations should allow researchers to find and understand analytical solutions at a much faster rate.

Mentor: Dr. Jason Haraldsen

35 Head Start Educators' Sense of Self-Efficacy While Navigating the Pandemic

Katherine Herndon, Amanda Yelverton, and Bria Ferera

The Covid-19 pandemic has negatively impacted Head Start educators' best practices. The pandemic exacerbated stress in low socioeconomic populations through systemic disparities (Lipscomb, Chandler, Abshire, Jaramillo, & Kothari, 2022; Snyder, Hill, Lee, Crawford, & Orlowski. 2020; Walton, Campbell, & Blakey, 2021). The inability to address students' needs via these practices has compounded the lack of healthcare minority groups faced during the pandemic. This resource gap may lead to a decline in Head Start employees' feelings of self-efficacy. Feelings of low self-efficacy lead educators to believe that they contribute to poor outcomes in students (Derscheid et al., 2014; Duff & Issartel, 2019; Lipscomb et al., 2022). The current study investigates changes in best practices during the Covid-19 pandemic that impacted Head Start staff's self-efficacy. The primarily African-American female participants included 75 Head Start education and school staff. Data was self-reported through The Health Risk Assessment survey with demographics and health history. The Health Risk Assessment survey and CAN Teach questionnaire show a lower sense of self-efficacy in Head Start employees with high blood pressure compared to those with healthy blood pressure ($p<.05$). Age was also a significant factor in the Head Start educators' sense of self-efficacy ($p<.05$), however, there was no significance between an employee's weight and their ability to

implement best practices. Data shows a need to intervene for older Head Start educators and school staff, particularly those with health risks such as high blood pressure, during times of heightened stress.

Mentor: Dr. Dawn Witherspoon

36 Latinx Cultural Production: Combating Stereotypes that Criminalize Immigrants

Camila Porfilio

With the increasing politicization of social issues in the United States, and more and more people taking sides one way or another, polarization is at an all-time high. Due to this high degree of conflict, the criminalization and even demonization of immigrants in the United States is more prominent than ever, especially when it comes to immigrants from areas like Latin America. This has put recent immigrants, as well as others with roots in those areas, in danger of being harassed and attacked, as well as tarnished their collective reputation by labeling them “dangerous criminals” and, most infamously, “job thieves.” Through the analysis of the art produced by wo of the largest Latin American groups in the United States, Mexicans and Puerto Ricans, this project aims to investigate how Latin Americans have worked to challenge the stereotypes that surround them, as well as the specific effect their art has had on this perception. In looking at both visual arts and song lyrics, the goal is to understand how Latin Americans resist being pigeonholed into stereotypes that reduce them as people. Through creating this cultural production, immigrants and activist groups alike fight to change the narrative by drawing attention to a system that promotes freedom but exploits the needs of its people to do so.

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