

# 14<sup>th</sup> Annual FAU Broward Student Research Showcase



FLORIDA ATLANTIC UNIVERSITY  
Broward Campuses

## BROWARD RESEARCH SHOWCASE 2024

Celebrate the creativity and hard work of our student scholars as they present their research and creative projects at the 14th Annual Broward Research Showcase! Stroll through innovative posters and projects or listen in on a spectacular presentation.

*Friday*  
**OCTOBER 25**  
10:00 AM - 1:00 PM  
FAU DAVIE CAMPUS

Friday, October 25, 2024  
10:00 am – 1:00 pm  
Liberal Arts Building, First Floor  
Davie Campus  
Email: [browardsymposium@fau.edu](mailto:browardsymposium@fau.edu)



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## Program Overview

### **Celebrating 14 Years of Student Research!**

Since its inception in 2010, the Broward Student Research Showcase has aimed to prepare students for professional research careers while fostering essential skills like academic perseverance, critical thinking, and creative problem-solving. This symposium continues to inspire interdisciplinary projects and offers undergraduate and graduate students a platform to showcase their research and creative endeavors to an audience of faculty, staff, community members, and peers.

The event highlights research activities from students at Florida Atlantic University, Broward College, and Nova Southeastern University, promoting interaction among students, faculty, and attendees. Presenters have chosen one of two formats: a narrated poster presentation or an 8-minute oral presentation.

### **Submission Statistics for the 2024 Broward Student Research Showcase**

This year's Broward Student Research Showcase featured an impressive array of submissions, showcasing the talent and dedication of students from various institutions. Here's a breakdown of the statistics:

- **Total Submissions:** 45 (14 group submissions)
- **Participating Institutions:**
  - Florida Atlantic University: 29
  - Broward College: 11
  - Nova Southeastern University: 5
- **Presentation Formats:**
  - Oral Presenters: 15
  - Poster Presenters: 30
- **Academic Levels:**
  - Doctoral Students: 8
  - Masters Students: 9
  - Undergraduate Students: 28
- **Total Participants (including group members):** 62

### **Acknowledgments**

A heartfelt thank you to the faculty mentors who support student research and creative scholarship. Your dedication is invaluable in guiding students through the knowledge-making process and enhancing their academic experience.

We also extend our gratitude to all FAU departments and staff who volunteered their time to ensure the event's success. Your contributions significantly enhanced the symposium's quality and facilitated meaningful exchanges among participants.

Thank you to all student presenters for sharing your research and showcasing your intellectual growth. Your efforts exemplify the spirit of inquiry and active learning that define this remarkable event.

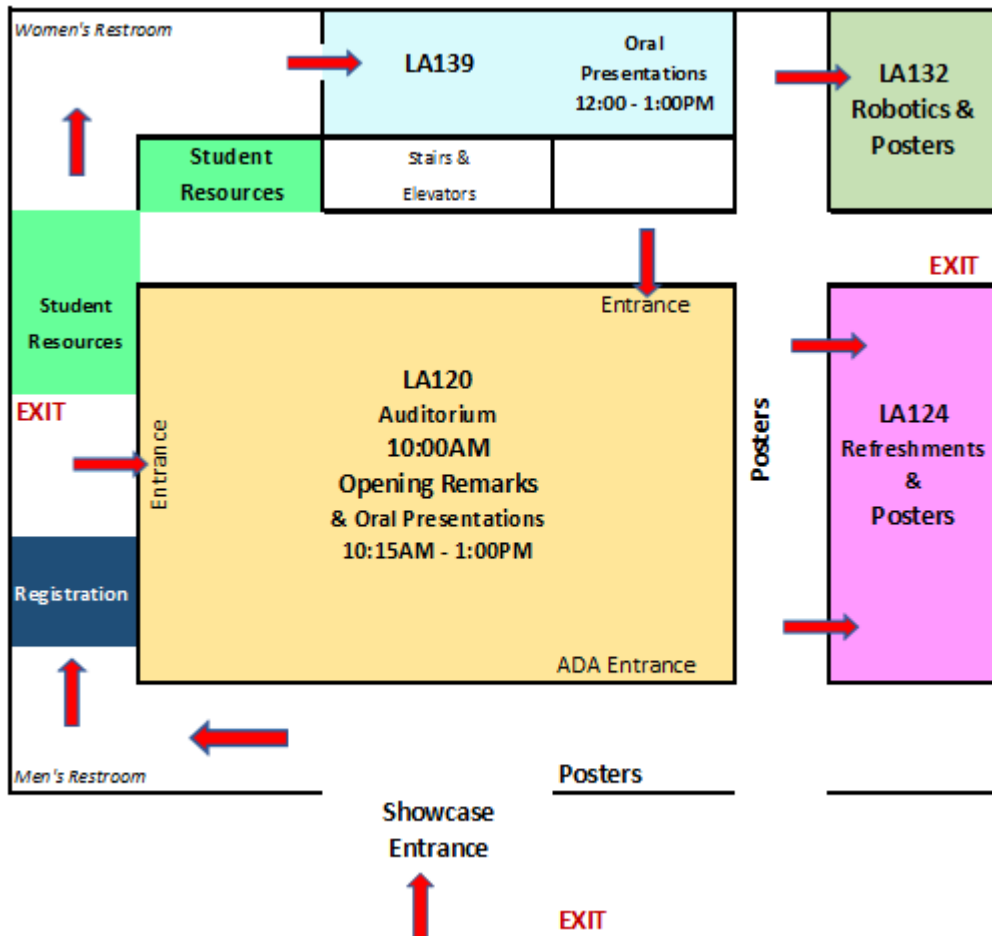
## Agenda

- 9:15 AM – 12:00 PM      On-going Registration *in the breezeway*
- 10:00 AM – 10:15 AM    Opening Remarks – Dr. Colin Polsky, Associate Vice President for Academic Affairs, Broward Campuses, *in the auditorium room LA 120*
- 10:15 AM – 1:00 PM      Oral Presentations *in the auditorium room LA 120 & room LA 139*
- 10:30 AM – 1:00 PM      Poster Presentations *in rooms LA 124, LA 132 and along the hallways*

FAU student resources including Transfer Admissions, Career Center, Graduate College, Office of Undergraduate Research and Inquiry, Department of Biology, Florida Public Archaeology Network, and the FAU Sustainability Club are located in and near the breezeway.

FAU Robotics and College of Education are located in room LA 132.

Refreshments are located in room LA 124.





## Oral Presentations

### **D1: 10:15 AM Impact of COVID-19 on Dual Enrollment**

*The Impact of COVID-19 on Dual Enrollment Including Access, Equity, and Learning Environment: Lessons Learned from the Secondary and Post-Secondary School Staff and Administrators Who Facilitate These Programs*

Adam DeRosa, [aderosa@fau.edu](mailto:aderosa@fau.edu), Doctoral Student, College of Education, Educational Leadership and Research Methodology, Florida Atlantic University

While students are the center of dual enrollment programs, high school guidance counselors and college/university administrators are vital to the success of these programs. COVID-19 has impacted both secondary and post-secondary school systems. Since dual enrollment is a formal bridge program between these systems, the pandemic may have long-term effects on access, equity, and learning environment. This study focused on the perspectives of educational leaders in Broward County, Florida who oversee dual enrollment programs. This study found out what worked, what did not work, and the lessons learned. The findings included access to internet and equipment was a challenge; navigating web tools and services wasn't intuitive to all; quality of instruction dwindled; communication barriers presented a challenge, and many rose to that challenge; the dual enrollment application process presented challenges to staff and students; and everyone had to adapt and overcome placement testing changes at the onset of the pandemic.

### **U1: 10:30 AM Interaction of male loneliness and pornography**

*Male Loneliness and Pornography: A Little-known Problem with Major Implications*

Brendan Sestito, [bsestito2022@fau.edu](mailto:bsestito2022@fau.edu), Undergraduate student, Charles E. Schmidt College of Science, Psychology, Florida Atlantic University, Mentor: Gary Perry

The contemporary issue of male loneliness is sparsely discussed; yet it continues to increase dramatically. While this has acquired the attention of the mental health community, very little has been done to address such a complicated issue. To make matters worse, and because of the convenient access to the internet, pornography usage is widespread among young and lonely men. Similar to male loneliness, the topic of pornography's harmful effects on an individual's physical and mental health is also rarely discussed. Unfortunately, some organizations and individuals seek to take advantage of male loneliness and its interaction with pornography for profit at the expense of their victims. The purpose of this presentation is to discuss the contemporary issues of male loneliness, pornography, and how these two issues interact along with their implications on a societal scale.

### **M1: 10:45 AM Intravenous Drip and Health Monitoring System**

*IV drip monitoring system is a project that was created help nurses in hospital by reducing their schedule*

Vasunitha Somashekar, vsomashekar2024@fau.edu, Master's Student, Artificial Intelligence, Florida Atlantic University

Saline, one of the most widely used intravenous (IV) medicines, is crucial in the treatment of critically ill patients. In order to prevent blood from flowing into the bottle while the saline bottle is emptied and the needle is still close to the vein, it is crucial to keep an eye on its level. The correct timing of extracting the needle from the patient's vein is typically disregarded due to negligence and any uncommon circumstance, which results in a large casualty and should also result in death. We have presented a cost-effective smart saline level monitoring device using Internet of things (IOT) that was created utilizing a load sensor and an inexpensive, ultra-low power Arduino microcontroller. In addition, the patient's oxygen level, temperature, humidity, and pulse would all be tracked by the implanted health monitoring system. The GPS device would help locate the patient, and the buzzer used would function to sound an alarm when it was time to change the saline container.

### **D5: 11:00 AM Novel therapeutics for Glioblastoma treatment**

*Novel Therapeutic Strategies for Glioblastoma: Uncovering Effective Nitro-Based Agents and Their Actions Against Cancer Stem Cells*

Roberto Martin, Matthew Pate, rm2972@mynsu.nova.edu, mp3475@mynsu.nova.edu, Doctoral Student, Kiran C Patel College of Osteopathic Medicine (DO), Nova Southeastern University

Introduction/Purpose

Glioblastoma multiforme (GBM) is the most lethal primary brain tumor in adults, with a five-year survival rate below 10%. Glioblastoma stem cells (GSCs) drive treatment resistance and tumor recurrence, complicating therapy outcomes. Nitro-containing compounds, with strong electron-withdrawing properties, are being investigated for their anti-cancer potential. This study aims to assess the cytotoxic effects of novel nitro chalcones and cyclic C5-curcumin analogs on GSCs to identify lead compounds for GBM therapy.

Methods

42 nitro-containing compounds were synthesized and tested against GSC lines. Active compounds (IC<sub>50</sub> < 10 μM) were further evaluated on non-tumor cell lines. Western blot analysis was performed to determine their mechanism of action.

## Outcomes

25 compounds showed IC<sub>50</sub> values  $10 \leq \mu\text{M}$ , with 4 in the nanomolar range. Cyclic C5-curcumin analogs were the most effective, causing STAT3 inhibition.

## Conclusion

Several novel nitro-containing compounds showed potent anti-GSC activity and STAT3 inhibition, suggesting their promise for GBM therapy.

### **U4: 11:15 AM FAU Sustainability Club**

*A student organization devoted to raising environmental awareness in the FAU community, and creating a positive impact through sustainable events and activities*

Jose Camacho, Liam Baysuraa, Rocio Macias, Ava Eakins, jcamacho2022@fau.edu, wbaysura2022@fau.edu, rmaciasgamon2022@fau.edu, aeakins2023@fau.edu, Undergraduate student, College of Engineering/College of Business/College of Science, Florida Atlantic University, Mentor: Melina Matos

Our club is more than just a student organization, it is a diverse and passionate family of students that understand the urgency to act on the current environmental crisis we are facing across the world. We believe in the power a small group of individuals with an honest cause and a strong determination can have in their community. Less than a year ago, the FAU Sustainability Club was only an idea, and today, we are a group of over 150 members from all majors and backgrounds. Together we have helped clean the beaches of Boca Raton, stop the development of several Florida State Parks, reduce landfill waste through several clothing drives, volunteer in turtle rescue centers, and now, even collaborate to make the 2024 Broward Symposium an eco-friendly event. Our mission is to empower others to live more sustainably and standup for our planet and future generations.

### **D6: 11:30 AM Hand-rearing study on Bachman's Sparrows**

*The Year of the Sparrow: Our First Year with Bachman's Sparrows in our Aviary*

Heather Wolverton, Hwolverton2013@fau.edu, Doctoral Student, College of Science Integrative Biology, Florida Atlantic University, Mentor: Dr. Rindy Anderson

Song learning in birds can deepen our understanding of animal communication and human language development. However, most research has focused on a limited number of species with small repertoires, leaving a large knowledge gap regarding species with large repertoires. This spring, my lab conducted the first-ever hand-rearing study of Bachman's sparrows, a songbird known for its large repertoire and delivery of the repertoire with simple syntax patterns. Our pilot study demonstrates that Bachman's sparrows can learn to sing in captivity from listening to audio playback of adult songs, providing new opportunities to explore how their vocal features develop during early life stages. We have gathered extensive data from the juveniles and will continue analyzing their song development and syntax formation over the coming year.

### **U11: 11:45 AM Carbon dots: Nanotech and Cancer Therapy**

*Synthesis and spectroscopic characterization of coconut oil-based carbon dots*

Pierce Canava, Aryan Rathi, Amaan Khan, pc1030@mynsu.nova.edu, ar3901@mynsu.nova.edu, ak1929@mynsu.nova.edu, Undergraduate student, College of Allopathic Medicine, Public health/Biology, Nova Southeastern University, Mentor: Regina Graham & Sajini Hettiarachchi

Carbon dots (C-dots) are zero-dimensional, carbon-based fluorescent nanoparticles that have gained attention due to their unique optical, chemical, and physical properties, as well as their biocompatibility, ease of synthesis, and low cost. These features make them useful in various applications, such as biomedical fields, food packaging, anti-counterfeiting, and semiconductors. Although natural products have been used for C-dot synthesis, oils have not been fully explored. In this study, we synthesized C-dots from coconut oil, rich in lauric acid, using a bottom-up approach. Coconut oil, citric acid, and ethylenediamine were heated at 180°C for 12 hours, and the resulting C-dots were purified by centrifugation and lyophilized. Their optical properties were characterized through UV-Vis, fluorescence, and FTIR spectroscopy. These fluorescent C-dots from coconut oil will be explored for biomedical uses, such as fluorescent imaging and drug delivery for cancer therapy.

### **U15: 12:00 PM Resonators Used In Building Emergency Sensors - Detection of Deterioration**

#### *Resonators Used In Building Emergency Sensors - Developing a Device*

Ruby Aubin, raubin2021@fau.edu, Undergraduate student, College of Engineering, Department of Civil and Environmental Engineering, Physics, Florida Atlantic University, Mentor: Dr. Madasamy Arockiasamy

Increasing necessity for the evaluation of deteriorating buildings comes to science as we examine the aftermath of tragedies such as the Surfside Condo Collapse in 2021. To understand how to prevent collapse, one must first understand how it occurs in the first place. In this study, an improved methodology for measuring structural disturbances, however minor, is proposed. String-based resonance is much more sensitive to small disturbances than bar-based resonance due to its elastic nature and responsiveness to deformation. This method is particularly favorable as it is proficient in measuring minor changes, even if they are not concerning structural deformations. While this may cause false-positive detections of structural failure signs, it is highly possible that a benign structural deterioration could develop into a critical failure, as seen with the Surfside Condo Collapse (Bell et al., 2024). A cost-effective, easily installable device that relies on the basic physical principles is essential.

### **D7: 12:00 PM Sleep, AD biomarkers, cognition, and aging**

#### *Research links aging to sleep architecture changes. This study examines AD biomarkers, genetic factors, and brain volumes over time, focusing on cognitive decline and sleep quality in older adults with CN, MCI, and dementia*

Layaly Shihadeh, Ishihadeh2017@fau.edu, Doctoral Student, College of Science, Department of Psychology, Experimental Psychology PhD, Florida Atlantic University, Mentor: Dr. Monica Rosselli

Research has shown that aging is consistently linked to changes in sleep architecture. However, the clinical relevance of sleep quality, biomarkers of AD (brain volume, beta-amyloid (A $\beta$ ), and APOE e4 carrier status) and executive function in abnormal aging is less understood. The aim of this proposed study is to address the existing gap by examining longitudinal changes in AD blood biomarkers, genetic markers, and brain volumes in relation to declines in executive function and sleep quality in individuals with CN, MCI, and dementia, as well as those classified as progressors or non-progressors. We will utilize participant data from the 1FL ADRC database, which includes older adults diagnosed with CN, MCI, or



dementia. Overall, we expect that individuals experiencing a decline in sleep quality will exhibit more pronounced decreases in executive function scores, reduced brain volumes, elevated A $\beta$  concentrations, progressor classification, and an increased prevalence of APOE e4 carriers.

#### **U16: 12:15 PM Resveratrol-Inspired Synthetic Compounds For Glioblastoma**

*Glioblastoma, a highly aggressive brain tumor, poses treatment challenges. This project synthesized resveratrol-inspired compounds targeting glioblastoma stem cells, showing that methoxy-substituted compounds reduce viability and nitro-containing compounds promote differentiation*

Brianna Calderon, Neha Jasti, Saya Seraj, Alma Partenza, bc1479@mynsu.nova.edu, nj574@mynsu.nova.edu, ss4967@mynsu.nova.edu, ap3493@mynsu.nova.edu, Undergraduate student, Halmos Arts and Sciences, Biology, Nova Southeastern University, Mentor: Dr. Graham

Glioblastoma, a highly aggressive brain tumor, is difficult to treat due to its invasive nature and the limitations of conventional therapies. Glioblastoma stem cells (GSCs), resistant to treatment, are believed to drive tumor growth, making their targeting crucial to prevent recurrence and improve survival. Resveratrol (RSV), a polyphenolic compound found in red grapes, has shown various therapeutic benefits such as anti-inflammatory, neuroprotective, and cardioprotective effects. However, its poor bioavailability limits clinical application. Recent research suggests that meso-substitutions on RSV's aromatic rings could enhance its chemotherapeutic potential. Diarylacrylonitrile analogs, which retain the stilbene structure of RSV, were synthesized and tested for their effects on GSCs. Using Knoevenagel condensation, the project produced several compounds, and an MTS assay revealed that methoxy-substituted analogs significantly reduced GSC viability, while nitro-containing compounds promoted differentiation. These results indicate that these compounds hold promise for further development as potential glioblastoma treatments.

#### **U26: 12:15 PM Systematic review of perceived stress scales**

*Reliability and Validity of Scales Used to Measure Levels of Stress: A Systematic Review*

Stephanie Torres, storres2023@fau.edu, Undergraduate student, Charles E. Schmidt College of Science, Psychology, Florida Atlantic University, Mentor: Dr. Monica Rosselli

Studies that observe psychological stress have used questionnaire assessments to measure perceived stress, such as the Perceived Stress Scale (PSS). However, with major societal changes and technological advancements, it is unclear whether current stress scales remain accurate measurements of people's stress levels, especially for underrepresented populations. This systematic review observes several components of widely used stress scales to measure their validity and reliability while considering modern-day life events and factors that may induce stress, such as social media, climate change, and mass shootings. Current scales may require significant updates to be accurate in assessing stress levels so that they do not risk being subjective forms of measurement.

#### **M6: 12:30 PM Alzheimer's Disease PET scans Compartmental Model**

*Data Science Analysis of Amyloid Beta Waste Product via Compartmental Areas in PET Scans*

Giselle Shim, Rudolf Hall, Alexandra To, Jacinta Nadarajan, gshim2017@fau.edu, rhall2017@fau.edu, ato2020@fau.edu, jnadarajan2021@fau.edu, Master's Student, Charles E Schmidt College of Medicine, Biomedical Science Department, Florida Atlantic University, Mentor: Dr. Rui Tao

Alzheimer's disease (AD) is a progressive neurodegenerative disease which results in devastating memory loss and impaired cognitive function. Amyloid beta is a peptide that is related to Alzheimer's disease and can be detected in PET scans by the radioactive tracer, Florbetapir. Currently, PET scans are being used to study AD with the Florbetapir tracer from Eli Lilly, however, there appears to be great data loss with the current methods. In this study, we propose to utilize data science to correct false perception in PET scans in order to determine the major and minor drainage pathways of waste products in the brain. The hypotheses are examined via Fiji ImageJ analysis of 2D and 3D PET scans from the IDA database. We discovered the presence of two compartments present in the PET scans that work to rid amyloid beta, the interstitial fluid (ISF) and non central nervous system (non-CNS) compartment. Under normal circumstances, the ISF compartment does not contain amyloid beta, however, presence of amyloid beta in the ISF can result in neurological diseases. Future research will be investigating drainage of other waste products associated with Alzheimer's disease such as hyperphosphorylated tau protein and how other waste products respond to the compartments. In conclusion, our data supports the theory that amyloid beta is cleaved from APP then actively transported to the non-CNS compartment, which then leads into the lymphatic system in order to clear amyloid beta waste product.

#### **M8: 12:30 PM Norms for neuropsychological tests for Bilingual Spanish speakers**

##### *Neuropsychological Norms for Bilingual Spanish speaking Hispanic/Latinos*

Flavio Carhuavilca, fcarhuavilca2022@fau.edu, Master's Student, Florida Atlantic University/College of Science/Department of Psychology, Florida Atlantic University, Mentor: Monica Rosselli

This study is a cross-sectional evaluation of item fairness across varying age and education groups. Age and years of education will be classified into 3 groups each. To measure invariances across age and education groups, we will use multiple group confirmatory factor analysis (CFA) and Item Response Theory, with differential item functioning (DIF) analysis for each item and the groups. If there are invariances across any of these groups, regression-based norms will be calculated. Age and education will be entered as independent variables in the regression model with other potential covariates added to create and save predicted raw test scores, later they will be standardized to create a normal distribution of scores. These scores will be adjusted for the covariates of LEAP-Q scores including the bilingualism index. This process will produce demographically adjusted normed scores based on the entire normative sample, instead of a subsample in an individual cell.

#### **M4: 12:45 PM Investigating cell starvation theory in Alzheimer's Disease**

##### *The Two-Compartment Interpretation of Amyloid Beta in Alzheimer's Disease*

Rudolf Hall, Giselle Shim, Alexandra To, rhall2017@fau.edu, gshim2017@fau.edu, ato2020@fau.edu  
Master's Student, Artificial Intelligence, Florida Atlantic University, Mentor: Dr. Rui Tao

The cellular starvation theory suggests that disruptions in nutrient and waste exchange may contribute to amyloid-beta (A $\beta$ ) plaque formation in Alzheimer's disease (AD). This study postulates that impaired interstitial fluid (ISF) and cerebrospinal fluid (CSF) compartmentalization may influence A $\beta$  accumulation by limiting cellular access to essential nutrients while impairing waste clearance. Through examining the dynamic flow between ISF and CSF, this investigation seeks to clarify whether improper nutrient delivery and waste disposal create conditions conducive to A $\beta$  aggregation. Understanding how cellular starvation,

driven by concentration compartmentalization exchange, influences plaque formation may offer new insights into AD pathogenesis.

**U21: 12:45 PM Bioinformatic algorithms to understand the brain**

*Designing algorithms for meta-analysis across multi dimensions by integrating multi omics for data across different modalities*

Ayan Sanaullah, asanaullah2022@fau.edu, Undergraduate Student, Florida Atlantic University Wilkes Honors College, Biological Sciences, Data Analytics, Mentor: Rodrigo Pena

The human brain, with its 86 billion neurons and over 10 trillion synapses, is the most intricate organ we know. Advances in omics technologies allow us to explore the molecular, cellular, and network architecture of the brain in unprecedented detail. Using multi-dimensional datasets, we investigate gene, age, sex, and brain region-specific transcriptomic variations. By analyzing mRNA sequencing (RNA-seq) data, we have identified genes with significant over- or under-expression across these factors. Leveraging AI, we transform this data into image-like inputs for deep neural network-based detection of key molecular changes. This approach aims to automate the identification of transcriptomic shifts with precision. In future work, we will integrate proteomic and lipidomic datasets to create a comprehensive multi-omics comparison, providing deeper insights into the molecular drivers of brain function and disease.



## Poster Presentations

### **D2: Screen Time, Low Language Skills and Behavioral Problems**

#### *Solitary Screen Time Exacerbates Longitudinal Associations from Low Language Skills to Heightened Adjustment Problems*

Molly Selover, mselover2023@fau.edu, Doctoral Student, Psychology, Florida Atlantic University,  
Mentor: Brett Laursen

Strong evidence suggests that early child socioemotional difficulties give rise to later language development problems (Petersen et al., 2013) and that language difficulties anticipate later socioemotional adjustment challenges (Ketelaars et al., 2008). We focus on child solitary screen time as a moderator, given findings that link unsupervised television watching to delays in language acquisition and cognitive development (e.g., Massaroni et al., 2023) and socioemotional problems (Liu et al., 2021). In the face of widespread availability and allure of screen technology, it's important for parents, teachers/educators and practitioners to appreciate the consequences of unsupervised screen time. Unfortunately, adults often seek to assuage the problems presented by poorly adjusted children with screen technology (McDaniel, 2019). Limiting and supervising screen time during early childhood is a global public health concern, particularly for children who are at risk for cascading adjustment difficulties.

### **D3: What Makes a Friend Desirable?**

#### *The Characteristics of Those who Make and Receive Desired Friend Nominations*

Lucinda Sherrod, lsherrod2024@fau.edu, Doctoral Student, Department of Psychology, Developmental,  
Florida Atlantic University, Mentor: Brett Laursen

This study explored friendship aspirations among middle school students in Florida, examining the characteristics of those who made and received desired friend nominations. Along with identifying classmates who they wish to be friends with, participants nominated peers who they believed to be popular, well-liked, prosocial, fun, and good at school. Results showed that desired friends were more popular, better liked, more fun, and had better grades than peers who were not nominated. Compared to those who made no desired friend nominations, participants with desired friends were more prosocial, fun, and academically successful. It is not surprising that youth who were desired as friends had favorable qualities; befriending peers with such characteristics holds many potential rewards. Contrary to expectations, students seeking new friends had more, not fewer, favorable attributes than those without desired friends, suggesting that aspirational friendships are not viewed as potential vehicles for overcoming social difficulties.

#### **D4: Relationship between friendship ranking and similarity**

##### *Higher ranked friends are more alike than lower ranked friends*

Maryana Madeira Borri, mmadeiraborr2024@fau.edu, Doctoral Student, Florida Atlantic University / Charles E. Schmidt College of Science / Psychology Department / PhD in Developmental Psychology, Florida Atlantic University, Mentor: Brett Laursen

Similarity is vital in friendships, predicting both their formation and stability (Osgood et al., 2022; Leenders, 1996). This study investigates whether friendships align with similarity, hypothesizing that higher-ranked friends are more similar than lower-ranked ones. A sample of 163 Floridian adolescents with diverse backgrounds nominated and ranked five friends. A standard peer nomination inventory assessed five social behaviors. A repeated measures ANOVA revealed that top-ranked friends (1st and 2nd) were significantly more similar to one another than some or all lower ranked (3rd, 4th, and 5th) friends. The results support the literature on the role of similarity in friendship, and how perceived closeness and similarity are interconnected. Conformity increases during early adolescence and leads to homophily (Laursen & Veenstra, 2021), which continues to increase as a result of ongoing close interactions (Kandel, 1978). Findings underscore how peers nominate one another as friends plays a crucial role in individual's behavior.

#### **D8: Validity of subjective bilingual proficiencies with objective language tests**

##### *Preliminary Validation of The Language Experience and Proficiency Questionnaire (LEAP-Q) in Aging Bilinguals and Monolinguals*

Merike Lang, Alicia Goytizolo, Flavio Carhuavilca, Andrea Montilla, mlang2015@fau.edu, agoytizolo2012@fau.edu, fcarhuavilca2022@fau.edu, amontilla2022@fau.edu, Doctoral Student, Psychology, Experimental Psychology, Florida Atlantic University, Mentor: Dr. Mónica Rosselli

Objective: This study aimed to validate LEAP-Q proficiencies with objective measures of verbal fluency and confrontation naming in a sample of bilinguals and monolinguals with typical and atypical aging.

Participants and Methods: 197 monolingual (n = 91) and Spanish/English bilingual (n = 106) participants completed neuropsychological testing at the 1Florida ADRC (normal cognition n = 76, mild cognitive impairment n = 92, and dementia n = 29). Partial correlations controlling for diagnosis

determined associations between English and Spanish Category/Phonemic fluency and naming scores with LEAP-Q Average proficiencies in both languages.

Results: All English fluency scores demonstrated significant positive associations with Average English proficiencies for the whole sample, as well as only for bilinguals.

Conclusions: Average English proficiencies associated positively with objective fluency measures, which was driven by bilinguals. Bilingualism influences the validity of subjective proficiency scores when compared with objective verbal measures, which may differ when assessing native and nonnative languages.

## **M2: Friend Influence over Academic Achievement**

*A longitudinal study that compares friendship dyads in late childhood (grades 4-5) versus early adolescence (grades 6-7), describing the strength of their mutual influence across peer- and self-reports of academic achievement*

Laury-Ann Leclerc Bedard, lleclercbeda2023@fau.edu, Master's Student, Florida Atlantic University/College of Science/Department of Psychology, Florida Atlantic University, Mentor: Brett Laursen

The present longitudinal study compares 283 friendship dyads in late childhood (grades 4-5) versus early adolescence (grades 6-7), describing the strength of their mutual influence across peer- and self-reports of academic achievement. Participants completed identical surveys twice during a school year. Students completed a standard peer nomination inventory to identify peer reported academic achievement. Self-reported academic achievement was obtained from survey items assessing school grades. Longitudinal indistinguishable dyad Actor-Partner Interdependence Model (APIM) analyses (Kenny, 2006) were conducted. Results indicated that one friend's initial (self- and peer-reported) academic achievement predicted changes in the other friend's academic achievement at Time 2. Grade differences emerged for peer-reported academic achievement, such that friends influenced one another in middle school but not primary school. There were no statistically significant location differences. New to this study is the finding that friend influence over academic achievement is stronger in early adolescence than during late childhood.

## **M3: Rank and Reciprocity in Friendship Nominations**

*Higher Ranked Friend Nominations are More Likely to be Reciprocated than Lower Ranked Friend Nominations*

Madeleine Guillont, mguillont2023@fau.edu, Master's Student, College of Science- Psychology Department, Florida Atlantic University, Mentor: Brett Laursen

Reciprocated friends (outgoing friend nominations that are returned by the nominee) are widely assumed to be closer and more important than unreciprocated friends (outgoing friend nominations that are not returned). Adolescents tend to rate reciprocated friendships more positively than unreciprocated friendships (Linden-Andersen, 2009). Less clear, is whether lower ranked friends are less likely to return friend nominations than higher ranked friends. To test this hypothesis, repeated measures ANOVAs were conducted to look at the interactions and effects of grade, sex, and friendship nomination type (reciprocated or unreciprocated). We found that reciprocated friend nominations were ranked higher

than unreciprocated friend nominations and that top-ranked friend nominations were reciprocated at greater than chance levels, whereas lower-ranked friend nominations were reciprocated at less than chance levels. Our study is the first to the role of nomination rank in friendship reciprocity. These findings carry important implications for scholars of peer relations.

### **M5: Novel Drug Discovery for the Treatment of Glioblastoma**

#### *Targeted Drug Delivery of Curcumin Analogues via Carbon Dot Nanocarriers for Effective Treatment of Resistant Glioblastoma Stem Cells*

Xavier Pantig, xp16@mynsu.nova.edu, Master's Student, Halmos College of Arts and Sciences, Chemistry Department, Nova Southeastern University, Mentor: Dr. Regina Graham

The FDA has only a limited number of approved drugs for treatment of glioblastoma, a highly aggressive brain cancer. Furthermore, treatment-resistant glioblastoma stem-like cells (GSCs) are pivotal in tumor recurrence post-therapy, making their elimination essential to improve the grim patient outcomes. This project aims to investigate the anti-cancer efficacy of a curcumin-like pharmacophore on GSCs. Despite their significant anti-cancer properties, naturally derived compounds such as curcumin suffer from poor water solubility and low bioavailability. To address these challenges, highly water-soluble and non-toxic carbon dots will be used as nanocarriers. In this phase, various compounds were synthesized through a Knoevenagel condensation of a substituted benzaldehyde with 4-piperidone, followed by an SN2 reaction with methyl bromoacetate to introduce a methyl carboxylate group. Characterization via NMR and LCMS confirmed successful reactions. Several compounds expressed nanomolar IC50 values, indicating potent GSC death with minimal drug. Future work will focus on conjugating these active compounds to carbon dot nanoparticles for targeted delivery to glioblastoma.

### **M7: Auto-Tuning PID Controllers for USVs**

#### *AI-Based PID Auto-Tuning for USVs: Evolutionary Algorithms in Real-World Trials*

Xavier Vicent Navarro, xvicentnavar2024@fau.edu, Master's Student, Florida Atlantic University College of Engineering/Department Ocean and Mechanical Engineering, Florida Atlantic University, Mentor: Dr. Manhar Dhanal

The use of artificial intelligence (AI) in the auto-tuning of PID controllers for unmanned surface vehicles (USVs) enhances their performance in maintaining precise control over heading, heading-speed, and station-keeping. Traditional PID tuning is a time-consuming process often requiring expert knowledge to achieve optimal performance. This study employs evolutionary algorithms, including NSGA-II, CMA-ES, and PSO, to streamline and automate the tuning process. The algorithms have been rigorously tested in the Virtual RobotX (VRX) simulator, demonstrating their capability to generate robust control gains efficiently. The next phase involves implementing these optimized controllers on a physical USV to validate their performance in real-world scenarios. Preliminary results indicate that AI-based auto-tuning significantly improves the vehicle's stability and responsiveness, enabling it to maintain its intended heading and position effectively.

### **M9: Acculturation Scales used for Hispanics/Latinos diagnosed with dementia**

#### *Acculturation scales in Dementia in US Latinos/Hispanics: A Systematic Reviews*

Julianne Paglianite, Alicia Goytizolo, jpaglianite2020@fau.edu, agoytizolo2012@fau.edu, Master's Student, College of Science, Psychology and Biological Sciences Departments, Florida Atlantic University, Mentor: Dr. Monica Rosselli

Little is known about the type of acculturation scales and the frequency in which they are used in dementia research among Latinos/Hispanics in the US. The purpose of this paper was to investigate the use of acculturation measures toward Latinos and Hispanics diagnosed with dementia.

Databases were searched using four key terms: dementia, acculturation scale, Latinos, and Hispanics. Criteria included: a sample population of Latinos/Hispanics diagnosed with dementia and the use of an acculturation scale as part of their methods. Data were extracted from all eligible articles regarding the study population, study methods, outcomes measured, acculturation measures used, and results.

The use of three different acculturation scales were identified (Marin Acculturation Scale, Short Acculturation Scale for Hispanics, and the Acculturation Rating Scale for Mexican Americans-II). 50% of the reviewed articles found a significant association between acculturation and cognition.

### **U3: Subscription Models Taking on the World**

*For a little over a decade the rise of subscriptions-based models has seemed inevitable. This has become even more so with the Covid-19 pandemic*

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For a little over a decade the rise of subscriptions-based models has seemed inevitable. This has become even more so with the Covid-19 pandemic. When faced with uncertain territory of fighting a global pandemic, the world locked down to help curb covid-19 transmissions. This lockdown led many to evaluate the way they were using their discretionary income when it came down to day-to-day purchases. This prompted both businesses and customers to attempt to squeeze more value, in part by offering subscription-based payments instead of one-time purchases in uncertain times. The purpose of my study is to see the people's preferences between subscription-based models and one-time purchases. To do so, I conducted a 12-question survey and collected data using Amazon M Turk, which compiled over 195 responses. The results show that there is a statistically significant difference between age and the usage of subscription-based models. In addition, I found there is a difference between gender and subscription-based models. These results are important because they highlight the strict breakdown of who has been most affected by the switch in spending patterns.

### **U5: Mangroves mitigating coastal erosion, enhancing resilience**

*Mangrove Forests: Natural Defenses Against Coastal Erosion and Climate Resilience*

Andrae Cockburn, acockburn2024@fau.edu, Undergraduate Student, Department Of Urban Regional Planning, Florida Atlantic University, Mentor: Melina Matos

Coastal erosion poses a significant threat to urban areas, particularly with rising sea levels. Mangroves serve as a natural defense, reducing erosion through their root systems and stabilizing coastlines. This research explores the role of mangrove ecosystems in mitigating erosion and recommends integrating mangrove restoration into urban planning to enhance resilience. Case studies from Florida and other regions compare erosion in areas with and without mangroves. The findings show that mangroves offer protection and additional ecological benefits, such as improved water quality.



## **U6: Saltwater effects on Florida native plants**

*Examining the effects of saltwater exposure on glycophytic plants, not tolerant to saltwater and halophytic plants, tolerant to saltwater, native to South Florida.*

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This study examines the effects that saltwater has on glycophytic plants, not tolerant to saltwater and halophytic plants, tolerant to saltwater, native to South Florida. To represent these two classifications of salt tolerance, *Portulaca oleracea* (purslane, halophytic) and *Asclepias tuberosa* (butterfly weed, glycophytic) is studied. Butterfly weed is known to be important to monarch butterflies and can be found readily throughout Florida in dry sandy upland areas (UFIFAS, n.d.). Purslane is also found throughout Florida. It grows best in direct sun; it can tolerate drought and various soils ranging from inundated to clay textures. This project aims to fill gaps in the literature by studying flowering plant species native to Florida to help gauge whether these plants will persist in South Florida as sea level rise and saltwater intrusion continues.

## **U7: Serotonin and Mouth-Hook Movement in *Drosophila***

*Our research focuses on how the absence of the antioxidant enzyme methionine sulfoxide reductase (MSR) affects the neurotransmitter serotonin resulting in a diminished growth rate of *Drosophila* (fruit fly) larvae*

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Oxidative damage is an unavoidable consequence for organisms that utilize oxygen.

However, a variety of biochemical mechanisms limit the debilitating effects of oxidative stress. One important mechanism, methionine sulfoxide reductase (MSR), repairs oxidized methionine, an important amino acid. Using *Drosophila melanogaster* as a genetic model organism, larvae lacking MSR enzyme activity have a slower growth rate. This is due to a slower rate of mouth hook movement (MHM). Mouth hooks are small appendages that facilitate feeding and development. Preliminary results involving serotonin, an important neurotransmitter, have suggested that the absence of MSR activity leads to lower levels of serotonin. Our current research is examining whether increasing serotonin levels in MSR-deficient flies can at least partially restore wild-type MHM rates. These studies have the potential to contribute to a better understanding of the role of oxidative stress in the progression of age-related neurodegenerative diseases like ALS, Alzheimer's, and Parkinson's Disease.

## **U8: Intrusive parenting and maternal depressive symptoms**

*Maternal depressive symptoms and associations with intrusive behaviors in mother-infant interactions following COVID-19*

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Research shows that maternal depression negatively impacts children's development, and the COVID-19 pandemic has worsened postnatal depression, highlighting the need for studies on depressive symptoms in mothers outside clinical settings, as they often lead to intrusive behaviors that hinder infants' attention and emotional regulation. This study examined the relationship between depressive symptoms and intrusive behaviors in mothers of typically developing infants (N = 35, male = 15) aged 12 to 24 months (M = 18.65, SD = 3.94). We used the Edinburgh Postnatal Depression Scale (EPDS) to assess depressive symptoms and the Coding Interactive Behaviors Scale (CIB) to measure intrusiveness and depressed mood during play sessions. There was no significant correlation between self-reported and coder-observed depressed mood, and neither measure predicted parental intrusiveness. Findings suggest that maternal depressive symptoms in the post-COVID-19 context did not substantially influence maternal intrusiveness, indicating mothers maintained healthy behaviors despite the pandemic.

#### **U9: Olive Oil-Derived Carbon Dots: Novel Nanotechnology**

##### *Olive Oil Derived Carbon Dot Nanoparticles: Synthesis and Spectroscopic Characterization*

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Olive oil, rich in triglycerides like oleic fatty acid, is known for its antioxidant and anti-inflammatory properties, but its potential in nanoparticle synthesis remains relatively underexplored. In this study, we synthesized fluorescent carbon dots (C-dots) from extra virgin olive oil using a bottom-up approach. C-dots, prized for their unique optical, physical, and chemical properties, are widely used in fields such as semiconductors, biomedical applications, food packaging, and LEDs. To create the C-dots, a mixture of olive oil, citric acid, and ethylenediamine was heated at 180°C for 72 hours. The resulting C-dots were purified through liquid-liquid extraction and freeze-dried to obtain water-free, oily carbon dots. These fluorescent olive oil-derived C-dots were characterized using UV-Vis, fluorescence, and FTIR spectroscopy. Future research will focus on their biomedical applications, including their potential as anti-oxidant and anti-inflammatory agents as well as bio-imaging, bio-sensing, and drug delivery.

#### **U10: CT Imaging Reveals Seagrass Structural Secrets**

##### *Assessing Gas Exchange Efficiency in Seagrasses applying 3-D Micro-CT Imaging: Implications for Conservation in Florida Bay*

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This study investigates the ratios of aerenchyma (internal tissue airspace) to tissue volume in *Thalassia testudinum*, a tropical seagrass species found in Florida Bay, which experiences significant die-off events due to anoxic carbonate sediment high in hydrogen sulfide (H<sub>2</sub>S). Different tissue types—leaf, meristem, rhizome, and roots—were examined to determine if oxygen from photosynthesis has the ability to flow efficiently throughout the plant to keep belowground tissues oxidized and detoxify H<sub>2</sub>S. Using high-

resolution 3-D micro-CT imaging tissue and aerenchyma was differentiated. This understanding could provide a crucial missing piece for conservation workers developing management plans for seagrass beds. The results of this study will enhance our knowledge of the structural and functional adaptations of seagrasses and contribute to the conservation efforts of *T. testudinum* in Florida Bay.

### **U12: Topographical Analysis of Alzheimer's Disease Neuroimaging**

#### *Topographical Analysis of PET Scans with Florbetapir in Alzheimer's Disease Patients*

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Although the co-registration of MRI-PET neuroimages is pivotal to accurately diagnosing various neurodegenerative diseases, it can also lead to critical misconceptions. Particularly, many people believe that any presence of amyloid beta in the brain is neurotoxic and induces Alzheimer's disease (AD). In actuality, amyloid beta peptides are present in the brains of both cognitively unimpaired (CU) individuals and AD patients. Using the image processing tool ImageJ, we investigated concentrations of amyloid beta within the internal capsules, temporal lobes, and skulls of CU subjects and AD patients through analysis of PET scans with florbetapir ([<sup>18</sup>F]AV-45). On average, CU subjects were observed to have higher intensities of amyloid beta within their internal capsules and skulls while AD patients had higher intensities within their temporal lobes. The varying intensities of amyloid beta may be indicative of a specific clearance pathway in the brain, which can be explored in future studies.

### **U13: Responses of Bachman's Sparrows to Prescribed Burns**

#### *Investigation of Bachman's Sparrow habitat preference and site fidelity in relation to prescribed burns in Johnathan Dickinson State Park*

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Bachman's Sparrow is a near-threatened songbird, endemic to the pine flatwoods of the southeastern US. This species requires specific habitat characteristics to breed, and prescribed fires are used to maintain these requirements. Suitable habitat for Bachman's Sparrow develops between 2-18mos post-burn and sparrows gravitate towards areas burned within this timeframe. The time of burn during peak sparrow breeding season (Apr-Jun) may cause displaced males to permanently abandon their breeding territory. We monitored the population of Bachman's Sparrows in Johnathan Dickinson State Park 2022-24 by banding males and using audio playback of Bachman's Sparrow song weekly to verify their location from Mar-Jul of each year. We used ArcGIS Pro to track their movements during the breeding season. Sparrows were primarily identified in suitable habitat in 2023-24, and were evenly spread during 2022, where burns occurred >18mos prior. There are some instances of relocation post-burn across all years. This research will contribute to understanding how timing of prescribed burns influences habitat occupancy and breeding behavior in an imperiled songbird.

### **U14: Infant intentional awareness of cooperative behaviors**

### ***Intentional Awareness During Infancy: Influence of Cooperation on Infant Pointing and Compliance Behaviors***

Charledgar Bedouet, cbedouet2015@fau.edu, Undergraduate Student, Charles E. Schmidt College of Science, Psychology, Neuroscience and Behavior, Florida Atlantic University, Mentor: Teresa Wilcox & Jacqueline Hammack

A previous pilot study identified a negative association between infant's compliance behaviors and frequency of infant-initiated pointing when engaged in free play (Bedouet et al., 2024). To investigate the influence cooperation has on that relationship, a within-subjects design is used to compare infant-mother interaction in a lab-based setting during (a) free play and (b) a cooperative play task. Pointing and compliance behaviors both rely on and exercise the cognitively demanding process of understanding the intentions of others (i.e., behaviorally and psychologically), all of which arise around the same stage during infancy (Behne et al., 2012; Liszkowski, 2020; Reddy et al., 2013; Tomasello et al., 2007). A moderation analysis is conducted to provide insight into the extent cooperation influences the negative association between infant compliance and their spontaneous pointing production. Overall, further insight into how humans exercise bidirectional gesture use and intention awareness to navigate social situations during infancy is provided.

### **U17: Tracking Chagas Disease Through GIS**

#### ***Utilizing Geographic Information Systems for Epidemiological Surveillance: Analyzing Environmental Influences on the Spread of Chagas Disease***

Leslie Anne Louissaint, louil74@mail.broward.edu, Undergraduate Student, Broward College, Environmental Science Technology, Broward College, Mentor: Dr. Julie Mura

This work proposes to utilize Geographic Information Systems (GIS) and spatial analysis to enhance epidemiological surveillance by investigating how environmental factors influence the spread of Chagas disease, a neglected tropical illness common in Latin America and emerging in newly affected regions like the U.S. and Europe. The research will integrate environmental data such as deforestation, land use, housing quality, and socioeconomic variables with disease incidence data to identify spatial patterns in Chagas transmission and the distribution of insect vectors, commonly known as "kissing bugs," that carry the parasite responsible for the disease. By mapping these relationships, this study will provide new insights into how environmental changes and urbanization contribute to the spread of Chagas. These findings can inform the development of targeted public health interventions and enhance current strategies for disease surveillance. This work will contribute to academic literature and ongoing efforts by epidemiologists and public health officials to optimize monitoring and response strategies in both endemic and newly affected regions.

### **U18: Survey of Fossils from Peace River, Florida**

#### ***Survey of Fossils from Peace River, Florida***

Janina Mulling, Kilveet Figueroa, mullj51@mail.broward.edu, figuk17@mail.broward.edu, Undergraduate Student, Broward College, Environmental Science Biosecurity Specialization, Mentor: Rebecca Clark

Florida has a rich fossil record due to its unique formation and hydrology. Fluctuating sea levels throughout geologic time has imposed both terrestrial and marine ecosystems on the platform at

different times. Ideal hydraulic conditions blocked northern siliciclastic sediment and created productive carbonate factories that built up the platform. Remains of whales, mammoths, giant ground sloths, giant tortoises, and other taxa, from many different time periods and ecosystems can be found here. The Peace River has gradually exposed older strata and washed sediments and fossils into the river. Using pan sifting techniques, a survey of fossil remains collected in Peace River was conducted. Such fossil survey research is lacking in literature. In this survey, 371 fossils were found representing invertebrates, chondrichthyans, mammals, and reptiles.

### **U19: Tracking Eco-Friendly Flights Using GIS**

#### *Using Geographic Information Systems (GIS) to Track and Analyze Eco-Friendly Flights: A Case Study of Orlando and Fort Lauderdale-Hollywood International Airports*

Ian Stephenson, stepi6@mail.broward.edu, Undergraduate Student, Broward College, Social Behavioral Science and Human Services, Mentor: Dr. Julie Mura

This project intends to use Geographic Information Systems (GIS) spatial analysis to track commercial flights in an effort to evaluate which routes result in the least amount of CO<sub>2</sub> emissions, while still being an efficient and fiscally sound mode of transportation. The study will analyze commercial flights out of two of the largest operating Florida airports- Orlando and Fort Lauderdale-Hollywood International Airports. This study is modelled largely on prior analysis conducted in Turkey of carbon emission on domestic flights. Similarly, this study will map flights out of these two airports, will determine the resulting average CO<sub>2</sub> emissions, and will offer potential alternatives using GIS analysis to reduce carbon emissions.

### **U21: Bioinformatic algorithms to understand the brain**

#### *Designing algorithms for meta-analysis across multi dimensions by integrating multi omics for data across different modalities*

Ayan Sanallah, asanallah2022@fau.edu, Undergraduate Student, Florida Atlantic University Wilkes Honors College, Biological Sciences, Data Analytics, Mentor: Rodrigo Pena

The human brain, with its 86 billion neurons and over 10 trillion synapses, is the most intricate organ we know. Advances in omics technologies allow us to explore the molecular, cellular, and network architecture of the brain in unprecedented detail. Using multi-dimensional datasets, we investigate gene, age, sex, and brain region-specific transcriptomic variations. By analyzing mRNA sequencing (RNA-seq) data, we have identified genes with significant over- or under-expression across these factors. Leveraging AI, we transform this data into image-like inputs for deep neural network-based detection of key molecular changes. This approach aims to automate the identification of transcriptomic shifts with precision. In future work, we will integrate proteomic and lipidomic datasets to create a comprehensive multi-omics comparison, providing deeper insights into the molecular drivers of brain function and disease.

### **U22: Engaging Middle School Students with Survey123**

#### *Introducing Middle School Students to Field Data Methods and Spatial Analysis by Using ESRI ArcGIS Survey123 for Biodiversity Classification and Inventory Along the Flamingo Park Trail*

Cristian Zorrilla, zorrc1@mail.broward.edu, Undergraduate Student, Broward College, Environmental Science, Mentor: Dr. Julie Mura

This work is a pilot project at Franklin Academy in Cooper City, that introduces middle school students to Geographic Information System (GIS), quantitative and qualitative methods of data collection, innovative field methods, and spatial analysis. Students use ESRI ArcGIS Survey123 to classify, record, inventory, and analyze local biodiversity along the Flamingo Park Trail. Students create a customized survey designed to identify species, estimate populations, and classify their observations into ecological categories. This project also allows students to access existing species inventory datasets to compare with their newly gathered data. As the project unfolds, additional ESRI ArcGIS field apps such as ArcGIS Quick Capture and ArcGIS Dashboards will be introduced. The long-term goal is to engage students across all five Franklin Academy campuses.

### **U23: Reuniting Lost Pets Through Geographic Insights**

#### *Reuniting Lost Pets Through Geographic Insights: Using Geographic Information Systems (GIS) and Social Media Platforms to Enhance Recovery Rates and Community Engagement*

Jamie Katz, katzj50@mail.broward.edu, Undergraduate Student, Broward College, SBSHS, Geographic Information Systems Cert, Mentor: Dr. Julie Mura

This work will investigate how Geographic Information Systems (GIS) and spatial analysis can enhance the recovery rates of lost pets. By mapping and analyzing data on pet sightings, recovery locations, and community demographics, it is expected that more effective recovery strategies will emerge. Furthermore, these geographic insights can be shared on social media platforms to facilitate public participation GIS (PPGIS), allowing pet owners, local organizations, and the local public to collaborate more effectively and in real-time. This work will contribute to the academic literature on public participation GIS and will provide practical insights for communities striving to reduce the number of lost pets, ultimately fostering a more affective and proactive approach to reuniting lost pets with their families.

### **U24: Analyzing chemical spills using GIS**

#### *Managing and spatially Analyzing chemical and oil spills using geographic information systems (GIS) to locate, contain, clean, and monitor a spill*

Angelo Della Monica, della18@mail.broward.edu, Undergraduate Student, Broward College, Chemical engineering, Mentor: Dr. Julie Mura

Geographic Information Systems (GIS) is a paramount tool for managing and analyzing chemical spills. GIS offers a real-time picture of damage incurred and allows for informed decision-making during a chemical spill incident. Additionally, GIS can be used for data analysis and reporting for response planning in both the short and long-term. First, workers must document the hazard and identify the risk, essentially determining the damages this hazard poses. Second, workers must contain the hazard, this is done by neutralizing the chemical or gating off an oil spill. Step three is to clean the hazard in the best way possible depending on the initial two steps. Finally, with the assistance of geographic information systems workers should use the documented information to plot the contaminated area and continue to monitor the area to understand the effects of such an event on surrounding ecosystems and humans.

## **U25: Engaging Residents with ArcGIS Traffic Service**

### *Engaging Residents with ArcGIS Traffic Service: A Pilot Study to Better Manage Routine Traffic Flow in Broward County, Florida*

Andrew Florist, florat@mail.broward.edu, Undergraduate Student, Broward College, Geographic Information Systems, Mentor: Dr. Julie Mura

This pilot study aims to engage residents by employing Geographic Information Systems (GIS) to improve daily traffic flow. Traffic flow in the context of GIS refers to the spatial analysis of movement patterns and behaviors on roads, while incorporating demographic variables, for optimal guidance and traffic efficiency. Some highly congested areas for consideration are school zones- specifically at student drop off and pickup times, construction zones, and highway exit ramps during rush hour. While most cities in Broward County use GIS for traffic management, including a centralized hub for sharing data, and hosting public-facing maps, this project will focus on engaging the public in direct participation in creation of GIS databases and neighborhood analysis to better understand and improve traffic flow.

## **U27: Modeling Gopher Tortoise Burrows Using GIS**

### *Modeling the effects of coastal dune degradation on gopher tortoise habitat occupancy using Geographic Information Systems (GIS) and spatial analysis*

Danielle Keener, keend6@mail.broward.edu, Undergraduate Student, Broward College, SBSHS, Environmental Science, Mentor: Dr. Julie Mura

The Gopher Tortoise is a threatened keystone species in the southeastern United States known for its essential burrowing habits. Habitat loss from destruction, storms, and coastal dune degradation has greatly impacted its coastal upland environments, which have been reduced by 85,834 acres in the last 100 years. While extensively studied inland, Gopher Tortoise behavior and conservation status in coastal sand dune areas remain largely unknown. In Florida, coastal habitats have been severely reduced and are now facing threats from rising sea levels and more intense storms. This work proposes to contribute to the ongoing research of biologists at Flagler College in St. Augustine, Florida by using geographic information systems (GIS) and spatial analysis to document the correlation between gopher tortoise burrowing habitat behavior and coastal dune degradation.

## **U28: GIS, Public Awareness, and the Great Outdoors Initiative**

### *Using Geographical Information Systems (GIS) to bring increased awareness and education of the Great Outdoors Initiative to Florida residents*

Victoria Fernandez, fernv17@mail.broward.edu, Undergraduate Student, Broward College, SBSHS, Environmental Science, Mentor: Dr. Julie Mura

The mission of the Florida Park Service is to provide resource-based recreation while preserving, interpreting and restoring natural and cultural resources. In stark contrast to this mission is the Florida Department of Environmental Protections (DEP) recently announced Great Outdoors Initiative, which proposes changes to nine state parks. The proposal has raised concerns from citizens, environmentalists, and conservation groups, as the project could potentially threaten the habitats of some of the state's most popular public spaces. The project has also been criticized for lack of public forums. Using geographic information systems (GIS), a transparent and interactive spatial representation of the

initiative's proposal and potential affects to overlapping natural habitats will be provided, as well as tools to organize and mobilize actionable responses.

#### **U29: Creating Local Scale Geospatial Digital Twins**

##### *Creating Geographic Information Systems (GIS)-Based Digital Twins on the Local Scale: A Case Study of the Broward County Courthouse Redesign*

Michael Boyce, boycmm@mail.broward.edu, Undergraduate Student, Broward College, Information Technology, Mentor: Dr. Julie Mura

A digital twin is a virtual representation of the real world, encompassing physical objects, processes, and their interconnections. When built on a foundation of geography, it becomes a geospatial digital twin. While geospatial digital twins have been created on multiple large-scale objects, such as cities, airports, or power grids, this work investigates the effectiveness of creating a digital twin on smaller-scale projects, such as the sustainable redesign of the Broward County Courthouse. There are a myriad of ways that geospatial digital twins speak to the architecture, engineering, and construction (AEC) world, while in this case, the focus lies in construction management, and more specifically for this project, in utilities and digital water. This work will investigate how digital twins can create efficiency on local and smaller and smaller-scale projects.



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