FAU
FLORIDA ATLANTIC UNIVERSITY

12th Annual FAU Broward Student Research Symposium

Friday, November 18, 2022
9:00AM – 1:00pm
University/College Library
First Floor
Davie Campus

Program Overview

12 Years of Student Research Celebrated!

When the Broward Student Research Symposium began in 2010, the event organizers saw this event as a way to prepare students to pursue research professionally, teach them invaluable skills like academic perseverance, critical thinking and creative problem-solving, and inspire interdisciplinary projects and this endures today. The symposium provides an excellent opportunity for undergraduate and graduate students to showcase their research and creative endeavors to an audience of faculty, staff, community members, and student peers. The student presenters over the years including this one state that conducting research and this symposium is a valuable part of their student experience.

This event features research activities of FAU, Miami Dade College, Broward College, and Nova Southeastern University students and provides a forum for student interaction with faculty, peers and attendees while showcasing their work.

Students have selected one of the following three presentation formats:

- Narrated poster presentation
- 8-minute performance art piece
- 8-minute oral presentation

Thank you to the faculty mentors for going above and beyond the call of duty to support student research and creative scholarship at your institutions.

To our student presenters, thank you for sharing your in-depth understanding of the knowledge-making process and to better understand the world. Your research, active learning, and intellectual fitness and preparedness is apparent through your scholarship.

A special vote of thanks to the University/College Library administration and staff for hosting the symposium and supporting the event at every turn. Thank you to the all the FAU departments and staff who volunteered their time to prepare for and ensure the event was a success. Your efforts contributed substantially to the quality of the symposium and the effectiveness of the interchange was enhanced by your expertise, knowledge, support, and logistics.

12th Annual FAU Broward Student Research Symposium Agenda

8:30 AM -12:30 PM	On-going Registration
9:00 AM	Opening Remarks - Linda Johnson, Associate Vice President for Academic Affairs, Broward Campuses
9:15 AM – 10:45 AM	Doctoral & Masters Poster Presentations
9:30 AM – 11:30 AM	Oral Presentations
10:00 AM – 11:30 AM	Undergraduate Poster Presentations – Session 1
11:15 AM – 12:45 PM	Undergraduate Poster Presentations – Session 2

12th Annual FAU Broward Student Research Symposium Schedule

D1-D5: DOCTORAL Submissions

M1-M5: MASTER'S Submissions

U1-U24: UNDERGRADUATE Submissions

9:30 AM – 11:30 AM Doctoral, Masters, and Undergraduate Oral Presentations

U8: 9:30 AM Automatic Generation of Virtual Learning Environments using Generative Adversarial Neural Networks

Isaac Dash, idash2020@fau.edu, Undergraduate student, Department of Mathematical Sciences, Charles E. Schmidt College of Science, Mentor: Dr. William Hahn

Artificial Intelligence (AI) systems, particularly neural networks, learn from experience. This experience is typically in the form of labeled training data, such as categorized photographs. Recently, it has been shown that AI can learn directly from experience in simulated environments, such as video games. Here we present a new method for automatically generating simulated learning environments. First, we create a small number of levels by hand, and then we employ a novel technique to prepare the data to be fed into a Generative Adversarial Network(GAN). This GAN then automatically generates new virtual training environments similar to the ones generated by humans. We compare the performance of a virtual AI agent after training with the new, additional AI-generated levels versus human-generated levels alone. Finally, we show how the extra experience from the new simulated environments affects the generalized performance in previously unseen human-generated environments.

U24: 9:45 AM Teaching students basic control theory without calculus

Jonathan Pearson, jonathan.pearson001@mymdc.net, Undergraduate student, Department of Mathematics, Miami Dade College, Mentor: Dr. Manuel Carames

STEM education at higher levels becomes increasingly difficult as concepts like rates of change are taught over multiple years. While the inner complexities of differential equations would be difficult for an algebra student, exposure into these topics will providing an intuitive understanding of the principles of control theory. I was tasked with making a course with the goal of providing a window into a potential

future in STEM with control theory. This course attempts to tackle the problem of teaching control theory with minimal mathematics by utilizing programming libraries, discrete changes, and interactive models with MATLAB and Simulink.

D2: 10:00 AM Is that you, neighbor? Testing the Dear Enemy Effect in Bachman's Sparrows

Heather Wolverton, Hwolverton2013@fau.edu, Doctoral student, Department of Biology, college, Mentor: Dr. Rindy Anderson

In many species, males have to defend their mates and resources from rivals. However, constantly performing aggressive displays can be time-consuming and energetically costly, and not all conspecifics are a potential threat. For example, males with an established territory and mate typically do not pose a threat to resident birds (vs. non-neighbors seeking to establish a territory). Because of this, territorial species often act relatively less aggressively toward known neighbors. This phenomenon, the "Dear Enemy Effect" (DEE), requires a male to distinguish between neighbors and non-neighbors. Bachman's sparrows are highly territorial songbirds and use their songs as aggressive displays. I conducted a song playback experiment to test whether Bachman's sparrows differentiate between neighbors and non-neighbors, therefore demonstrating the DEE. While my analysis is pending, the answer to this foundational question will improve our understanding of songbird social communication and will provide direction in the next stages of my dissertation.

M3: 10:15 AM Examining the interaction of climate, morphology and behavior in the Bachman's sparrow.

Billy Abbott, wabbott2021@fau.edu, Masters student, Department of Environmental Science, Charles E. Schmidt College of Science, Mentor: Dr. Rindy Anderson

Exposure to increased heat has been shown to have detrimental sublethal effects on wildlife that can affect their health and success. Complicating this, in the subtropical climate of Florida, is humidity. As climate change persists, it is important to understand how shifting climatic variables are affecting organisms and their behavior. To explore this, I conducted experiments with male Bachman's sparrows (Peucaea aestivalis) during the hottest portion of their breeding season, at Jonathan Dickinson State Park in Hobe Sound, Florida. The intent is to gain a better understand how temperature and humidity affect territorial behavior, and if morphological features associated with thermoregulation (i.e., bills and legs) have the ability to buffer heat stress in these birds.

D4: 10:30 AM So you think you can sing? Investigating the social function and vocal complexity of complex song in a near-threatened oscine.

Hans Gonzembach, hgonzembach2020@fau.edu, Doctoral student, Department of Biological Sciences, Charles E. Schmidt College of Science, Mentor: Dr. Rindy Anderson

Animals maintain phenotypic features that signal their physical fitness and health. While much is known about how vocal performance of songbirds indicate individual fitness, minimal is known about how territorial males showcase these vocal athletics as a tactic of intimidation. Some species of songbirds also exhibit elaborate color patches on their wings, which has been related to individual fitness. Because wing epaulette coloration is an indicator of fitness, I have taken photographs of the epaulettes of Bachman's sparrows to assess for features of pronounce coloration. Complex songs have also been recorded from each male to measure complex acoustic features. Finally, I have measured various morphological features

of each male. By investigating the relationship between phenotypic features and song complexity, we can gain a holistic understanding of the multitude of factors that influence the development and maintenance of the functions of various acoustic signals in a population of songbirds.

D3: 10:45 AM What's there says how you'll fare: Taxonomic comparison of a songbirds microbiome community structure across multiple health parameters

Morgan Slevin, mslevin2018@fau.edu, Doctoral student, Department of Biological Sciences, Charles E. Schmidt College of Science, Mentor: Dr. Rindy Anderson

The natural bacterial communities living in different body cavities, an animal's microbiomes, can relate to important facets of host health including cognitive function, behavior, and stress response. Because relatively very little is known about these relationships in birds and other non-mammals, I sampled the microbiomes of wild Northern Cardinals (Cardinalis cardinalis) in Davie, FL. At last year's symposium, I presented data demonstrating how microbiome characteristics related to sexual ornamentation, stress, and body condition. Building on these encouraging preliminary results, I now present findings on how specific bacterial taxa vary in relative abundance between sex and age, and how abundances covary with ornamentation, stress, and body condition. This taxonomic-level analysis is the next step to using microbiomes to index wild animal population health, and to ameliorate stress and improve the health of animals in captive breeding and rehabilitation programs.

M4: 11:00 AM Development of a microfluidic device for exosome isolation in point-of-care settings

Natasha Ramnauth, nramnauth2017@fau.edu, Masters student, Department of Biological Sciences & Electrical Engineering and Computer Science Department, Charles E. Schmidt College of Science, Mentor: Dr. Waseem Asghar and Dr. David Binninger

Exosomes have gained recognition in cancer diagnostics and therapeutics. Most exosome isolation methods are time-consuming, costly and require bulky equipment, rendering them unsuitable for point-of-care (POC) settings. Microfluidics can be the key to solving these challenges. Here, we employ the development of a double filtration microfluidic device that can rapidly isolate exosomes in POC settings. The device can efficiently isolate exosomes from just 100uL of patient plasma within 50 minutes. The device was compared against polyethylene glycol (PEG) based precipitation, and findings show that both methods yield comparable exosome sizes and purity, but the device can detect exosomal miRNA earlier than PEG. Finally, a comparative analysis of membrane filters with exosomes collected from pore sizes 15nm and 30nm showed a similarity in exosome size and miRNA expressions, with one showing a significantly increased sample purity. These findings suggest that this device has potential in POC settings.

9:15 AM – 10:45 AM Doctoral & Masters Poster Presentations

D1: Dr. Adrienne Coleman's D-STEM Equity Model by Jacqueline Gordon

The poster presentation describes a proposed national-based, robust approach to racial and ethnic diversity in the STEM education to career pathway.

Jacqueline Gordon, jacquelinego2022@fau.edu, Doctoral student, Department of Education, College of Education, Mentor: Dr. David Kumar and Dr. Dilys Schoorman

As an advisor, I witness too many minority college students whose interest in STEM never convert to strong internship and job opportunities upon graduation. In helping combat such low participation in

STEM fields, this presentation focuses on Dr. Coleman's Diversifying STEM Equity Model. The model connects two studies; one that focuses on factors that motivate Black and Latino students to engage in STEM, the other on identifying and addressing issues related to the racial STEM divide; with the goal of informing diversifying the STEM education to career pathway. The studies included focus groups and interviews with 415 students, parents, educators, professionals, and organizations engaged in STEM. Eight major problems contributing to racial inequity in STEM were identified as well as five significant factors that motivate minority students to engage in STEM. The model is solution focused, incorporating the motivational factors identified in the study and emphasizing programming mandated by policy.

D5: Passive Pumping of a Point of Care Microfluidic Device For Detecting Viral Diseases

Sheikh Muhammad Asher Iqbal and Argyrios Agritis, siqbal2019@fau.edu; agritisa2017@fau.edu, Doctoral students, Department of Electrical Engineering, College of Engineering and Computer Science

Passive pumping of a microfluidic device to pump required reagents in the device. This involves the pumping of reagents without the need for any active pump. For this purpose, reservoirs and valves have been designed. Reagents from the reservoirs flow into their respective chambers without any significant mixing between reagents.

Passive pumping ensures a point-of-care device by not only reducing the power requirements but also by reducing the requirement of a required technician for disease diagnosis.

M2: Potential Role of Subventricular Zone Neurogenesis in the Treatment of Alzheimer's Disease

Hailee Sontag and Parsa Sartipi, Hailee Sontag-hsontag2017@fau.edu; Parsa Sartipi-psartipi2020@fau.edu, Masters students, Department of Biomedical Science, Charles E. Schmidt College of Medicine, Mentor: Dr. Howard Prentice and Dr. Jang-Yen Wu

The discovery of neurogenesis has opened novel potential treatment options for neurodegenerative diseases such as Alzheimer's Disease (AD). Neurogenesis is best described in two parts of the brain: the sub-granular zone (SGZ) of the hippocampus and the subventricular zone (SVZ) of the lateral ventricles. In order to understand the role that newly differentiated neurons might contribute to the prevention of disease progression, it is crucial to understand the brain regions involved in the neurogenesis and the regions that potentially acquire the migrating neurons.

The newly generated neurons of the hippocampus potentially play an important role in regulating mood, cognition, and learning. In contrast, new neurons of the SVZ contribute to optimal olfactory circuit formation in rodents via the rostral migratory stream (RMS). The new neurons of the olfactory bulb allow for more adaptation to new senses of smell for rodents. A similar proliferation of the stem cells in the SVZ is seen in non-human primates and in humans. We hypothesize that the new neurons of the SVZ migrate to different brain regions.

Further research in rodents has shown new neurons in other brain regions, such as the striatum, substantia nigra, and amygdala, but the origin of these neurons has not been established. There is some evidence that these neurons potentially arise from SVZ. However, a number of studies indicate that neuronal precursors can be found in several brain regions including hypothalamus, striatum, substantia nigra, cortex and amygdala.

This project aims to determine the presence of neurogenesis at the SVZ in the AD mice model. Additionally, we will identify brain regions that may inherit the migrating neurons from the SVZ by analyzing BrdU+ cells. If proven to be accurate, the potential for further research on the stimulation of these pathways could be conducted in order to aid in therapeutic intervention for neurodegenerative diseases such as Alzheimer's disease.

M1: Utilizing Facial Recognition Software to Identify Hybrid Cercopithecus Monkeys within a Five-Year Photo Collection

Kayla Ahlness, kahlness2020@fau.edu, Masters student, Department of Biology, Charles E. Schmidt College of Science, Mentor: Dr. Kate Detwiler

Population monitoring, group member identification and the cultivation of an accurate life history profile is crucial in documenting population trends for wildlife species. An experienced field researcher is capable of tracking known individuals with high success, however visiting researchers or novice field assistants are not able to reliably identify individuals. Recent studies have implemented Artificial Intelligence (A.I.) to automate individual identifications, thus providing researchers with a new tool to build life history profiles of wild animals. This project utilizes an originally built A.I. facial recognition software to identify study individuals in a photographic collection (2015-2019) of two Cercopithecus species and their hybrids (n = 896 photos). We defined an identification as correct if the A.I. yielded a 98.0-100% accuracy score. We identified 55 unique monkeys from 61 A.I. profiles in the 5-year photo collection, confirming that the A.I. can identify individuals and be a reliable tool for monitoring individuals overtime.

M5: How Video Playback Speed is Associated with Inhibitory Control

Kayla Cowman, Emily Ahne, and Josh Conniff, kcowman2018@fau.edu; eahne2014@fau.edu; jconniff@my.fau.edu, Masters students, Department of Psychology, Charles E. Schmidt College of Science, Mentor: Dr. Monica Rosselli

The COVID-19 pandemic impacted the college learning environment with more lectures presented in recorded video format, allowing students the opportunity to manipulate video playback speed. The aim of the current proposal is to examine how selection of video playback speeds impact students' level of impulse control. Here, we will test approximately 100 college students to see how manipulating video playback speed is related to inhibitory control in adults. This proposed project will include four cognitive assessments of attention and inhibitory control (Paper Stroop, Visual Simon, Go/No-Go, Stop-Signal Task). Then, participants will watch two pre-recorded videos of experimenters reading a psychological research article and a passage from a fictional story (Alice in Wonderland). We expect that those with low impulse control will increase playback speed compared to individuals with high impulse control. We hope the results from this study will be beneficial towards the learning environment for the adult students.

M4: Development of a microfluidic device for exosome isolation in point-of-care settings

Natasha Ramnauth and Elise Neubarth, nramnauth2017@fau.edu; eneubarth2015@fau.edu, Masters students, Department of Biological Sciences & Electrical Engineering and Computer Science Department, Charles E. Schmidt College of Science, Mentor: Dr. Waseem Asghar and Dr. David Binninger

Exosomes have gained recognition in cancer diagnostics and therapeutics. Most exosome isolation methods are time-consuming, costly and require bulky equipment, rendering them unsuitable for point-

of-care (POC) settings. Microfluidics can be the key to solving these challenges. Here, we employ the development of a double filtration microfluidic device that can rapidly isolate exosomes in POC settings. The device can efficiently isolate exosomes from just 100uL of patient plasma within 50 minutes. The device was compared against polyethylene glycol (PEG) based precipitation, and findings show that both methods yield comparable exosome sizes and purity, but the device can detect exosomal miRNA earlier than PEG. Finally, a comparative analysis of membrane filters with exosomes collected from pore sizes 15nm and 30nm showed a similarity in exosome size and miRNA expressions, with one showing a significantly increased sample purity. These findings suggest that this device has potential in POC settings.

10:00 AM – 11:30 AM Undergraduate Poster Presentations – Session 1

U5: Introducing a geospatial curriculum to schools in low income areas.

Andreina Blanco, blana87@mail.broward.edu, Undergraduate student, Department of Social Behavioral Sciences and Human Services, Broward College

This poster will highlight how low-income schools in Broward County have the opportunity to introduce their elementary students to a geospatial curriculum. Through free year-long access to ESRI ArcGIS Online, the skill of geographic information systems (GIS) can become a vital tool for teaching and learning at the elementary school level. From promoting student engagement in the classroom to supporting projects that get students involved in their community, the introduction of GIS can allow students at an early age to begin thinking spatially. Maps and data provide a deeper understanding of many topics on multiple scales, and a knowledge of GIS provides a skill that will benefit students as young as first grade and will provide a valuable skill to grow through middle and high school.

U9: Using equity analysis to visualize Black-owned businesses in Fort Lauderdale, Florida.

Xiomara Kerr, kerrx@mail.broward.edu, Undergraduate student, Department of Social Behavioral Sciences and Human Services, Broward College

This poster will highlight Black-owned businesses in the city of Fort Lauderdale, Florida. While much work has been done in recent years to highlight Black-owned businesses from an entrepreneurial perspective, this work uses ESRI ArcGIS spatial analysis tools, specifically the social equity analysis index and the enrich tool. The ESRI ArcGIS social equity analysis solution can offer insights into community characteristics, analyze community conditions and actions, and generate an equity index that can be used to educate internal and external stakeholders. Equity analysts can then adjust the analysis to focus on a focus variable to ensure the condition which is being analyzed is equitable. The term "equity analysis index" references the map produced when comparing the condition rate and community characteristics map coincide to see where need is highest and lowest relative to other reporting areas.

U14: Urban Sharks - The effects of human induced stressors on the ecology of sharks occupying urbanized landscapes.

Christina Horvath, horvc5@mail.broward.edu, Undergraduate student, Department of Social Behavioral Sciences and Human Resources, Broward College

This poster will highlight recent work by University of Miami (UM) scientists on urban sharks in the city of Miami, Florida. Given numerous factors attributed to this coastal metropolis, researchers point out that sharks would be expected to avoid areas close to the city- but tracking of the movements of three shark

species, bull, nurse and great hammerhead, in relation to Miami, informs otherwise. The presence of these shark species identified as "urban exploiters" may have consequences for both sharks and humans. This poster will further illustrate these patterns using geographic information systems to offer a spatial visualization of this emerging marine issue.

U6: Exploring the Escalating Fentanyl Crisis In Broward County, Florida. From the years

Jamie Arguello-Lupera, arguj23@mail.broward.edu, Undergraduate student, Department of Social Behavioral Sciences and Human Services, Broward College

This poster will demonstrate the fentanyl increase in Broward County, Florida. It offers an examination of the escalating fentanyl crisis in Florida from 2017-2022, during which time there has been a 700 percent increase in fentanyl-related overdoses, with a focus on providing a visualization of the epidemic in Broward County. In the United States, drug overdose is the leading cause of accidental deaths, with opioid addiction driving the epidemic and the United States is experiencing an opioid epidemic like never before leading the federal government to declare the opioid crisis a public health emergency. Geographic information systems (GIS) and spatial analysis have become the number one tools in understanding and responding to the opioid crisis. Understanding the geography of the crisis in real time is critical to effectively deploying resources, analyzing prescription patterns and exploring ways to create a community driven response.

U3: Use of spatial tools as a new approach to examining beach aptitude and public policy in South Florida.

Benjamin Giczy, giczb@mail.Broward.edu, Undergraduate student, Department of Geosciences, Broward College

This poster will highlight spatial tools such as ArcGIS Survey 123 as a new approach to examining beach aptitude in South Florida. Additional geographic information systems (GIS) tools will be showcased that can be used such as interactive maps and dashboards.

While there has been extensive discussion into both public policy and beach aptitude in South Florida, there is a void in geographic visualization in this arena as well as constantly evolving tools that can be utilized for public participation. This poster will highlight ways that GIS tools can engage the public in data collection and inform both policy makers and the local community.

U15: Ethnic grocery stores as a measure of health for diverse neighborhoods: A spatial analysis of Hollywood Florida

Ashley Dorvilus, dorva12@mail.broward.edu, Undergraduate student, Department of Social Behavioral Sciences and Human Services, Broward College

This poster will illustrate ethnic grocery stores and food markets in the city of Hollywood, Florida as a measure of health for diverse neighborhoods, using geographic information systems (GIS). Food is personal and often ethnically specific. Using GIS, this poster will present a visualization of all grocers in the city of Hollywood, while highlighting ethnic grocers. Using ESRI ArcGIS spatial analysis tools, specifically the social equity analysis index and the enrich tool, this work serves to demonstrate how cultural food security and community health are potentially intertwined. The ESRI ArcGIS social equity

analysis solution can offer insights into community characteristics, analyze community conditions, and generate an equity index that speaks directly to community health.

U2: Spatial Analysis of the Potential for the Increase in Localized Renewable Energy Farms in Florida

Gabriel Valensin, valeg29@mail.broward.edu, Undergraduate student, Department of Geosciences, Broward College

This poster will highlight the potential for future growth in the renewable resource industry. It will represent elements of research done towards land availability needed to place a renewable resource farm in the state of Florida, as well as the research done towards the conditions required for renewable resource farms to thrive. The project will allow the general public to visualize Florida's probability to convert itself into a eco-friendly state in terms of energy usage and reduced carbon emissions from fuel sources.

From this poster, the viewer will gain the necessary knowledge required to predict future trends in the rise of renewable power due to the lack of abundance of land availability. It will also present a picture of Florida's potential to shift to an eco-friendly state versus the idea that the state is doomed to forever use carbon emitting resources.

U22: Foraging gene influence on Drosophila melanogaster ethanol preference and activity

Joshua Pearson Davis, joshuadavis2015@fau.edu, Undergraduate student, Department of Biological Sciences & Psychology, Charles E. Schmidt College of Science, Mentor: Dr. Jennifer Krill

The foraging gene in the fruit fly Drosophila melanogaster is defined by the lower PKG "sitter" variants that tend to stay with an initial food source, and the higher PKG "rovers" that are inclined to roam while foraging. Foraging variants have also been associated with other behavioral and physiological differences, including ethanol-cued feeding behaviors. This project aims to validate suggestions that sitters prefer ethanol-based food options compared to rovers by measuring liquid food consumption with the CAFE assay. Additionally, three adjacent Trikinetics DAM2 systems record the positional activity of individual flies in relation to solid food options in order to examine locomotor response to close proximity to ethanol in relation to their ethanol consumption preference predisposition. The foraging gene ortholog in humans has been previously associated with alcohol misuse, and results in the fly may provide further insight into the mechanisms of alcohol-influenced behaviors.

U16: Cultural fairness in neurocognitive testing of older Haitians adults.

Daniela Baptiste, Marisenele Eloi-Alexis, Marie Tamara Adonis-Rizzo, and Joshua Conniff, dbaptiste2019@fau.edu; eloim2019@fau.edu; madonis@health.fau.edu; jconniff@my.fau.edu, Undergraduate students, Department of Psychology, Charles E. Schmidt College of Science, Mentors: Dr. Monica Rosselli, Dr. Ruth Tappen and Dr. David Newman

A culturally diverse sample including older Haitian adults (65 Years or older) will be recruited from communities in South Florida to participate in an NIH research project with a multidisciplinary FAU team aiming to detect Cognitive Changes in Older Adults using vehicle sensors. Participants will undergo a series of neurocognitive and clinical diagnostic tests. The recorded changes in drivers' behavior will be compared to results from the battery of cognitive tests (global cognition, executive function, memory, visuospatial, visual attention, and language) with demonstrated ability to detect early cognitive changes.

Currently, there are no validated neurocognitive measures translated into Creole nor any normative data established for this group of older adults who are linguistically and ethnically different. Thus, we are proposing translating and adapting test items in creole to achieve cultural fairness for Haitian participants.

U23: Assisted Driving Head Tracking Module

Felipe Rodas, felipe.rodas001@mymdc.net, Undergraduate student, Department Mathematics, Miami Dade College, Mentor: Dr. Manuel Carames

The purpose of this study is to develop and test the viability of a robot that will assist delivery drivers in visually acquiring important contextual delivery information, such as: house numbers or building numbers, in unfavorable conditions such as night or heavy rain.

The system uses head tracking technology and a multidirectional robot that can be easily attached to the roof of a vehicle. The multidirectional robot could be outfitted with many different attachments depending on the requirements of the operator. Such as multidirectional illumination on unfavorable conditions, enhanced vision, night vision, optical zoom or personal safety.

The efficacy of the module and different attachments will be tested in the lab and in the real world by having drivers read signs under unfavorable illuminated conditions. First with and after without the aid of the module.

U7: The Effects of Heat Shock Protein Expression on D. melanogaster with Malignant Tumors

Saachi Mody, smody2019@fau.edu, Undergraduate student, Harriet L. Wilkes Honors College, Mentor: Dr. Jennifer Krill

Upon experiencing a stress event, such as anoxia or oxidative stress, organisms like humans and Drosophila melanogaster produce heat shock proteins (HSPs), which assist in maintenance of cellular homeostasis. The expression of HSPs near tumors often indicates resistance to cancer treatments. While HSPs have been correlated to decreases in tumor treatment effectiveness, research observing HSPs rarely focus on understanding their influence on cancer resistance. The effects of HSPs on tumor size were observed through genetic crosses aimed to create tumors in D. melanogaster and subsequent heat shock to induce HSP expression. Although experimentation has not concluded, initial results reveal that D. melanogaster samples with HSP overexpression had larger tumors than samples with maintained HSP levels. Based on these results, regulation of heat shock proteins is a viable mechanism for tumor reduction and has potential to be developed as a therapeutic treatment to decrease tumor size and resistance prior to chemotherapy.

U1: Disulfiram Metabolites & Sulindac: Two Potential Therapeutics For Alzheimer's Disease

Daniel Gerguis and Anthony Dawod, dgerguis2020@fau.edu; adawod2021@fau.edu, Undergraduate student, Department of Biology, Charles E. Schmidt College of Science, Mentor: Dr. Howard Prentice

Alzheimer's disease is a neurodegenerative disorder that predominantly affects senior citizens causing the eradication of memory and thinking skills. Early signs of Alzheimer’s cause damage to the hippocampus and entorhinal cortex. Current FDA-approved medications such as donepezil, rivastigmine, and galantamine can help mitigate the effects of mild Alzheimer's symptoms and regulate neurotransmitters; however, those medications do not completely cure the disease. Furthermore, neurodegenerative

diseases are implicated with neuronal over-excitation via glutamate receptors in addition to oxidative stress and calcium overload. Sulindac, a non-steroidal anti-inflammatory medication, contributes to decreasing oxidative stress and induces pro-survival signaling in models of tissue ischemia and neuronal overexcitation. Carbamathione, a glutamate receptor partial antagonist, is protective against excitotoxicity through downregulating ER stress and mitochondrial stress. The current studies address the effects on maintaining neuronal cell viability and examine the mechanisms of carbamathione and sulindac mediated neuroprotection using disease models of neuronal excitotoxicity.

U4: Differential DNA methylation profiles of Vitamin C related genes in individuals with and without chronic pain

Karelys Daphne Montanez, km2766@mynsu.nova.edu, Undergraduate student, Department of Psychology, Nova Southeastern University, Mentor: Dr. Yenisel Cruz-Almeida

Epigenetic modifications have been discovered to impact our body's health outcomes and are associated with varying nutrients, such as Vitamin C. The purpose of this study was to explore the epigenetic landscape of immune-related genes known to be regulated by Vitamin C in individuals with and without chronic pain. The current study is part of a larger investigation in 177 participants with and without chronic pain. Participants self-reported pain intensity and pain-related interference from the Graded Chronic Pain Scale. There were significant differences in self-reported pain intensity and pain-related interference between groups ($p<0.05$). There were differences in DNA methylation between the groups in genes that code for proteins related to immune system function, which has been implicated in the pain experience. Future research includes observing the Vitamin C levels and gene expression in order to determine if vitamin C is an effective therapeutic target for chronic pain.

11:15 AM – 12:45 PM Undergraduate Poster Presentations – Session 2

U11: Preparation of PLGA-Nanoparticles Encapsulating Sulindac

Simon Geneste, sgeneste2019@fau.edu, Undergraduate student, Department of Biology, Charles E. Schmidt College of Science, Mentor: Dr. Shailaja Allani

Sulindac, FDA-approved NSAID protects normal cells undergoing oxidative stress but kills cancer cells in the presence oxidative stress. The goal of the research is to prepare poly-lacto-glycolic-acid (PLGA) nanoparticles encapsulating sulindac so they will eventually be able to cross the blood-brain barrier to help with the treatment of neurodegenerative diseases. Currently, we are still in the early developmental phases of preparing the nanoparticle with the encapsulation of the drug using a single emulsion solvent method. For future experiments we plan to include calculating encapsulation efficiency, characterizing of the nanoparticle properties, and testing drug delivery. Characterization of nanoparticles will involve the use of Diffraction light scattering, High pressure/performance liquid chromatography, and electron microscopy to help determine size, stability, and encapsulation efficiency.

U21: Exploring the Role of MUC-Type O-Glycosylation in Alzheimer's Disease

Gustavo Mundim, gmundim2020@fau.edu, Undergraduate student, Department of Chemistry and Biochemistry, Charles E. Schmidt College of Science, Mentor: Dr. Mare Cudic

Evidence supports the idea that deficiencies in amyloid-Î² precursor protein (APP) clearance of AÎ² peptides is the initiating event of Alzheimer's Disease (AD) pathogenic processes. Efforts to understand

the proteolytic cleavage of APP by Î±-, Î²-, and Î³-secretases have sparked interest in the role of O-glycosylation in AÎ² processing. Therefore, we have synthesized native and Swedish-mutated (glyco)peptides incorporating the Î²-secretase and/or Î±-secretase cleavage sites, with O-GalNAc moiety on Tyr681, Thr663 and/or Ser667 to explore the role of glycosylation on conformation, secretase activity, and aggregation kinetics of AÎ²40. CD analysis demonstrated that Swedish mutation and O-glycosylation were the key factors driving conformational changes. Furthermore, atomic force microscopy revealed glycopeptides impact the kinetics of AÎ²40 aggregation by significantly increasing the lag phase and delaying aggregation onset, however, this effect is less pronounced for its Swedish-mutated counterparts. Lastly, Î²-secretase activity significantly increases for the Swedish-mutated glycopeptides compared to their nonglycosylated and native counterparts.

U20: Overexpression of a Halophytic Plant Gene SeNN24 to Improve Salt Tolerance in Crop Plants

Liah Brussolo Cremona, Marcos Klingler and Annalise Wellman, lcremona2017@fau.edu; mklingler2020@fau.edu; awellman2019@fau.edu, Undergraduate student, Department of Biological Sciences, Charles E. Schmidt College of Science, Mentor: Dr. Xing-Hai Zhang

Salinity is an abiotic stress which has a significant impact on agriculture, affecting the ability to provide sufficient food supply for a human population of nearly 8 billion. It affects more than 20% of farmland, which is about $12 billion of the United States economy. In this study, SeNN24, a gene from Salicornia europaea was used in various tobacco samples, each with either a root promoter or a promoter expressed tissue wide. Leaf samples of each genotype were then tested in 0.0M NaCl, 0.6M NaCl and seawater. Measurements of chlorophyll were taken and compared with the wildtype (control group) across the different ranges of salt concentrations. The results showed that samples expressing SeNN24 had higher average total chlorophyll concentrations, showing that SeNN24 confers salt tolerance. Further research would be beneficial to test expression of SeNN24 in other crop plants such as rice, tomato, and strawberry.

U19: The integration of Salicylic Acid into Antibacterial Cyclic Lipopeptide

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Project focuses on integration of salicylic acid into an active six-member cyclic lipopeptide, CLP-4, that is derived from the naturally occurring peptide antibiotic fusaricidin A. We have demonstrated that CLP-4 has the potential to inhibit and eradicate planktonic and biofilm bacteria. We hypothesize that incorporation of salicylic acid into CLP-4 will additionally improve its antibacterial activity, especially activity against bacterial biofilms. Our hypothesis is based on the literature reports demonstrating that salicylic acid inhibits bacterial growth and biofilm formation. An analogue of CLP-4 containing salicylic acid was synthesized using solid phase peptide synthetic approach and fully characterized using High Performance Liquid Chromatography (HPLC) and Matrix Assisted Laser Desorption Ionization (MALDI) TOF mass spectrometry. Peptide was purified using Solid-Phase Extraction (SPE) procedure and is currently undergoing evaluation for its antibacterial and antibiofilm activities.

U17: Monitoring MMP-2, -9, -14 Expression Levels in Primary vs. Metastatic Cancer Cell Lines Under Normoxic and Hypoxic Conditions

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M Pancreatic cancers are among the most difficult cancers to treat with a median 5-year survival rate of 9%. Disease etiology is associated with the expression of matrix metalloproteinase-14 (MMP-14). This proteolytic enzyme is associated with proliferation, migration, angiogenesis, and collagen turnover, all associated with a malignant profile. Much of these known characteristics of MMP-14 are affiliated with its extracellular expression; however, recent studies have suggested a non-proteolytic intracellular role that has yet to be fully characterized. One such function not involving proteolytic processing is cellular oxygenation levels. Pancreatic cancers are well known to have hypoxic niches; these niches can lead to inflammation resulting in angiogenesis. In this study, we quantitatively delineate the expression of extracellular/intracellular MMP-14 on two human pancreatic cell lines: using flow cytometry and demonstrate data suggesting high MMP-14 expression is associated with increased sensitivity to hypoxia.

U18: CEO Compensation and Quality Outcomes: Exploring Trade-offs in U.S. Non-Profit Hospitals

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Hospital chief executive officers (CEOs) can set the agenda for improved organizational

performance. However, little is known about the link between their compensation and hospitals' quality performance. We aim to examine the association between CEO compensation and hospital quality. Our 2019 data includes 1,231 U.S. nonprofit hospital CEOs. Utilizing linear regression, we identify hospital structural characteristics associated with CEO compensation. We then determine the degree to which a hospital's performance on financial and quality metrics were associated with CEO compensation.

CEOs' mean compensation was $640,521. CEO pay was associated with the number of hospital-staffed beds overseen ($680 for each additional bed), teaching status ($521,425 more at major teaching hospitals), and urban location. Hospitals with high patient satisfaction compensated their CEOs $61,206 more than those with low patient satisfaction (P = .006). We found higher 30-day hospital-wide readmission rates and 30-day CABG hospital mortality rate associated with higher CEO compensation.

U12: The Influence of Bacterial Diet on C. elegans Lifespan

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Caenorhabditis elegans is a free-living nematode and important model organism for aging research. The organism's diet is usually based on various Escherichia coli strains that have different nutritional values. Dietary composition determines the overall health and lifespan of C. elegans. Dietary restriction slows down aging and progression of age-related human diseases. It remains elusive how different diets affect aging at the molecular level. DCAR-1, a G protein-coupled receptor, is likely involved in sensing bacterial food and transducing food signals. We examined how different E. Coli food affects the lifespan of wildtype C. elegans and dcar-1 mutants. The lifespan of dcar-1 mutants is significantly influenced by different bacterial diets compared to wildtype worms. Mutation of such genes compromises the

nematode's ability to detect food, and therefore affects lifespan. Our data confirms the role of DCAR-1 in food signaling, which contributes to the understanding of the effects of dietary restriction on aging.

U10: Mental health has always been a struggle for university students throughout the World. The current researcher has decided to pursue university-based research on the Florida Atlantic University Boca Raton Campus for residential students who took online classes during the pandemic.

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Mental health has always been a struggle for university students throughout the World. While a significant percentage of teenagers and adults under the age of twenty-five could be somewhat safe from the severity of the virus, the increased risk of mental health issues in which physical and social restraint has been placed on a myriad of societies around the world (France, Hancock, Stack, Serbin, & Hollenstein, 2021). The current researcher has decided to pursue university-based research on the Florida Atlantic University Boca Raton Campus for residential students who took online classes during the pandemic. The patient health questionnaire (PHQ-9) was active on survey monkey from October 26, 2021, to February 24, 2022, ranging from one hundred- nineteen days. During this period, one hundred and sixty-nine students responded to the questionnaire.The survey indicated a myriad of ways a student deals with stress using both healthy and unhealthy methods, such as meditation, exercise, drinking alcohol and smoking marijuana. The statistics obtained from the PHQ-9 scale show that the students had varying responses to the nine scenarios asked by selecting one answer to each prompt, not at all, several days, more than half of the days, and almost every day. The majority of the students chose several days or more than half of the days. The results of this study may create awareness regarding student mental health and aid students undergoing depressive episodes during their university life.

U13: Testing for effects of anthropogenic noise on social behavior in a songbird.

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Urbanization presents novel challenges that affect the survival and reproductive success of wild animals. We studied how playbacks of traffic noise impacted social behaviors in captive groups of zebra finches, a songbird. Our experiment tested the hypothesis that traffic noise negatively affects finch social behavior by disrupting vocal communication, interfering with the birds' normal activity budget, and increasing agonistic behaviors due to stress. We quantified rates and durations of behaviors from video recordings taken before, during, and after playbacks of moderate levels of traffic noise. We found statistically significant changes in behavior during noise exposure when compared to pre- and post-noise periods. Our study contributes to a broader understanding of how urbanization affects the survival and reproduction of animals in urban environments.