

2020 ROCI

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UNIVERSITY OF MIAMI

Research, Creativity,  
and Innovation Forum

*Showcasing undergraduate research across the disciplines*

ABSTRACT BOOK

*LETTER FROM THE DIRECTOR*

The Office of Undergraduate Research and Community Outreach (UGR) is pleased to present the first official Research, Creativity, and Innovation Forum (RCIF) Abstract Book. The RCIF has been an annual fixture at the University of Miami since 2008, celebrating undergraduate research from a wide range of disciplines. It provides a platform for students to present their research to a wide audience, bringing together students, faculty, and staff from all campuses, departments, as well as the broader Miami community. The RCIF is an opportune occasion for undergraduates of all experience levels to obtain feedback about their research and interact with peers.

This year is different. Across the globe, life has changed dramatically in response to the COVID-19 public health emergency, and colleges and universities are no exception. We empathize with the losses felt through campus closures, event cancellations, and physical separation; all this against the backdrop of the tragic loss in human life. Nevertheless, we remain committed to our mission of supporting undergraduate research, the importance of which has only been emphasized by the current pandemic.

Though the physical 2020 RCIF event has been cancelled, we are thrilled to be able to honor the students who have worked diligently to present their undergraduate research. This year's RCIF showcases 107 undergraduate presenters, representing all nine undergraduate colleges. Research was done on all three campuses, under the guidance of 75 mentors, within 39 departments. This truly is a testament to the diversity of ongoing projects at the University of Miami, and confirms our position as a leading research institution.

We would like to thank the research mentors who invest a great deal of their time and energy to support undergraduate research; this event would not be possible without their guidance. We would also like to thank the undergraduate student researchers for their hard work and commitment to prepare their research projects for presentation. As RCIF continued to grow, this year we welcome the collaboration from additional campus partners: The College of Arts and Sciences, Student Government Association, and UConnect, UM's undergraduate research student organization.

We encourage you to take the time to read and appreciate the outstanding achievements of our undergraduate Miami Hurricanes in this abstract book. Countless hours were devoted to each project, and the book will provide deserved recognition to our researchers. Thank you for joining us in this endeavor and for your continued support.

Michael Gaines

Director of Undergraduate Research and Community Outreach



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**About this book:** *We are pleased to present all approved abstracts for the 2020 Undergraduate Research, Creativity, and Innovation Forum. Abstracts are listed within students' school or college, under their selected research discipline: Arts, Biological Sciences, Engineering, Humanities, Physical Sciences, or Social Sciences. We are proud to have representation from all nine undergraduate colleges. Special thanks to the entire UGR team, including Cassidy Ragunas, Corinne Allen, and Sage Rains, student employees who worked meticulously (and remotely) to compile this document.*



**GABRIEL SOOMAR** *Junior / Architecture*

*Research Mentor: Germane Barnes / Architecture*

## THE LEGACY OF CARNIVAL AS A LENS FOR SPATIAL MOBILITY

Throughout history, race has been a critical factor in the production of space. In places like Trinidad and Tobago; it determines access to wealth, education, power, and, most importantly, spatial mobility. The social hierarchy in Trinidad was dictated by this dynamic – plantation owners at the top of the social ladder, followed by East Indian indentured servants, and finally West African slaves at the bottom. It was this legalized segregation that ultimately led to the conception of one of the country's most popular events of the year – Carnival. Trinidad's carnival is much more than just a three-day event comprised of music, bodily freedom, and hedonism. European slave owners would stage elegant festivities during the period between Christmas and the Lenten seasons. This form of carnival was strictly for the elite white members of society and consisted of masquerades, where they would transverse large estates which held different festivities at each location. A modest parade would lead the privileged individuals from plantation to plantation along a planned route that highlighted the differences in spatial organization of domesticity. Slaves were traditionally banned from these celebrations and responded by creating their own festivities that were celebrated in a much more secretive manner within their own living quarters. Mimicking the behavior they saw from the elite members of society, miniature parades were hosted within the barrack ranges – a long shed built along a wall with a small strip of yard, divided into six, eight or ten rooms of twelve square feet, each being occupied by a whole family or by four single men. Compared to the spacious grounds of the white elite, this intimate version of Carnival was deficient in many aspects not limited to human congregation capacity. Slave emancipation yielded new spatial possibilities for the discriminated population and a new celebration known as “Canboulay” was created. Although carnival has transformed greatly, the festival is rooted in a history of resistance and emancipation; the modern-day carnival is inaugurated by the reenactment of many of these traditions, like Canboulay, in commemoration of this history. Carnival is an important event to investigate issues related to collective domestic identity, planning and spatial mobility.

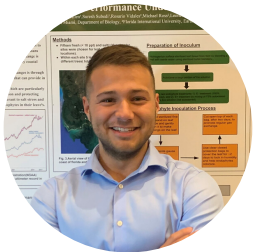


**ANAM AHMED** *Freshman / Microbiology & Immunology*

*Research Mentor: Dagmar Klein / Diabetes Research Institute*

### DEVELOPMENT OF A NOVEL MONITORING SYSTEM FOR INSULIN-PRODUCING BETA CELLS

Type 1 diabetes (T1D) is an autoimmune disease, in which the insulin-producing beta cells in the pancreatic islets are destroyed by the immune system. There is no cure for T1D. The only treatment is insulin administration to control high glucose levels in blood. A long-term treatment is pancreatic islet transplantation; however, the shortage of donors and necessity of additional infusions decreases the method's feasibility. Using bone morphogenetic protein 7 (BMP-7), scientists have established a method to reprogram non-endocrine pancreatic tissue (hNEPT) into insulin-producing cells without genetic modifications. This experiment examines a method to monitor insulin secretion of newly programmed cells using the Gaussia Luciferase (GLuc) reporter under the control of Synthetic Human Insulin Promoter (SHIP). Expression of insulin activates GLuc production, which is secreted into culture medium. GLuc catalyzes the added substrate-coelenterazine, resulting in luminescence. We hypothesized that the amount of secreted insulin will directly correlate with the amount of GLuc. To confirm our hypothesis, the GLuc/SHIP construct was transfected into mouse insulinoma cells and into the negative control-fibroblast cells. The resulting bioluminescence showed the specific expression from insulin-producing insulinoma but minimal amount from the fibroblast controls. The results were statistically significant with p-values  $<0.001$ . This project aims to provide a method to monitor beta cells in vitro but may be applied to other biological processes in vitro and in vivo. Production of insulin-secreting, beta-like cells would mitigate the shortage of pancreatic islets for transplantation, furthering research to establish a cure for T1D.



**PRESTON ALLEN** *Junior / Biology*

*Research Mentor: Michelle Afkhami / Biology*

### MICROBIOMES IN MANGROVES AND THEIR ECOPHYSIOLOGICAL EFFECTS ON TREE PERFORMANCE UNDER SALINITY STRESS

Anthropogenic global change is causing substantial threats to biodiversity and many ecosystem services on which humans depend. For instance, sea-level rise due to climate change is rapidly increasing the salinity stress experienced by coastal species. One potential avenue for dealing with these changes is through interactions with beneficial microorganisms that can provide in situ stress amelioration. Mangroves, which are particularly important trees for reducing coastal erosion and protecting against hurricane impacts, are fairly tolerant to salt stress and host a diverse assemblage of fungal endophytes in their leaves. Here, we test whether the leaf endophytes in mangroves underlie their tolerance to salinity and how increased salinity impacts endophyte community composition. We are surveying the community composition of endophytes in red mangroves (*Rhizophora mangle* L.) from Everglades National Park. In addition, we are testing the how inoculation of mangroves with endophytes affects plant growth, survival and ecophysiological performance of plants exposed to stressful conditions in growth room experiment. Specifically, we are testing how inoculation with endophytes isolated from 30 natural habitats affect morphological and biochemical characteristics that enhances or suppresses the ability of mangroves to grow in high and low stress environments. This work provides insight into knowledge of symbiotic associations in salt-tolerant species, which can inform restoration and management of vulnerable coastal ecosystems already threatened by sea-level rise.



## ISABELLA ALTILIO BOVE

*Junior / Biochemistry & Nutrition*

*Research Mentor: Claudia Rodrigues / Interdisciplinary Stem Cell Institute*

### LOSS OF ENDOTHELIAL C-MYC TRIGGERS OBESITY IN AGING MICE

Obesity is a major public health problem worldwide, affecting people from all ages. Endothelial cells play a central role in tissue homeostasis. Endothelial dysfunction is a hallmark of obesity and an early predictor of cardiovascular disease. Little is known regarding endothelial mechanisms that trigger obesity. The transcription factor c-Myc is a master regulator of the genome. Our group has recently reported that reduced expression of c-Myc in the endothelium triggers endothelial dysfunction characterized by cellular senescence and inflammation. The aim of this study was to investigate the impact of endothelial c-Myc loss in metabolism and the development of obesity in vivo using an endothelia-specific c-Myc knockout mouse model. By 16-months of age, we observed a 58.82% increase in body fat in c-Myc KO mice relative to control. Weight gain was associated with high percentage of total cholesterol in c-Myc KO during aging (3M  $108.8 \pm 8.6$  vs 16M  $140.2 \pm 10.2$  mg/dL,  $p < 0.03$ ) which was not significantly affected in control animals (3M  $100.8 \pm 4.8$  vs 16M  $120.8 \pm 10.6$  mg/dL). Sera analysis showed that c-Myc KO mice has high circulating levels of leptin relative to control ( $4143 \pm 658$  vs  $1490 \pm 170$  pg/mL,  $p < 0.02$ ). Furthermore, c-Myc KO mice show decreased energy expenditure, as indicated by reduced oxygen consumption, carbon dioxide production and heat generation. These results suggest a novel potential role for endothelial c-Myc in the development of obesity.



## MARYLOURDES ANDREU

*Freshman / Neuroscience*

*Research Mentor: Shyam Gajavelli / Miami Project to Cure Paralysis*

### LACK OF EFFECT OF CLINICAL-GRADE HUMAN NEURAL STEM CELL (HNSC) TRANSPLANTS ON PROGRESSION OF PENETRATING TRAUMATIC BRAIN INJURY (PTBI) LESION IN ATHYMIC RATS.

Traumatic brain injury (TBI) is a progressive disease, characterized by disability due to loss of neural tissue. While pursuing the safety of cell therapy approach in pTBI in athymic rats, we hypothesized that quantitation of pTBI lesion will determine role of immune cell depletion on transplant mediated beneficial effects. Adult male athymic Sprague Dawley (SD) rats were subjected to unilateral pTBI via inflation of elastic balloon attached to perforated probe inserted through right frontal cortex. One-week post-injury animals were randomized to either Group A perilesional injection of vehicle or Group B perilesional injection of 3 million GFP. Animals were euthanized 6 months post-transplantation. Slides were stained, brain sections were scanned, areas of lesion, right/left ventricles, intact left hemisphere, whole brain, calcifications, transplant were measured with Matlab CalLesion/Olympus cellSens Dimension. Animals in both groups had lesion, while only Group B showed engraftment. Transplant area averaged 8.25% of intact hemisphere. The lesion size  $17.7 \pm 8.138$ ,  $17.65 \pm 6.45$  % of intact hemisphere in Groups A/B respectively was not significantly different. Lack of pTBI lesion mitigation, despite robust engraftment in athymic SD rats was in contrast to previous work in immunosuppressed rats where pTBI lesion size  $22.53 \pm 2.86\%$  in untreated injured group was diminished to  $9.171 \pm 1.53\%$  in treated group even with 30% fewer cells. These findings suggest the beneficial effects associated with transplants are in part due to the appropriate levels of T/B-lymphocytes, not NK cells/IgM response. Access to large numbers annotated brain sections offers an opportunity to automate image classification/lesion quantitation with Convolutional Neural Networks (CNN).





**SARTHAK CHAKRAVARTY** *Junior / Biochemistry & Molecular Biology*

*Research Mentor: Roshni Thakkar / Neurology*

### SAFETY AND EFFICACY OF INTRA-ARTERIAL EXOSOME TREATMENT AFTER STROKE IN THE RAT BRAIN

Stroke is a leading cause of death and disability worldwide. Despite the available management, more than 50% of stroke survivors live with disability. There is a dire need for development of new stroke therapies. Recent studies have shown potential in cell-based therapies, like stem cell derived extracellular vesicle called exosomes. Exosomes mediated transfer of miRNA promotes neurite remodeling and has provided functional recovery in rats. We propose IA delivery of exosomes in a dose-escalation study to establish safety and early efficacy. Female ovariectomized Sprague-Dawley rats were exposed to reversible Middle Cerebral Artery occlusion (rMCAo) for 90 mins. Rats were treated with IA exosomes (10, 50, or 100 $\mu$ g), IA Mesenchymal Stem Cells (MSCs) (105 cells) or IA phosphate buffered saline (PBS), all at 24 hours post-rMCAo. To test functional efficacy, we used the Neurological deficit score (NDS) and the rotarod test at 7, 15 and 30 days after treatment. NDS of IA exosomes 10 and 50  $\mu$ g at POD 30 significantly improved in comparison to other groups ( $p < 0.05$ ). IA exosomes 50ug and IA MCSs showed a trend of improvement in motor coordination. Stroke volume of IA exosome 50ug was smaller than other groups, and IA exosome 100ug had larger stroke volume than other groups including IA PBS at POD 30.



**WIL HARRIS** *Senior / Biology & History*

*Research Mentor: Barbara Whitlock / Biology*

### VIVIPARY IN TILLANDSIA AND ITS RELATIONSHIP TO PHENOLOGY

Vivipary in plants is the phenomenon of seed germination within parental tissues. Researchers hypothesize that vivipary allows plants to establish themselves faster in unpredictable environments, as observed in mangroves. Some taxa of epiphytes, plants that live commensally attached to trees, also demonstrate vivipary, which is theorized to be adaptive for the unstable arboreal environment. However, neither records of vivipary nor adaptive hypotheses for vivipary are well developed for the genus Tillandsia, preeminent new-world epiphytes. Here, we catalog the occurrence of vivipary in South Floridian Tillandsia species. We propose that because Tillandsia species are wind and not animal dispersed, vivipary is non-adaptive and arises from changes in phenology. We performed several experiments testing the effects of environmental variables on several aspects of Tillandsia reproduction and vivipary (dispersal, dehiscence, and viability). We observed fruits under conditions mimicking the Florida wet and dry seasons to study the effects of humidity on dehiscence, and discovered that dehiscence only occurs in *T. fasciculata* and *T. utriculata* when exposed to low humidity, showing that air plants avoid dehiscence in conditions conducive to vivipary. We also simulated dispersal events which demonstrated that unseasonal precipitation and germination detrimentally affect the ability of seeds to leave the parent fruit. Our results suggest that although vivipary has been proposed to be adaptive to epiphytic life history, vivipary in Tillandsia is likely related to unseasonal weather disrupting phenology. Future studies should continue to compare the long-term effects of vivipary in the Tillandsia genus to other viviparous species.



## **TYLER KASHUV**

*Junior / Biochemistry & Molecular Biology & Physics*

*Research Mentor: Harrys K.C. Jacob / Surgery*

### MODULATION OF THE PDAC TUMOR MICROENVIRONMENT – “THE EXTRAVESICULAR LINK”

Pancreatic ductal adenocarcinoma is a very aggressive cancer with one of the lowest survival rates. Recently, extracellular vesicles (EVs) of endocytic origin ranging from 30–100nm have emerged as key players in the intercellular communication between cancer cells and their microenvironment. The following is a systematic characterization of the proteome of EVs secreted from Pancreatic Stellate Cells (PSCs) and cancer cells grown in isolation and/or in co-culture conditions. A pancreatic cancer cell line was generated from an LSL-KrasG12D/+;LSL-Trp53R172H/+;Pdx-1-Cre GEMM mouse using a CD326+/CD45-/CD31- enrichment strategy. Fresh stellate cells were isolated from normal C57BL/6 mice. Cells were grown in exosome-depleted media and EVs were isolated using a PEG-based enrichment strategy. Transmission Electron Microscopy and western blotting were used to confirm isolation of a pure population of EVs. A CD9-based enrichment was done, and proteins were digested and subjected to mass spectrometry on an LTQ-Orbitrap Velos Pro. A total of 721, 400, and 540 proteins were identified from KPC, stellate, and co-culture conditions, respectively, with 267 of the proteins identified globally. We discovered that IGF transport, assembly of collagen fibrils, ECM initiation and degradation, and platelet and neutrophil degranulation pathways were enriched in EV fractions. To our knowledge, this is the first report of a proteomic characterization of EVs released from the co-culture of cancer and stromal cells. This study provides evidence of signaling proteins that could mediate stromal-cancer cross-talk affecting the initiation of ECM remodeling. Inhibition of EV release might provide a better solution to control ECM remodeling and desmoplastic transformation.



## **MAHITHA KUNAMNENI**

*Junior / Neuroscience & English*

*Research Mentor: Daniel Liebl / Neurological Surgery*

### THE ROLE OF TMEM97 FOLLOWING TRAUMATIC BRAIN INJURIES

Traumatic brain injuries (TBI) are a leading cause of death and disability in the United States. A TBI may lead to seizures, nerve damage and strokes resulting in long-lasting damage to neurons and glia. To date, all therapeutic attempts have failed to significantly reduce cell death after a TBI, warranting the need for a better understanding of cell death processes. Previous evidence shows that the regulation of cholesterol trafficking is disrupted after brain injury. Lysosomal cholesterol dispersion is critical to normal cellular membrane homeostasis, but the molecular entities responsible for sterol dysfunction following TBI remains unknown. We became interested in transmembrane protein 97 (TMEM97) because it is implicated in lysosomal sterol trafficking. We hypothesize that TMEM97 is misregulated after injury, causing sterol retention and ultimately cell death. To assess the effect of TMEM97 on cell survival after injury, we administered DKR-1677, a novel TMEM97 antagonist, intraperitoneally in mice for 7 days post injury (dpi). We then quantified the number of surviving neurons and oligodendrocytes using unbiased stereological assessment in the cortical penumbra. We observed no difference at 1dpi, but a lack of significant cell loss at 7dpi. Additional examination revealed improved cell survival at 1dpi, but not at 7dpi, when TMEM97 was genetically deleted. Future studies will consider the kinetic properties to enhance DKR-1677 efficacy. Overall, these studies reveal the importance of cholesterol trafficking after a TBI.



## LAUREN LOTENFOE

*Senior / Biology*

*Research Mentor: Fangliang Zhang / Cellular & Molecular Pharmacology*

### THE CELLULAR LOCALIZATION OF ATE1 IN RESPONSE TO STRESS

Arginyltransferase 1 (Ate1) an evolutionarily conserved enzyme, mediates arginylation, a poorly-understood protein posttranslational modification (PTM) in eukaryotic cells. Studies have shown that Ate1 and arginylation play an important role in cardiovascular development, cell motility, and the stress response. In the stress response, Ate1 and arginylation have a pro-apoptotic role, they are upregulated during the general response to stress and induce cell growth arrest and cell death. Additionally, the downregulation of Ate1 causes an increase in stress resistance, while the overexpression of Ate1 activates Aif1-dependent apoptosis. While, the role of arginylation and Ate1 is known, little is known about the localization of Ate1. Studies found it diffused in the cytosol and the nucleus. However, new evidence from our group suggests that Ate1 may also be localized inside the mitochondria although Ate1 does not contain a common targeting peptide sequence for it. We hypothesize that the localization of Ate1 may be affected by external stress. This study focuses on determining the Ate1 targeting sequence for localization inside the mitochondria and its localization under external stressors. This will be done by transfecting plasmids containing a green fluorescent protein (GFP) tag and overlapping sequenced fragments to target the Ate1 locus of human embryonic kidney (HEK) and mouse embryonic fibroblast (MEF) wild type cells, then exposing the cells to differing levels of gamma irradiation and H<sub>2</sub>O<sub>2</sub> oxidative stress. We will use endogenous protein immunostaining to visualize the mitochondria and compare the spatial overlap with the GFP-tagged Ate1 fragments to determine its position in the cell.



## MARISSA MIARA

*Senior / Neuroscience*

*Research Mentor: Lucina Uddin / Psychology*

### EXAMINATION OF INTERHEMISPHERIC AND INTRAHEMISPHERIC PATHWAYS IN A PATIENT WITH CALLOSAL AGENESIS USING DIFFUSION TENSOR IMAGING

White matter consists of myelinated axons that connect neurons in different parts of the brain. The largest white matter bundle is the corpus callosum that connects the left and right cerebral hemispheres. The main function of the corpus callosum is to transfer sensory, motor, and cognitive signals to and from both hemispheres. Agenesis of the corpus callosum is a congenital condition where the corpus callosum is partially or completely missing. Individuals with this disorder tend to have altered white matter structures and some cognitive deficits. Previous research in an adult who had a complete commissurotomy (surgical removal of white matter pathways connecting the two hemispheres as a treatment for epilepsy) identified a subcortical pathway within the brainstem with increased white matter integrity that possibly served as a compensatory mechanism for the transfer of information across hemispheres (Nomi et al, 2019). It is currently unknown if similar compensatory mechanisms exist in a child born with complete callosal agenesis. Therefore, the present study aimed to compare interhemispheric and intrahemispheric white matter pathways in a 9 year old child born with callosal agenesis with a typically developing age-matched group ( $M = 8.6$ , range = 7-10) using diffusion tensor imaging (DTI) tractography. Extra-callosal pathways for communication were quantified by means of fractional anisotropy (FA; a measure of structural connectivity), and the differences in organization and structural integrity were compared between the agenesis patient and typical controls. Unlike the results found in the previously studied commissurotomy patient, few differences in FA values for both intrahemispheric and interhemispheric pathways between the patient and comparison group were observed. These results may suggest that the plasticity of the young brain may reorganize itself in a different manner compared to a commissurotomy patient as a compensatory mechanism to maintain typical cognitive abilities.





**SASHA MILBECK** *Sophomore / Neuroscience*

*Research Mentor: Sanjoy Bhattacharya / Ophthalmology*

**ALTERATION IN LYSOPHOSPHOLIPIDS AND CONVERTING ENZYMES IN GLAUCOMATOUS OPTIC NERVES**

Purpose: To determine whether lysophospholipid profiles and corresponding conversion enzymes in the lysophospholipid pathways are altered in the optic nerve (ON) between human control and glaucoma samples. Lipids extracted from control (n = 11) and glaucomatous (n = 12) ON samples using Bligh and Dyer method were subjected to high-resolution mass spectrometry on a Q-exactive mass spectrometer coupled with a high-performance liquid chromatography (HPLC; Accela 600) system. Analysis was performed for lysophospholipids, phospholipids, and glycerides using LipidSearch and MetaboAnalyst. Lysophospholipid synthesis and degradation pathway maps, utilizing UniProt and BRENDA database entries as needed, were created using Kyoto Encyclopedia of Genes and Genomes (KEGG) based tools. The mRNA expression level in normal and glaucomatous human ON were analyzed using Gene Expression Omnibus (GEO) entry GSE45570. PHAST gel and Dot Blot were used for normalization of protein amounts across samples. Western blot, ELISA, and protein quantification were performed using established protocols. Principal Component Analysis (PCA) of ON lysophospholipid profile placed control and glaucomatous ONs in two distinct separate groups. Mass spectrometric analysis of ON revealed decrease in lysophosphatidic Acid (LPA), lysophosphatidylethanolamine (LPE), lysophosphatidylcholine (LPC), and significant increase in diacylglycerol (DG) in glaucomatous ON. Statistical analysis of LPL conversion enzymes revealed significant over-expression of LPIN2, PLPP3, LCAT, and PLA2G5, and a significant down-regulation of GPAT4 at mRNA level in glaucomatous ON. Western blot and ELISA confirmed proteomic differences between normal and diseased ON. Our analysis revealed alterations in specific LPL levels and corresponding select enzyme level changes in glaucomatous ON.



**LAURA MISIARA LINCHETA** *Sophomore / Biochemistry*

*Research Mentor: Priyamvada Rai / Medicine*

**NOVEL CHEMISTRY BASED METHODOLOGY FOR MEASURING DNA QUALITY CONTROL MECHANISMS AND ASSESSING THEIR THERAPEUTIC UTILITY IN RAS DRIVEN TUMORS AND CANCER CELL LINES**

RAS is a G-protein with the critical role of regulating cell growth. When mutated, it causes uncontrolled proliferation leading to tumorigenesis. Mutated RAS-signaling generates reactive oxygen species (ROS), which causes DNA breakage or cell death due to nucleotide oxidative damage. However, RAS driven cancers tend to overexpress the 8-oxo-dGTPase MutT Homolog 1 (MTH1) as a defense mechanism against ROS. Our lab has shown that there is a direct correlation between oncogenic RAS and MTH1 expression in tumor cells. Also, MTH1 knockdown significantly decreases cancer cell growth in mice and RAS expression; therefore, inhibiting MTH1 may achieve tumor-suppressive effects. Consequently, multiple research groups synthesized various MTH1 inhibitors, but results have been inconsistent. We hypothesize that the critical gap in the field is the lack of a sensitive assay to evaluate MTH1 enzymatic activity. To address this, we used the novel ATP-releasing guanine-oxidized (ARGO) assay, to assess MTH1 enzymatic activity in cancer cell lines as well as patient-matched tumor vs normal tissues. The ARGO probe is the substrate of MTH1, 8-oxo-dGTP, conjugated to ATP. The chimeric ARGO probe generates ATP following its cleavage in response to 8-oxo-dGTPase activity, which can be directly detected as luminescence. The ARGO assay showed that MTH1 enzymatic activity is variable between cancer patient tissues and tumor cell lines, and it did not always correlate with MTH1 protein expression. Our findings indicate that the ARGO assay is an invaluable tool to supplement immunohistochemical detection of MTH1 protein expression, in the successful stratification of patients to MTH1 inhibitors.





**SHWETHA MUDALEGUNDI** *Senior / Neuroscience & Public Health*

*Research Mentor: Roberta Brambilla / Neuroscience*

### ASTROGLIAL TNFR2 SIGNALING IS IMPLICATED IN THE REGULATION OF LEARNING, MEMORY AND ANXIETY

Tumor necrosis factor (TNF) is a pleiotropic cytokine implicated in key physiologic and pathologic processes in the central nervous system (CNS). These range from modulating synaptic plasticity, thereby regulating memory and cognitive function, to participating in the pathophysiology of neurologic disorders such as multiple sclerosis, Alzheimer's disease, stroke. TNF exists in two forms, transmembrane (tmTNF) and soluble (solTNF), whose functions are mediated by TNFR1 and TNFR2. The signals activated by the two receptors are often opposite: TNFR1 mediates apoptosis and inflammation, while TNFR2 mediates cell survival, immunity and myelination. Studies with knockout mice have implicated TNFR2 in the regulation of cognitive function and anxiety-like behavior in physiological conditions. However, the cell type that contributes to this effect is still unknown. Since astrocytes are key players in synaptic function and express TNFR2, we sought to investigate whether astroglial TNFR2 could be implicated in regulating cognition and memory. To do so, we generated conditional knockout mice to selectively ablate TNFR2 in GFAP expressing astrocytes (GFAPcreERT2:Tnfrsf1bfl/fl mice). Ablation of TNFR2 did not alter basal locomotor function as measured with the open field and rotarod tests. However, it did impair spatial learning and memory, measured with the Morris water maze tests, disrupted cognitive function assessed by the novel object recognition test, and exacerbated anxiety-like behaviors assessed by the light-dark transition test. GFAPcreERT2:Tnfrsf1bfl/fl mice displayed astrogliosis and microgliosis in the hippocampus, with increased numbers of GFAP+ and Iba1+ cells. They showed upregulation of TNFR1 protein expression, as well as a marked increase in SNARE complex synaptic proteins (synaptotagmin 1/2, SNAP-25 and PCLO) and glutamate receptors (mGluR5 and NR1).

Taken together, our data show that astroglial TNFR2, by affecting glial and neuronal functions is a key modulator of hippocampal homeostasis. Furthermore, our data point at a role for astroglial TNFR2 in cognition, memory and anxiety. Further studies are warranted to better understand the mechanisms of these effects, and whether they are maintained under disease conditions.



**NATALIA PEREZ BAEZ** *Junior / Neuroscience*

*Research Mentor: Martin Oudega / Miami Project to Cure Paralysis*

### MACROPHAGE AND MESENCHYMAL STEM CELL INTERACTIONS SUPPORT BLOOD VESSEL FORMATION IN THE INJURED SPINAL CORD

Spinal cord injury (SCI) causes nervous tissue loss and, consequently, motor and sensory function impairments. The impact typically results in blood vessel rupture, increased inflammation, and neuronal death. Inflammation consists of the infiltration of immune cells, such as macrophages, that generate a cytotoxic environment at the injury site, inducing additional cell death. Mesenchymal stem cells (MSC) are multipotent stromal cells that secrete multiple paracrine factors. For that reason, MSC have been transplanted into the injured spinal cord where they were shown to support the formation of blood vessels (i.e., angiogenesis) as well as affect inflammation. Exposure to stressful stimuli, such as the inflammatory environment at the spinal cord injury site, increases MSC paracrine activity. We investigated if inflammatory priming of MSC enhances their angiogenic potential. The angiogenic potential of naïve MSC (nMSC) versus inflammation-primed MSC (pMSC) was compared by evaluating the rate and quality of tubule formation by human vascular endothelial cells in vitro, thereby modeling blood vessel formation. We found that pMSC tend to increase tubule and loop formation compared to control conditions. It was also noticed that there was a general decrease of tube network properties between the 8 hour and 16 hour timepoints. In the future, we will validate assay results and conduct immunoassays, like ELISA or Bio-Plex, to identify and quantify the proteins in each conditioned medium.



## KATHERINE RAFFENSPERGER

Senior / Neuroscience

*Research Mentor: Brian Noga / Neuroscience*

### ATLAS OF CHOLINERGIC NEURONS IN THE YUCATAN MICROPIG BRAINSTEM AFTER INDUCED LOCOMOTION

Previous experiments have implicated cholinergic brainstem neurons in the control of locomotion. Stimulation of the mesencephalic locomotor region (MLR) was used to induce locomotion and activate brainstem circuits producing locomotion. Locomotor neurons were identified using the activity-dependent marker c-Fos. Cholinergic neurons were identified using choline acetyltransferase (ChAT) immunohistochemistry. Experiments used a large animal translational model (Yucatan Micropig) of neurosurgery after implantation of deep brain stimulating electrodes into the MLR. Animals were either induced to walk on a manual treadmill with MLR stimulation or were left within their pen as non-stimulated, non-locomotor control. Cholinergic cells were found in the lateral dorsal thalamic nucleus (LDT), oculomotor nerve (NIII), dorsal raphe nucleus (DR), pedunculopontine tegmental nucleus (PPT), motor nucleus of trigeminal nerve (MV), and nucleus ambiguus (AM) in both control and locomotion animals. There was a small but significant increase in the percentage of activated cholinergic neurons in the PPT, a purported component of the MLR (0% vs.  $7.209 \pm 2.316\%$ ,  $p=0.0055$ ). Interestingly, there was a larger increase in the number of non-cholinergic neurons expressing Fos in cholinergic nuclei: LDT (0 vs.  $15.340 \pm 2.502$ ,  $p=0.0038$ ), PPT (0 vs.  $5.304 \pm 4.134$ ,  $p=0.0027$ ), and AM (0 vs.  $7.113 \pm 0.109$ ,  $p<0.001$ ). This data suggests minimal involvement of cholinergic neurons in the production of MLR evoked locomotion. Additionally, other, non-cholinergic neurons within these nuclei may activate during locomotion. Knowledge of the location and activation of different neuronal phenotypes within the brainstem is important for translating neuromodulation strategies (like DBS) for improving gait in persons with Spinal Cord Injury or Parkinson's Disease.



## VARUN REDDY

Junior / Neuroscience

*Research Mentor: Ami Raval / Neurology*

### EFFECTS OF ENDOGENOUS ESTROGEN FLUCTUATIONS ON THE POST-ISCHEMIC INNATE INFLAMMATION IN THE BRAIN OF FEMALE RATS.

One out of five women suffer stroke after menopause in the United States. Menopause is characterized by decline in endogenous estradiol-17 beta (E2). Women appear to be naturally protected against ischemic neuronal damage during pre-menopausal life. Thus, a better understanding of the mechanisms by which endogenous estrogen fluctuations govern the female brain is required. E2 reduces stroke-induced ischemic brain damage by inhibiting inflammation and the inflammasome which is a key component of innate immune response. The aim of current study is to test effects of higher and lower levels of endogenous E2 on post-stroke inflammasome proteins. We hypothesized that prevailing higher levels of endogenous E2 during estrus would protect the brain from ischemic injury by reducing inflammasome activation. We tested the hypothesis using young female, retired breeder, and age-matched male Sprague-Dawley rats. Rats were randomly exposed to transient middle cerebral artery occlusion (tMCAO; 90 min) or sham surgery. Twenty-four hours after tMCAO, brains were removed rapidly and the area of infarction was measured using ImageJ software. In a separated cohort of rats, brain tissue was collected for western blot analysis 24h after tMCAO/sham surgeries. We observed significantly ( $p<0.05$ ) reduced infarct volume in young female rats, which underwent tMCAO during estrus stage as compared to diestrus stage. Results also showed that the brain of young rats had significantly lower infarct volume and reduced inflammasome activation in the brain as compared to reproductively senescent female rats. Our study demonstrated that endogenous E2 regulates innate immune response in the brain of female rats.



**ALEXANDER RIVERO** *Freshman / Neuroscience & Business Management*

*Research Mentor: Shyam Gajavelli / Miami Project to Cure Paralysis*

### EVALUATING THE INFLUENCE OF PRE-HOSPITAL CHARACTERISTICS OF TRAUMATIC BRAIN INJURY ON RACE-ETHNIC DIFFERENCES IN MORTALITY

Traumatic brain injury (TBI) induces physiological disruption of brain function at the time of injury. Hospital and post hospital care drive disparities in TBI outcomes, as do Race-ethnic differences in populations. This study evaluates how prehospital characteristics affect TBI outcomes in diverse South Florida (SF) populations.

Data from Jackson Memorial Hospital (JMH) of 3,740 patients, between the years 2008-2013, was used. Demographic differences were evaluated with Students t-test, Pearson  $\chi^2$ , and logistic regression. No differences were found in Glasgow Coma Scale (GCS) scores, a measure of acute brain injury, across the four demographics (white,  $n=1,069$ ; black,  $n=810$ ; Hispanic,  $n=1,843$ ; and other,  $n=18$ ). Nevertheless, statistically significant ( $P < 0.05$ ) differences between races were due to insurance, pre-hospital transport, and cause of injury. Once adjusted, the main factors of mortality were age ( $> 50$ ), lack of insurance, Medicare and cause of injury (weapons or violence). White males had greater risk of violent TBI than white females (OR 4.11). Unlike white females who experienced vehicular TBI, black females were far more likely to suffer violent TBI (OR 7.27), as were black males compared to white males (OR 2.04). Among Hispanics, males were more likely to suffer violent TBI than their female counterparts (OR 4.55). In aggregate, despite limitations, such as comorbidities, nature of hospital (JMH, a trauma center), consistent with national trends, prehospital characteristics contribute to disparities in SF too. Future work should aim to discover factors contributing to race-ethnic and sex differences.



**LAURA ROSOK** *Senior / Neuroscience & Vocal Jazz Performance*

*Research Mentor: Lucina Uddin / Neuroscience*

### MAJOR DEPRESSIVE DISORDER AND THE DEFAULT MODE NETWORK: A RESTING-STATE FMRI ANALYSIS

A number of studies have evaluated the connection strength between regions implicated in major depressive disorder MDD. Among these implicated ROIs is the default mode network (DMN), which consists of the posterior cingulate cortex (PCC), ventral anterior cingulate cortex (vACC), medial prefrontal cortex (mPFC), precuneus, and lateral and inferior parietal cortex (Hamilton, J. P., Farmer, M., Fogelman, P., & Gotlib, I. H., 2015). A dynamic resting state fMRI study found a stronger connection between the sgPFC and DMN in MDD patients than those without MDD (Hamilton et al., 2015). Several task-based fMRI studies found that increased vACC and mPFC activity, as well as vACC and hippocampus suppression of dorsal cortical activity, is associated with MDD (Masten et al., 2011; Hamilton, J. P., Farmer, M., Fogelman, P., & Gotlib, I. H., 2011). Masten et al. found that sgACC is active in teens who would later develop depression (2011). A structural fMRI study also discovered that the sgACC is abnormally reduced in size in MDD patients (Drevets WC., Savitz J., Trimble M., 2008). The findings from these dynamic resting state, task-based, and structural fMRI studies will aid the current static resting state fMRI study. The study will utilize a large sample of NKI data containing Beck Depression Inventory diagnoses to conduct a whole brain voxel-wise ROI analysis using coordinates from the medial prefrontal cortex.





## SHARNIKHA SARAVANAN

*Senior / Neuroscience & Health Science*

*Research Mentor: Ami Raval / Neurology*

### POST-STROKE PHYSICAL EXERCISE REDUCES ISCHEMIC BRAIN DAMAGE AND IMPROVES COGNITION IN REPRODUCTIVELY SENESCENT FEMALE RATS

Stroke disproportionately kills more women than men, and one in five women suffer a stroke. Importantly, a woman's risk for stroke increases exponentially after the onset of menopause. Cognitive decline is a significant consequence of stroke survivors and two-thirds of stroke survivors experience cognitive deficits. Our earlier study demonstrated that physical exercise (PE) reduced post-stroke brain injury and improved cognitive functions in male rats. However, the efficacy of PE in female counterparts remains elusive so it is the focus of our current study. Reproductively senescent Sprague-Dawley female rats were exposed to transient middle cerebral artery occlusion (tMCAO; 90 min) and randomly assigned to either PE or sham-PE groups. After three to five days, rats underwent sham-PE (0m/min speed) or PE (15m/min speed) for 30 minutes on alternate days for five times on a treadmill. The rats that underwent alternate day paradigm were treated with ER- $\beta$  agonist (beta 2, 3-bis(4-hydroxyphenyl) propionitrile; DPN; 1mg/kg) or vehicle-DMSO immediately following PE/sham-PE session to determine the synergistic effect with physical exercise since ER- $\beta$  agonist is shown to reduce ischemic damage. Seven days after the last PE/sham-PE, rats were tested for hippocampal-dependent contextual fear conditioning and freeze time was measured. Results indicated that the alternate PE regimen increased freezing on the second day of fear conditioning by 15%, indicating improved spatial memory. Overall, the study suggests that an alternate day PE paradigm and ER- $\beta$  activation improves post-stroke cognition, and future studies delineating underlying mechanisms could help identify therapies to reduce stroke-related cognitive decline in stroke patients.



## ASHLEE SEALY

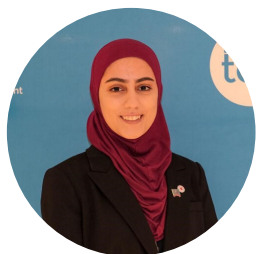
*Sophomore / Biochemistry & Molecular Biology*

*Research Mentor: Stephan Schürer / Pharmacology*

### UTILIZING COMPUTATIONAL METHODS TO IDENTIFY POTENTIAL SMALL MOLECULE KINASE INHIBITORS OF THE MITOTIC CHECKPOINT SERINE/THREONINE-PROTEIN KINASE BUB1 BETA

The NIH's Illuminating the Druggable Genome (IDG) project promotes the investigation of historically understudied kinases. To aid in target validation efforts and further study the biological and molecular roles of these kinases, selective and potent molecular probes must be discovered and developed. BUB1B is one such kinase with no known molecular probe compounds which satisfy the activity threshold of  $<30\text{nM}$  (referred to as target development level (TDL), Tbio). BUB1B was identified as a kinase of interest in a pan-cancer genomic, transcriptomic, pathologic and clinical study of all kinases in The Cancer Genome Atlas (TCGA). Our work has shown that BUB1B is overexpressed in 19 solid-tumors and its increased mRNA levels correlate with negative clinical outcomes including overall survival and TNM staging. BUB1B is known to play a role in mitotic checkpoints and interacts closely with known cancer targets AURKB at the anaphase promotive complex. Utilizing a combination of computational methods, we have scored and rank-ordered over 10,000 predicted small molecule inhibitors for BUB1B. Multiple sequence alignment was used to identify a homologous kinase to BUB1B. Machine learning prediction data was queried to acquire top predicted compounds for top 50 homologous kinases to BUB1B, resulting in ~3 million predicted compounds. 37K compounds were filtered out for lead-like properties. Docking results showed MAPK1 compounds with top docking scores. Future research includes repeating these procedures with MAPK1 compounds, then high-scoring actives will be ordered to test in biochemical and cell-based screens to identify at least one molecular probe compound for BUB1B.





**SAHAR SHAFIQUE** *Senior / Biochemistry & Nutrition*

*Research Mentor: Elnaz Zeynaloo / Chemistry*

### REAL TIME, NON ENZYMATIC ELECTROCHEMICAL BIOSENSOR FOR GLUTAMATE DETECTION

A biosensor is a device that measures the presence of chemicals or biological compounds or reactions. In our study we use enzyme based electrochemical sensors to detect analytes like glutamate. Glutamate is a neurotransmitter in our brains that is used for excitatory brain processes in the central nervous system. Glutamate is the most abundant neurotransmitter in our brain and has a great role in the pathophysiology of Parkinson's disease, damage to the brain from trauma, stroke, and tumors and any changes in concentration or levels causes action potential misfiring. Therefore it is imperative to find a method to monitor glutamate levels in real time. Using carbon-electrodes for this cause is not only cost-effective but high in performance, and requires small samples. We use non-enzymatic carbon electrodes, placed gold for conductivity and then placed our genetically engineered periplasmic glutamate binding protein (GluBP) onto the layer of gold nanoparticle (AuNP) modified carbon printed electrodes. Cyclic voltammetry is used to measure the current of chemicals on the working electrode as well as to investigate the reduction and oxidation processes of molecular species. Our biosensor proved to highly favor glutamate over neurotransmitters such as L-DOPA and GABA, aspartate, glutamine, serine and lysine.



**ANUJ SHAH** *Junior / Microbiology & Immunology*

*Research Mentor: Shanta Dhar / Biochemistry & Molecular Biology*

### ORALLY ADMINSTRABLE THERAPEUTIC SYNTHETIC NANOPARTICLE FOR ZIKA VIRUS

Methods for targeted delivery of drugs have presented new opportunities for treating illnesses such as cancers and viral diseases. Infected Aedes mosquitoes transmit Zika virus (ZIKV), which leads to severe neurological complications. We have proposed that nanotherapeutic solutions will be more effective than traditional therapies in treating ZIKV. The drug ivermectin (IVM) was chosen to be encapsulated into biodegradable, polymeric nanoparticles to better treat ZIKV. We have developed Fc-IVM-NPs, nanoparticles (NPs) decorated with neonatal Fc receptor and loaded with ivermectin, to allow for the transport of ivermectin across the gut epithelial barrier and the controlled release of the drug in the ZIKV-infected blood, to ensure all virus-infected cells are killed. Our studies documented that when delivered with the synthetic nanoparticle, IVM can be accumulated in the blood at a higher concentration. Furthermore, preliminary studies highlighted that NP-delivered IVM has the ability to target and inhibit nonstructural protein 1, one of the main virulent proteins of ZIKV. To create an orally administrable, powdered, capsule formulation of the NPs, they were freeze-dried in the presence of cryoprotectants and tested to ensure maintenance of size, stability, and therapeutic effectiveness. Our preliminary in vitro studies documented that while ivermectin crosses the placental barrier, making it unsafe for the pregnant ZIKV population, the IVM-loaded nanoparticles did not show any significant placental barrier crossing, thus indicating its potential suitability for such populations. As a whole, this work fills a great unmet need by developing safer, more effective therapies for the treatment of viral infections, including ZIKV.



## MADELEINE SNIDER

*Senior / Neuroscience*

*Research Mentor: Elizabeth Losin / Psychology*

### EFFECT OF GENDER ON THE PERCEPTION OF PAIN IN OTHERS

A clinicians' assessment of patient pain is influenced by many factors aside from the patient's self-report. This provides the opportunity for inaccurate pain assessment and subsequent inappropriate pain treatment. Racial minorities and women are often particularly vulnerable to having their pain underestimated. This may be due in part to demographic biases that impact people's assessment of pain. However, the mechanisms behind these potential biases are not well understood. Here, we tested the hypothesis that both the demographics of the patient and the demographics of the pain perceiver would affect the amount of pain perceived in others. To test these hypotheses, participants (N=128) viewed videos of a diverse group of patients experiencing experimentally induced pain. Participants were then asked to rate the intensity of the pain they perceived each patient to be in. We found a marginal main effect of participant's gender, such that female raters provided higher ratings for pain intensity. This difference was greater for Black compared to both White and Hispanic patients. Finally, when controlling for the intensity of the patients' pain facial expressions, there was no longer a main effect of rater gender. However, there was a marginal interaction between rater gender and pain facial expression intensity such that pain facial expression intensity predicted pain intensity ratings more strongly for female raters. Together these findings suggest that males and females may differ in how they perceive the pain of different demographic groups, which may help explain pain assessment biases seen in healthcare settings.



## IVAN VARELA

*Junior / Neuroscience & Computer Science*

*Research Mentor: Julia Dallman / Biology*

### ASSESSING OPTOKINETIC RESPONSE IN ZEBRAFISH MODELS OF ASD

Autism Spectrum Disorder (ASD) is a condition affecting ~1.7% of children in the US, clinically characterized by impaired social communications and interactions, and restricted and repetitive behaviors. Recently, sensory deficits have been added to the list of characteristics by which this condition can be diagnosed, including lower tactile thresholds and aversion to visual input. The gene SYNGAP1 encodes scaffolding proteins in the postsynaptic density, and mutations in SYNGAP1 are prevalent in 1 to 2% of all cases of ASD, making it a major monogenic cause for the condition. An interesting behavioral assay to investigate the sensory-motor integration in our zebrafish (*Danio rerio*) ASD models is optokinetic response (OKR). This involuntary response is elicited by a moving landscape in the peripheral vision of a static body and is characterized by a slow eye movement and quick return to original eye position (known as saccade). Six days post fertilization zebrafish larvae were mounted in 3% methylcellulose. Once immobilized, eye movements were recorded as the larvae were shown three-minute videos of moving stripes at 10, 15 and 20 degrees per second projected onto a translucent screen. Tracking of eye angle and further analysis was performed using MATLAB open-source code. Although OKR was elicited normally at slower speeds, *syngap1* mutant zebrafish tracked slower and displayed fewer saccades than wildtype larvae ( $8.0 \pm 16.0$  vs.  $15.0 \pm 7.3$ ;  $p < 0.05$ ) with the 20 deg./s stimulus. Further research will help to gain better understanding of the brain circuitry affected by *syngap1* mutations during OKR in larval zebrafish.



## MAXWELL WRAY

Senior / Neuroscience

Research Mentor: Julia Dallman / Biology

### ASSESSING THE INTERACTION BETWEEN SYNGAP 1 AND 2-PHENOXYETHANOL U

Although anesthetics are commonly used, there are still many questions about their safety and mechanisms of action. In particular, it is known that some genetic neurological disorders can make patients more resistant to certain anesthetics or predispose them to complications such as grogginess and cognitive decline following treatment. Despite these risks, there are no guidelines specifying suitable anesthetics for treating patients who could be at risk such as those with Syngap1 haploinsufficiency who lack a functional allele. This condition features deficits in proper synaptic development, and is linked to intellectual disability, epilepsy, and autism spectrum disorder. To address these concerns, zebrafish larvae that were either homozygous dominant (wild type) or heterozygous for Syngap1ab were exposed to the popular fish anesthetic, 2-phenoxyethanol. The larvae were five days and six days post fertilization (dpf), and exposed to different doses for five minutes each until they were anesthetized, to determine if there were differences in dose responses. The data reveal no significant differences in dose response ( $n = 108$ ,  $P > 0.05$ )

## ENGINEERING



## LEILA ABDELRAHMAN

Senior / Chemistry

Research Mentor: Sanjoy Bhattacharya / Ophthalmology

### SAMPLE-TRACK: A MOBILE APPLICATION TO HELP RESEARCHERS TRACK THEIR CLINICAL DATA

Many researchers and scientists still struggle with keeping track of their samples' clinical information. Often times, they rely on pen and paper, methods that are both inefficient and susceptible to information loss. To solve this problem, we have developed an iOS application called Sample-Track that allows researchers to locally store anonymized sample data in a secure way on their mobile device. They can further share their findings with collaborators by exporting data as a .CSV file. Overall, this application streamlines the data collection and communication process. To collect information needed for the application architecture, sample parameters like including patient MRN number, medication list, ICD10 problem list, and others, were included as base features. To enhance performance, an object-oriented rather than a relational database was used to store information to the user's files application. The application was built in the XCode Internal Development Environment (IDE) using the Swift programming language. Performance and edge-case testing were completed using both iOS simulations and directly on the iPhone. Apple's TestFlight environment was the platform utilized for both internal and external beta-testing. The application received overall positive verbal feedback. To garner more quantitative information, IBM's Post-Study System Usability Questionnaire (PSSUQ) will be utilized in the future to parametrize the app's strengths and weaknesses. From the positive results thus far, we also plan to integrate other data sample sources, including mammals. By generalizing the application's uses, we hope to expand its impact on data collections for years to come.



**HALLE ALITZ***Senior / English & Economics**Research Mentor: Thomas Goodman / English***REINTERPRETING BEOWULF: GENDER AND MONSTROSITY**

Beowulf is an over a thousand-year old Anglo-Saxon poem that is widely considered to be the first great piece of English literature-- inspiring countless translations and adaptations. My study provides an overview of Beowulf's continuing presence in our society through the contemporary media of adaptive novels; films; graphic novels; comics; and children's literature produced over the past fifty years. I argue that, following the publication of John Gardner's *Grendel* in 1971, recent Beowulf adaptations have shifted to define the poem's themes of gender and monstrosity in new terms. The emphasis on gender roles and violence in modern Beowulf productions reflects contemporary society's fascination with such issues. The creators whose work I engage in my study promote topics that both they and their audience are interested in, and use Beowulf as a platform to do so. Adaptors' success in modernizing these themes has kept the poem alive and relevant into the 21st century. However, in prioritizing solely the issues that appeal to society's interests, recent media has failed to replicate important aspects of the original text- and resultantly the Beowulf we are presented with today is only a condensed version of what the extraordinary, thousand-year old poem has to offer.

**NATHALY GONZALEZ***Junior / Psychology & French**Research Mentor: Sarah Cash / English***THE SOLITUDE OF COLOMBIA: STORY AND SUBALTERNITY**

Stories and oral tradition have long been important to Colombia and Colombian culture, and it is through storytelling that the subaltern is allowed to speak and allowed to process the collective trauma of colonialism. In establishing an assumed reality as part of social capital, the invisibility of Colombia is further exacerbated through the condition of the establishment illegitimizing realism in magical realism. This is further complicated when the subaltern speaks through a voice that is not their own, but rather one imposed upon them through centuries of colonization. For this research project, I listened to and analyze the stories told by an indigenous Colombian woman after deciding not to use Gabriel Garcia Marquez's *100 Years of Solitude* as the definitive source of magical realism, in favor of a primary recounting of the oral traditions on which modern magical realism is based. This served to advance an understanding of how colonialism has shaped the self-identity and overall culture in Colombia. Further research is necessary to uncover these stories and considering the decolonization of reality; however, these findings serve as a foundation for the continuing exploration of the depths of colonialism's impact in Colombia.





## CHRISTINA JAYARAJ

*Junior / Biochemistry & Classics*

*Research Mentor: Vera Spika / Library Research Scholars*

### THE INFLUENCE OF WEARABLE TECHNOLOGY ON HEALTH INSURANCE POLICY

Healthcare is an incredibly complex topic that is extremely relevant economically and politically. It is a somewhat paradoxical subject as it affects all, but the entirety of its implications is understood by little to none. In the US system, healthcare is often directly tied to one's employment. With the advent of new technology, the divide between the workplace and the personal life of employees has become increasingly blurred. This project will aim to investigate the integration of wearable technology into the everyday lives of consumers, and the impact of this phenomenon on the relationship between employers, health insurance companies, and individual consumers. This poster will explore three main questions: The logistics and efficacy of the implementation of these devices, the motives of all parties involved, and the ethical implications of this phenomenon. The method employed to gather data in this project was a through literature review of the subject.



## NHADYA LAWES

*Sophomore / English Literature*

*Research Mentor: Roxane Pickens / American Studies*

### "A DIFFERENT IMAGE, ANOTHER SOUND": RESISTANT RHETORIC AND BLACK IDENTITY

It would be ridiculous to debate the presence of biased rhetorical structures in United States history and present-day practice. We live in a racialized society: there's not much growth or opportunity there. Yet, the deliberate manipulation of ideas and thought, and the power politics of who does that manipulating is worth consideration. Rhetoric is a weapon of the times; it is also our internal remedy. Rather than face outward for a cure, this project leans in to an interior perspective about the beauty and complexity of American blackness. To do so, my research looks at how and in what ways oppressive rhetoric has been rejected/reclaimed by the US black community across eras. The first component will look at brief histories of rhetorical oppression towards black people in the US. Past resistance movements such as the Chicago and Harlem Renaissances, and the Civil Rights, Black Power, and Black Arts movements will start the conversation of reclamation and resistance. My exploration of current practices will take a personal approach, as I use survey responses to look at what informs blackness for generations living in this time. This research will culminate with the creation of a composite of what I call "resistant/revisionist/remedial rhetoric," including verbal, written, and visual language, in an online digital collection. Ultimately, the project will shed light on interior studies of cultural blackhood, shifting the conversation of rhetoric and blackness from one of victimhood to agency and power.



## STEPHANIE PEREZ

*Senior / English Literature*

*Research Mentor: Thomas Goodman / English*

### REVISIONIST CONSTRUCTIONS OF HEROISM IN J.R.R. TOLKIEN'S THE LORD OF THE RINGS AND GEORGE R. R. MARTIN'S A SONG OF ICE AND FIRE

J.R.R. Tolkien's *The Lord of the Rings* and George R.R. Martin's *A Song of Ice and Fire* have been considered the hallmark of modern fantasy literature for the ways they have developed the genre. My thesis addresses how Tolkien and Martin challenge and revise conventional constructions of heroism. I argue that Tolkien keeps the archetypal characters of traditional heroic literature intact, but he reassigns their roles in the narrative and creates a new kind of hero meant to bridge the gap between the known world for his audience and his unknown world of Middle-earth. Martin, on the other hand, completely subverts expectations of the archetypal heroic figures by creating complicated and unpredictable versions of these archetypes that more accurately represent the human psyche. To explore these authors' challenges to conventional heroism, I provide an overview of theoretical definitions of the conventional hero as well as an analysis of how the conventional hero is portrayed across Western cultures. I focus on three ways that Tolkien and Martin challenge conventional heroism: the portrayal of Tolkien's protagonist and the lack of protagonist in Martin's series, the depiction of the knight figure, and the challenges to conventional portrayals of women. I also compare the methods of Tolkien and Martin, and ultimately conclude that while their methods vary, the effects of their challenges are the same: to create a narrative that allows a novel-reading audience to better engage with the fantasy world, the characters in it, and the underlying issues brought up by the narrative.



## DENISSE SANDOVAL

*Senior / Political Science & History*

*Research Mentor: Kate Ramsey / History*

### FREE WOMEN OF COLOR IN LATE EIGHTEENTH-CENTURY SAINT-DOMINGUE: HOW THEY WERE OBJECTIFIED BY WHITE MEN AND FREE MEN OF COLOR

In the colony of Saint-Domingue, before the Haitian Revolution, there existed a population of free people of color who found themselves in limbo between the black enslaved population and the white wealthy class. Born from mixed parents who tended to be white fathers and black enslaved mothers, they emerged as a new social group in the colony of Saint-Domingue during the late 17th and 18th centuries. In the 1780s and 1790s, free men and women of color became subjects of interest to white wealthy men such as Moreau de Saint-Méry and Michel Etienne Descourtilz, whose writings focus on the physical attributes of both sexes and their cultural habits. At the same time, there were free men of color such as Julien Raimond, who wrote on their experiences and tried to justify and establish their position as free men of color. This thesis aims to answer the following questions: How different were the views of white wealthy men and free men of color toward free women of color, in what ways were they similar, and why did they consider the depiction of free women of color important for their respective political agendas? Both groups of men viewed women of color as objects of desire, however, their grounds for this viewpoint differed, and likewise the goals that these two groups of men had in depicting such women in their writings. To support my thesis, two paintings from Italian painter Agostino Brunias are included that depict free women of color in social settings.

**BRICE SEWELL***Junior / Biochemistry & English Literature**Research Mentor: Joel Nickels / English***WASTE NOT TIME ON VANITY**

A close analysis and comparison of the memento mori tradition across mediums in representative samples of German poetry and Flemish still-life. The memento mori tradition is the remembrance that death is inevitable and that humanity must live with this foregone conclusion. Within the memento mori tradition several themes including vanitas, tempus fugit, and the well known carpe diem are utilized to give meaning to life and ultimately make sense of death as a universal human experience. Gryphius in his poem "Human Misery" and Mankes in his "Still Life with a Skull on a Book" endeavor to confront the ephemeral natural of the human condition and look forward without fear or remorse. It is only by this unmasking of death, that the individual is able to go on with life and enjoy it to the fullest.

**CHINOIA WEIR***Senior / Political Science & English Literature**Research Mentor: Frank Stringfellow / English***THE PSYCHOANALYTICAL PERSPECTIVES OF FEMALE LITERARY SUCIDES IN 19TH CENTURY LITERATURE**

Literary realism refers to a form of artistic literary expression that arose in the mid-19th century. These literary works often revolved around the life of a middle-class woman, usually married, who eventually pursues a romance outside of her marriage, which leads her down a path of existential questioning that ultimately ends with her suicide. The act of suicide became normalized in literary realism as a resolution—and perhaps sole solution—to the problem of existence that these female literary characters face. Leo Tolstoy's Anna Karenina, Kate Chopin's The Awakening, and Gustave Flaubert's Madame Bovary are a representational selection of such works that tell the story of a woman who commits suicide. All three novels utilize the trope that I will dub the "Unhappy Wife Syndrome", which mirrors Barbara Welter's concept of "True Womanhood". It becomes unmistakable how unhappy each protagonist (Anna, Emma and Edna) is with the reality of her life, and when affairs fail to fill the void in her life, she commits suicide. Freud's concepts of narcissism, the pleasure principle, and melancholia are reflected in the actions of each woman, and through Melanie Klein's constructions of the inner and outer worlds, we can understand why the actions of all three women mirror each other. Ultimately, these theories prove that there is something psychological within the woman, that when added to certain socio-economic conditions, a woman's life falls apart, and suicide becomes the only way of reconciling the fact that her inner and outer worlds are ultimately incompatible.





**JESSICA BAYUK** *Senior / Psychology*

*Research Mentor: Rebecca Shearer / Psychology*

THE RELATIONSHIP BETWEEN EMPATHY AND PEER PLAY BEHAVIORS IN VISUALLY IMPAIRED AND TYPICALLY DEVELOPING PRESCHOOL AGED CHILDREN AND TODDLERS

The aim of this study was to examine the relationship between empathy and peer play skills in typically developing and visually impaired (VI) preschool children and toddlers participating in an early childhood inclusion program. The following research questions were examined: (a) Are there changes from fall to spring in empathy and peer play skills among typically developing and VI preschool children and toddlers? (b) What are the associations between empathy and change in peer play skills over time, for both groups of children?

Participants included 64 children (N=5 classrooms) who were enrolled in the Miami Lighthouse for the Blind Early Learning Center from 2017-2019, a research-practice collaboration between Dr. Shearer's research team at UM and a community-based early childhood inclusion program. Peer play interaction, disruption, disconnection, and empathy were measured using teacher rated Penn Interactive Peer Play Scale (PIPPS-T) and the teacher rated Empathy Scale, respectively. We found that only empathy and play interaction positively changed over time. Group differences were found, with VI children scoring lower as a group on empathy and play interaction compared to peers. No group by time interactions were found; VI and non-VI children changed the same over time. Fall empathy levels and spring play interaction were positively associated, while fall empathy levels and spring play disconnection were negatively associated. Implications for policy and practice of the study findings suggest that inclusive early learning settings like the Lighthouse for the Blind Early Learning Center can benefit all children regardless of disability group, contradicting previous research.



**DANIELA BOLIVAR FORERO**

*Sophomore / Biology & Psychology*

*Research Mentor: Philip Harvey / Psychology*

**LAUREN AHERN**

*Junior / Biochemistry*



COMPUTERIZED FUNCTIONAL SKILLS TRAINING IN MILD COGNITIVE IMPAIRMENT: TRAINING ENGAGEMENT PREDICTS IMPROVEMENTS IN PERFORMANCE

Pharmacological interventions aimed at mild cognitive impairment (MCI) have not been successful. Computerized cognitive training (CCT) may have beneficial effects on cognition in people with MCI. Functional skills training across diagnoses is facilitated by CCT. Recent data suggests that the extent of engagement in training in CCT predicts the extent of cognitive gains. This presentation presents a clinical trial of MCI patients and healthy controls where individuals with normal cognition or MCI (n's=50) were randomized to receive 24 sessions of one-hour computerized functional skills training (CFST) sessions or 24 sessions split between CCT and CFST. The functional skills trained were technology based, focused on banking, shopping, and medication management. Completion time for tasks significantly improved from baseline in both groups, all  $ps < .001$ . Average improvement in time to completion was 48%. None of the tasks improved differentially in the MCI and NC samples: all  $ps > .12$ . Finally, CCT plus CFST did not differ from CFST alone on any of the %-change measures: all  $p > .11$ . Training engagement in CCT correlated  $r = .40$  with cognitive gains and with several functional task gains. MCI participants required more training sessions but learned equivalently. CCT supplementation led to similar CFST gains with half as many CFST sessions and improved cognition. Both groups demonstrated improvements in performance across all tasks and training engagement predicted cognitive and functional gains. This suggests that training interventions can bypass memory impairments in MCI and lead to gains in the ability to perform functional tasks.



**PEIJUN CHEN***Senior / Sociology**Research Mentor: Jan Sokol-Katz / Sociology***THE LIVED EXPERIENCES OF CHINESE INTERNATIONAL STUDENTS IN THE UNITED STATES: A CASE STUDY IN A SOUTHEASTERN SMALL PRIVATE UNIVERSITY**

Today in the United States, Chinese students account for the largest number of international students group. After the 1980s, Chinese government has strategically fostered students who have studies abroad to provide enough human resource for the country. However, the tension between the United States and China has intensified after the China-United States trade war. Chinese Ministry of Education has announced the “No.1 Alert” for studying abroad in the United States, claiming that the U.S. embassy is more likely to deny the visa for Chinese students. U.S. politicians have also publicly spoken for the spying of Chinese students. Therefore, under these circumstances, learning the experiences of Chinese international students in the United States is essential. Studies have focused on their factors of stresses, social networking practice, career incentives, and also their values to host culture and society and their original culture and society in order to reveal their lived experiences in the United States.

**DANIELLE GOLDWERT***Junior / Psychology & Studio Art**Research Mentor: Debra Lieberman / Psychology***INTERPERSONAL LEVERAGE: INDIVIDUAL DIFFERENCES IN THE USE OF GRATITUDE AND ANGER**

Two studies report the development of a new construct measuring individual differences in the perceived value of expressing gratitude and how this construct relates to established indices of interpersonal leverage, specifically, physical formidability in men and physical attractiveness in women. Study 1 (N=193) provided initial evidence using exploratory factor analytic techniques that items asking about the perceived consequences of not expressing gratitude indexed a psychological construct distinct from those captured by prior measures of gratitude. Furthermore, correlational analyses hinted that individual differences in this new construct, but not prior measures, were predicted by indices of interpersonal leverage: more physically formidable men and more attractive women were less likely to feel their lack of gratitude cut them off from future benefits of social interactions. Study 2 (N=419) expanded the number of items measuring the perceived consequences and utility of expressing gratitude. Factor analysis revealed two constructs: one indexing the value/utility of expressing gratitude and the Study 1 factor indexing perceived consequences of ingratitude. Only individual differences in the utility of expressing gratitude were robustly predicted by measures of interpersonal leverage: more formidable men ( $r=.42$ ,  $p<.001$ ,  $N=238$ ) and more attractive women ( $r=.37$ ,  $p<.001$ ,  $N=179$ ) reported a lower value of expressing gratitude in social interactions. This effect was not found for the original factor reported in Study 1 nor an established gratitude scale.


**KAITLIN HAHN**
*Junior / Medical Anthropology & Psychology*
*Research Mentor: Youngmee Kim / Psychology*

### DYADIC INVESTIGATION OF SELF-DISCLOSURE AND SLEEP IN COLORECTAL CANCER PATIENTS AND THEIR SPOUSAL CAREGIVERS

Sleep disturbance in adult cancer patients and their caregivers is a substantial health problem. Sleep is a dyadic process, influenced by relational activities, including daily communication. This study aims to examine the degree to which patients and spousal caregivers self-disclose to each other relates to sleep disturbance on the same night and the subsequent night, around the time of diagnosis and treatment initiation. Colorectal cancer patients and their spouses ( $n=24$  dyads) completed daily self-disclosure and sleep logs across 14 consecutive days. Two items regarding sharing one's feelings and thoughts measured individuals' self-disclosure. Sleep efficiency was assessed using the Consensus Sleep Diary. Both patients and their spousal caregivers reported mildly effective sleep ( $M=89.6\%$  and  $88.2\%$ ). Dyadic multi-level modeling revealed that patients' sleep efficiency (SE) was predicted by their own SE on the previous night ( $B=0.146$ ,  $p<.040$ ) but not by self-disclosure of themselves or spouse. Patients' good sleep was associated with good sleep the following day. On the other hand, spousal caregivers' SE was predicted by their patients' self-disclosure on the previous day ( $B=0.018$ ,  $p<.022$ ) but not by other variables. Spousal caregivers had good sleep the day after their patients disclosed to them. Our findings provide preliminary support that sleep is a dyadic process. Findings suggest sleep interventions should be tailored for patients to improve cognitive and behavioral aspects related to poor sleep, whereas tailored for the spousal caregivers to improve their communication with the patient. Investigations with a larger sample and of other interpersonal and medical characteristics are warranted.


**LINDSEY HOSHAW**
*Senior / Psychology*
*Research Mentor: Jennifer Britton / Psychology*

### SOCIAL ANXIETY AND THREAT BIAS: COMPARISON OF COVERT AND OVERT ATTENTION

Typically, individuals with social anxiety disorder (SAD) tend to orient to threat. Threat detection, both consciously and unconsciously, may occur more rapidly in anxious individuals. Yet, few studies have compared social anxiety-related differences in attention bias towards threat under these conditions. To examine this relationship, 250 adult participants (18-30 years old) completed a dot-probe task in which threat-neutral face pairs were presented overtly (i.e., 500 ms) and covertly (i.e., 16ms followed by a 184ms mask). Attention bias scores were calculated by subtracting the reaction time on congruent trials (i.e., a probe in the location previously occupied by threatening face) from incongruent trials (i.e., a probe in the location previously occupied by neutral face). Pearson correlations between Social Interaction Anxiety Scale (SIAS) and threat bias under overt and covert conditions were characterized and compared. Reaction times in the covert condition were significantly faster than reaction times in the overt condition ( $p = .003$ ), but no significant attention biases in either condition were present in our sample ( $p_{overt} = .693$ ,  $p_{covert} = .336$ ) nor was there a significant correlation present between overt and covert conditions ( $p = .138$ ). We also were unable to find a significant relationship with the SIAS ( $p_{overt} = .231$ ,  $p_{covert} = .804$ ). Future research should examine how findings may differ across different demographics and clinical settings.



## AMY HUMBER

*Senior / Sociology & Political Science*

*Research Mentor: Amie Nielsen / Sociology*

### POLITICAL PARTICIPATION AND ENGAGEMENT OF UNIVERSITY OF MIAMI UNDERGRADUATES

Undergraduate education and the university environment are considered to be very impactful in terms of political identity, participation, and engagement. It must be noted that each university and its corresponding campus environment are unique, and therefore have varying impacts. Due to shifts in political environment over time, it also is important to acknowledge that the impacts of the university environment and the political behavior of undergraduate students also shifts over time. In addition to time and place, the demographics of individual students and their backgrounds undoubtedly play a role in their political behavior. Recent understandings of political activity have expanded beyond formal (voting, calling representatives, etc.) and informal (protesting, boycotting, etc.) political activity to include actions such as volunteering and community-based work. This study is intended to allow for a better understanding of the nature of the current political behavior of University of Miami undergraduates and the factors that may contribute to this behavior. A survey of convenience was administered to a sample of 136 students across multiple areas of study, predominantly the social sciences, STEM, and the humanities. Quantitative data was collected regarding their demographic information, backgrounds, political beliefs, political actions, and political intentions for the future. Qualitative data was collected in the form of short answer questions pertaining to their perceptions of the political engagement of the University of Miami student body and personal political engagements. Further analysis must be conducted to better understand the factors contributing to the nature of political activity among University of Miami undergraduates.



## SHANICE HYLER

*Senior / Criminology & French*

*Research Mentor: Marissa Omori / Criminology*

### ANALYZING SENTENCING AND IMMIGRATION IN FLORIDA COUNTIES

The media often suggests immigration increases crime; but that has been discredited in academic research. On the other hand, research suggests that there has been harsher sentencing of immigrants when prosecuted in the criminal justice system (Light 2014). Some scholars argue that this reflects racial threat theory, which argues that the increased presence of a minority group results in the dominant group imposing harsher measures of control upon the minority group (Blalock 1967). The impact of incarceration, and especially mass incarceration, not only impacts the individual incarcerated, but also affects the community to which they belong. However, less research explores community-level sentencing and racial disparities. This project explores the impact of immigration and racial inequality on sentencing at the county level in the state of Florida with data provided by the Department of Corrections. By examining the population at the macro level, this study will test whether the idea of racial threat explains sentencing patterns. Specifically, I test whether more individuals are sentenced to incarceration as a result of factors like race and immigration as well as other factors: migrant status, education, age, poverty statistics, etc. I will then seek to test racial threat theory using correlations between the role of immigration, age, poverty, education, etc. and the sentencing of defendants within counties in Florida. Further analysis will include a discussion on whether the racial threat theory is applicable to the specific case of the immigrant versus defendant population.




**NOA ISRAEL**
*Senior / Criminology*
*Research Mentor: Jan Sokol-Katz / Sociology*

### THE IMPACT OF EDUCATION ON RECIDIVISM

In the United States, the societal and economical cost of crime is a persisting issue. As the recidivism rate for incarcerated individuals is an estimated 45%, a main focus within correctional facilities is that of preventing re-offending. Research has been conducted on a variety of factors that can contribute to crime in order to target this issue. One major factor that has been researched is that of education. Education has a profound effect on crime and criminal behavior and can be used to find solutions to lessen the societal and economical burden that crime creates for communities, especially in regards to recidivism. This thesis uses a combination of previously collected data from past research focused on the relationship between education levels, socioeconomic levels and involvement in crime to show the impact of educational programs within correctional facilities. By using data from past studies to show that increased education levels and educational programs in correctional facilities can decrease crime and recidivism, it can be concluded that there is a significant relationship between education, crime and recidivism. It is also important to note that changes in policy to better educational programs within correctional facilities could yield large social savings by preventing crime and decreasing the rate of re-offending.


**EMMA JAISLE**
*Senior / Psychology*
*Research Mentor: Elizabeth Simpson / Psychology*

### INDIVIDUAL DIFFERENCES IN NEONATAL IMITATION AND NEWBORN SOCIAL ATTENTION

Neonatal imitation—newborns' ability to match observed actions—is a prevalent early phenomenon, documented across behaviors and species. However, many questions remain about the robustness of neonatal imitation in humans. We explored whether neonatal imitation is consistent across behaviors, over time, and linked to social attentiveness in a diverse sample of newborns (59% Hispanic, 25% Black, 15% Multi-racial, 61% White). We tested newborns' (N=75) facial gesture imitation twice, at approximately 2-3 weeks after birth. Newborns imitated tongue-protrusion and mouth-opening gestures at rates greater than chance ( $\chi^2 \geq 11.11$ ,  $ps \leq .001$ ). Imitation of one gesture was associated with imitation of the other, but only in the first visit,  $r=.368$ ,  $p=.050$ ,  $n=29$ , and imitation in the first and second visits were not associated,  $ps > .10$ , suggesting limited stability across contexts and over time. Infant eye-contact during imitation was stable for both gestures across visits,  $r=.372$ ,  $p=.002$ ,  $n=64$ , suggesting newborn social attention may be a stable measure of individual differences. We found limited evidence that imitation and attention were positively linked,  $ps > .10$ ; in other words, individual differences in attentiveness are unlikely to account for individual differences in imitation. Females exhibited higher rates of imitation and attended more to the models' eyes than males. Together, these findings suggest that neonatal imitation is robust, detectable in an ethnically diverse sample. Further, newborn social attention may be a temporally stable individual difference in early infancy. Our findings also highlight the importance of testing infants' imitation more than once, to capture their true abilities.

**MARIA KANELLOS***Senior / Neuroscience**Research Mentor: Patrice Saab / Psychology***DOES NEIGHBORHOOD FOOD ACCESS IMPACT BMI?**

In America today, one in three children are overweight or obese. As the prevalence of overweight and obese status continues to increase, adolescent girls are specifically at risk due to health promoting behaviors decreasing with age. The goal of the current study was to investigate the relationship between BMI and supermarket and fast food access in a sample of middle school aged girls ( $N = 375$ ). For each participant BMI was measured and home addresses were geocoded to identify proximity to fast food and supermarket outlets using Euclidean distances. Results indicated that both supermarket and fast food distance were significantly associated with BMI ( $R^2 = .139$ ,  $F(9, 339) = 6.091$ ,  $p < .001$ ). Participant's BMI increased by  $1.66 \text{ kg/m}^2$  for every 1 mile lived away from a supermarket ( $p = .027$ ). Participant's BMI decreased by  $1.97 \text{ kg/m}^2$  for every 1 mile lived away from a fast food outlet ( $p = .042$ ). Findings suggest that it may be advantageous to direct efforts to improve the food environment near neighborhoods.

**MENDEL LEBOWITZ***Junior / Neuroscience***ISABELLA CABRERA VALENCIA***Senior / Psychology***JACKSON KYSER***Junior / Neuroscience***ALANNA ADLER***Senior / Psychology**Research Mentor: Elizabeth Simpson / Psychology***ENDOGENOUS SALIVARY OXYTOCIN MEASURED LONGITUDINALLY IN 4-, 8-, AND 14-MONTH-OLD INFANTS**

Oxytocin is a neuropeptide involved in social bond formation, including parental, romantic, and filial bonds (Feldman, 2012). Understanding how levels of oxytocin change developmentally in infancy may help explore individual differences in social development. Unfortunately, while recent research has begun uncovering the role of oxytocin in adults and older children (Fujisawa et al., 2014; Schneiderman et al., 2012), we know little about healthy levels of oxytocin in infants. In the present study, we longitudinally measured human infants' ( $N=32$ ) salivary oxytocin at 4, 8, and 14 months of age. In each visit, we collected saliva twice, at the start and end of each visit. We successfully collected saliva 87% of the time ( $N=167$  samples), and found intra-individual consistency in oxytocin levels within each visit,  $r(52)=.33$ ,  $p=.014$ . Infants also displayed stable intra-individual differences in salivary oxytocin with age, reflected in correlations between infants' salivary oxytocin levels at 8 and 14 months,  $r(19)=.46$ ,  $p=.035$ . Finally, we found age-related increases in oxytocin levels between 4 months ( $M=3.97 \text{ pg/ml}$ ,  $SD=1.87$ ) and 14 months ( $M=5.21 \text{ pg/ml}$ ,  $SD=2.91$ ),  $t(21)=1.84$ ,  $p=.080$ ,  $d=.39$ , suggesting oxytocin levels may increase across the first year after birth. These findings are in contrast to previous reports of oxytocin levels declining with age, in older children (Nishizato et al., 2017), possibly indicating nonlinear developmental patterns. Our findings reveal that salivary oxytocin can be reliably measured in young infants. We next plan to explore links between infant oxytocin levels and social behaviors, including attending to faces and interpreting social signals, (e.g., eye gaze, facial expressions).


**GABRIELA LEE**
*Junior / Medical Anthropology*
*Research Mentor: Youngmee Kim / Psychology*

### MIND AND MATTER: THE NEUROENDOCRINE DOWNSTREAM OF BENEFIT FINDING AMONG CANCER PATIENTS

Cancer diagnosis evokes psychological turmoil that prompts resilience. Despite its significant health implications, the physiological downstream of resilience in cancer patients has been understudied. This study explored how various domains of finding benefit from cancer are associated with neuroendocrine biomarkers. Newly diagnosed colorectal cancer patients (M=55 years old, 57% female, 50% Hispanic, 45% advanced-cancer; 3 months post-diagnosis) participated. Patients self-reported 6 domains of benefit finding around diagnosis (T1). Saliva samples were collected 4 times a day on 2 days at T1 (n=99) and 1 year later (T2: n=59). Salivary alpha-amylase (sAA)—a stress biomarker and proxy of sympathetic adrenal medullary system and dehydroepiandrosterone-sulfate (DHEA-s)—an anti-aging and anti-stress biomarker, were assayed. Corresponding diurnal slopes were calculated. Covariates included age, gender, ethnicity, and cancer stage. Patients reported moderate to high levels of benefit finding at T1. Hierarchical general linear modeling revealed at T1, greater acceptance related to dysregulated diurnal sAA pattern ( $B=-2.73$ ,  $p=0.041$ ) and family marginally related to regulated diurnal sAA pattern ( $B=2.35$ ,  $p=0.060$ ). Predicting neuroendocrine slopes at T2, controlling for T1, empathy related to dysregulated diurnal sAA pattern ( $B=-5.61$ ,  $p=0.027$ ). No benefit finding domains predicted diurnal DHEA-s patterns. Several domains of benefit finding predicted a salivary stress marker, not anti-stress marker, during the early phase of cancer survivorship. The biological cost of accepting the cancer diagnosis and increased appreciation of family and the delayed cost of increased empathy should be acknowledged. Investigations of long-term health consequences of finding meaning out of cancer experience are warranted.


**MUFENG LI**
*Senior / Psychology*
*Research Mentor: Daniel Messinger / Psychology*

### USING AUTOMATIC MEASUREMENT TO PREDICT ATTACHMENT TYPE

Infant attachment security indicates how easily an infant can be calmed by a parent when it is under stress. Previous studies used expert ratings to measure attachment security; however, to train an expert is time consuming, and expert ratings do not provide unbiased results of infant behaviors. Instead, novel, objective measurements such as Kinect cameras and LENA audio recorders can be applied to measure attachment security more objectively. To confirm that the automatic measurements are reliable, 48 twelve-month-old infants were placed under the Strange Situation Procedure (SSP) while the processes were recorded by automatic measurements. Then the same scenario was rated by experts on infant's proximity-seeking, contact-maintenance, resistance, avoidance and disorganized behaviors (attachment related behaviors) on a Likert Scale, and the results from two measurements were compared. The comparison of the results indicated a significant correlation between the objective position of mother and infant calculated by the automatic measurements and expert ratings, with most of the differences being less than one point apart on Likert Scale. This is the first time automatic measurements have been used in infant attachment security to predict the results from experts. Future study can include a larger sample size and a better capture of objective behaviors.





## EMILY MARSHALL

*Senior / Neuroscience*

*Research Mentor: Lucina Uddin / Psychology*

### CO-ACTIVATION PATTERN ANALYSIS REVEALS ALTERED SALIENCE NETWORK DYNAMICS IN CHILDREN WITH AUTISM SPECTRUM DISORDERS

Accumulating neuroimaging evidence reveals differences in functional connectivity (FC) in individuals with autism spectrum disorders (ASD) when compared to their typically developing (TD) counterparts. This research has historically relied on static measures of FC, but more recent approaches have focused instead on dynamic patterns of brain activity. In contrast to sFC measures, dynamic approaches allow for the identification of transient configurations of brain activity. Although some studies have investigated dynamic patterns of brain activity in ASD populations, questions remain about the nature of dynamic differences related to specific brain networks implicated in ASD pathology. In the present study, a dynamic co-activation approach (CAP) was used to investigate differences between TD and ASD children related to the salience network (SN), which has been identified as a locus of dysfunction in ASD. Resting-state functional magnetic resonance imaging data were collected from 172 participants (6-13 years;  $n = 75$  ASD) at three sites. A high-model independent component analysis (ICA) was run to parcellate the brain into regions of interest. Dynamic CAP analyses were run in conjunction with k-means clustering to determine patterns of transient activation. Brain configurations in which the SN was co-activated with other brain networks appeared more frequently for the TD group compared to the ASD group, providing support for the "under-connectivity" hypothesis of autism. Our findings indicate a potential explanation for the regimented and inflexible behaviors commonly observed in children and adolescents with ASD. Future studies are needed to investigate the neural basis of these connectivity patterns in the resting-state.



## KELLEN MCDONALD

*Senior / Neuroscience*

*Research Mentor: Ekaterina Denkova / Psychology*

### ATTENTION AND WELL-BEING OF UNDERGRADUATE STUDENTS DURING THE ACADEMIC SEMESTER

Prior literature in undergraduate students has demonstrated a link between attentional abilities and general well-being, such as students with lower levels of anxiety and depression having greater attentional abilities. Some studies have also examined student attention and well-being at the beginning and end of the academic semester and the majority of them showed a degradation pattern. However, it is unclear if attention and well-being change in the middle of the semester. The main goal of the present study is to examine attention and subjective well-being reports in undergraduates over a four-week period in the middle of the academic semester and how these measures relate to each other. Sixty-one undergraduate students were enrolled in the present study and were tested online at two time points in the middle of the academic semester using Inquisit, which allows millisecond precision on responses to cognitive tasks. The testing battery included an attention task (Sustained Attention to Response Task, SART) and a set of self-reported instruments related to attentional abilities (cognitive failures and attention control), emotional well-being (perceived stress), and train of thoughts (perseverative thoughts and mind wandering). To assess the precision and validity of online task completion, another set of 22 participants completed the SART in laboratory-controlled settings. The results from the present study showed no significant change over the four-week period for most of the outcomes. This finding suggests that the middle of the semester can be used as a target period for a mindfulness based training intervention to prevent degradation of attention and well-being at the end of the semester.


**ALEXANDRA MCMURRAY**
*Senior / Psychology*
*Research Mentor: Debra Lieberman / Psychology*

### INFANTS' EXPECTATIONS OF TEARS IN SOCIAL CONFLICT

Infants possess a sophisticated set of abilities that enable them to understand the social world. Recent work suggests infants 11 months of age and older are able to understand concepts such as dominance, expecting larger agents to get their way in social interactions. If true, then another question is whether infants understand the use of emotion signals used to convey dominance or lack thereof. Here we explore infants' expectations regarding the use of tears in social conflict. Specifically, we investigate whether infants older than 11 months of age expect a smaller, less dominant agent to use tears when in a social conflict with a larger more dominant agent. Four 8-month-old and five 13-month-old infants were recruited through an infant research lab at the University of Miami. Infants were presented with a video in which either a larger or smaller agent cried after a sequence of physical bumps. We measured infants' looking times during the physical interaction through the end of the video. We found a marginally significant effect such that overall, infants looked longer at the bigger agent crying than the smaller agent crying. Furthermore, this difference was more pronounced in the 13-month-olds. These findings parallel past results which showed that infants older than 11 months of age understand social dominance. Taken together these data suggest infants at a very early age also begin to understand the complex emotional reactions associated with social conflict and dominance.


**LAUREN MILGRAM**
*Senior / Psychology & French*
*Research Mentor: Jill Ehrenreich-May / Psychology*

### YOUTH TOP PROBLEMS AND EARLY TREATMENT RESPONSE TO THE UNIFIED PROTOCOLS FOR THE TRANSDIAGNOSTIC TREATMENT OF EMOTIONAL DISORDERS IN CHILDREN AND ADOLESCENTS

The Top Problems (TP) assessment (Weisz et al., 2011) is an idiographic measure used for routine monitoring that may be more sensitive to change than standardized measures and may allow clinicians to identify early treatment response (ETR) that predicts improved treatment outcomes. Few studies have examined ETR using TP data. We collected TP data from 95 youth participants diagnosed with emotional disorders who presented to a University-based research clinic and received treatment using the Unified Protocols for the Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (UP-C/A; Ehrenreich-May et al., 2018). We examined ETR using paired samples t-tests to assess TP rating change from sessions 1 to 4. We compared early responders to non-early responders on baseline characteristics using independent samples t-tests. We used linear regression to examine the role of ETR in treatment outcomes. On average, child TP ratings decreased by 1.41 points ( $SD=1.69$ ,  $p<.001$ ) and parent ratings decreased by 1.58 points ( $SD=1.68$ ,  $p<.001$ ) on an 8-point scale. Age predicted child TP improvement ( $t(76)=2.72$ ,  $p=.008$ ) and parent cognitive reappraisal predicted parent TP improvement ( $t(63)=-2.082$ ,  $p=.043$ ). Child TP improvement was associated with lower post-treatment avoidance. Parent TP improvement was associated with higher child distress tolerance and cognitive reappraisal and lower child depression at post-treatment. Eleven participants exhibited ETR. Age predicted child-reported ETR ( $t(77)=2.89$ ,  $p=.005$ ). No baseline characteristics predicted parent-reported ETR. Child-reported ETR was associated with higher distress tolerance and lower avoidance at post-treatment. Findings have implications for treatment personalization. Prior to presentation, we will examine the qualitative TP data.



## AMANDA PEREZ

*Senior / Neuroscience & History*

*Research Mentor: Michael Antoni / Psychology*

### RELATIONSHIP BETWEEN SLEEP QUALITY, DEPRESSED MOOD, AND INFLAMMATION IN POST-SURGICAL PATIENTS WITH NON-METASTATIC BREAST CANCER

Biopsychosocial models relate stress to physiological health by way of cognitive-emotional and health behavioral changes. Existing literature highlights significant relationships between sleep quality, depressed mood, and inflammation in chronic illness. A breast cancer diagnosis is a major life stressor, and women with BCa have heightened levels of emotional distress and inflammation. However, the relationship between sleep quality, depressed mood, and inflammation has not been fully explored in this population. Women with Stage 0-III BCa were enrolled 2-10 weeks post BCa surgery and before the initiation of adjuvant therapies (N = 183). Participants completed a psychosocial battery, including self-report measures of sleep and mood, and provided a blood sample, from which circulating proinflammatory cytokines and the s100A8/A9 RAGE ligand were quantified using ELISA. Linear regression will be used to examine the relationship between sleep quality (Pittsburg Sleep Quality Index—Sleep Quality Subscale), depressed mood (Affect Balance Scale—Negative Affect Subscale), and inflammation (circulating proinflammatory cytokines IL-6, IL-1b, and TNF-a and s100A8/A9). I hypothesize that sleep quality will be inversely related to depressed mood and inflammation and that depressed mood will be positively related to inflammation. Additionally, I hypothesize that depressed mood will be an intermediary variable in the association between sleep quality and inflammation, partially explaining the relationship. As increased inflammation during primary treatment for BCa has been related to less favorable long-term disease outcomes, it is important to understand the psychological and behavioral factors that may be influencing inflammation if we hope to successfully intervene to improve well-being.



## DARIA PIETROPAOLO

*Junior / Political Science*

*Research Mentors: Meghan Homer / Center for the Humanities*

*Lorenzo Bacchini / Italian Studies & Modern Languages*

### NEW WORLD TRIUMPH IN IL GATTOPARDO

The end of the Risorgimento, a tumultuous period of Italian state unification culminating in 1861, represented a transition in Italian politics and identity. Before the Risorgimento, the Italian peninsula was a collection of kingdoms and competing political entities. As the Italian peninsula unified for the first time, the ruling aristocratic class became increasingly less powerful and relevant. Luchino Visconti's *Il Gattopardo* recounts the novel of Tomasi di Lampedusa, depicting this period in Italy's history by exploring the tension between the old, aristocratic class and new bourgeoisie class. Particularly, Visconti's development of the story's two leading protagonists, Prince of Salina and Angelica, highlight the social and political transition of the Italian peninsula during the Risorgimento and demonstrate the strained relationship between those who strive for progress and those who remain stagnant in their traditional identities which define Italy. The Prince's tacit consent and surrender to the new system that is overcoming his world demonstrate his perceived inevitability of change. Angelica juxtaposes the Prince's character with her un-refinedness and femininity which represents the raw power of the new order. By engaging the Prince and Angelica, Visconti encourages history to face the present times, where the emerging middle class and nationalist ideals triumph over the old, traditional social structure of the Italian peninsula.



**EMILY POWELL***Senior / Psychology**Research Mentor: Jennifer Britton / Psychology***TO APPROACH OR TO AVOID?: SOCIALLY ANXIOUS INDIVIDUALS' RESPONSE TO HAPPY AND FEAR FACIAL EXPRESSIONS**

Social anxiety disorder (SAD), a common mental illness, is characterized by an exaggerated fear and avoidance of social situations. Previous work has investigated how individuals approach and avoid to implicitly processed happy, neutral, and angry faces. However, it is unclear how other negative emotional stimuli may also elicit anxiety-related differences in approach and avoidance. The goal of the present research was to understand how socially anxious individuals' approach or avoid happy, neutral, and fearful facial stimuli. One hundred and thirty-eight adults (18–30 years old, 59.4% female) participated in an implicit approach-avoidance task (AAT, Ref) and completed the Social Interaction Anxiety Scale (Mattick & Clarke, 1998). Participants identified the background color of images. With successive mouse responses, the size of a facial stimulus increased or decreased, mimicking approach and avoidance, respectively. The response times generated a “U” pattern. The initial response required more time than the successive responses, which were increasingly faster except the final response ( $p < 0.001$ ). Initially, there were no condition differences in the first two responses; however, the approach reaction times were faster than the avoid reaction time in the latter responses ( $p < 0.001$ ). Some hesitancy was also observed when avoiding, but not during approach trials ( $p < 0.001$ ). No other significant effects (e.g., emotion, anxiety) were observed ( $p > 0.11$ ). These findings are both consistent and inconsistent with previous work using angry faces. Further research is needed to understand the differences.

**JORDYN SAVY***Senior / Psychology**Research Mentor: Lynn Perry / Psychology***BIDIRECTIONAL ASSOCIATIONS BETWEEN LANGUAGE DEVELOPMENT AND FRIENDSHIP IN CHILDREN WITH AUTISM SPECTRUM DISORDER**

Children with autism spectrum disorder (ASD) often have delayed language development and difficulties making friends. Proximity and talk with peers is a basis for both language development and friendship in typically developing (TD) preschoolers. Here, we utilize automated, objective measurements of children's vocalization and location in a preschool classroom to simultaneously observe all peer interactions and examine bidirectional relationships between language and friendship in children with and without ASD. We collected monthly observations of continuous peer interaction and sociometric friendship ratings of fourteen preschoolers in two ASD inclusion classrooms. Although children with ASD tended to receive fewer positive peer nominations than their TD peers, children's scores on a standard language assessment and their rates of talking to peers in class were positively associated with the number of positive peer nominations they received regardless of their diagnosis. Additionally, instances of real-time vocalization (peer input and target output) were positively associated with positive peer nominations that children with ASD received. Together these results demonstrate that language support friendship making, highlighting a potential role for language intervention to support social skills in children with ASD.



**RISHUBH SHAH** *Senior / Neuroscience*

*Research Mentor: Aaron Heller / Psychology*

**THE RELATIONSHIP BETWEEN UNCINATE FASCICULUS STRENGTH AND MEASURES OF ANXIETY AND DEPRESSION**

The Uncinate Fasciculus (UF) is a white matter tract connecting the limbic system to the frontal lobe. We hypothesize that the UF is related to anxiety and depression as a result. Using Diffusion Tensor Imaging (DTI) and deterministic tractography using DSIStudio, we analyzed the functional connectivity of a cohort of Pre-Medical students ( $n=8$ ). Deterministic tractography has output measures of Fractional Anisotropy (FA) and Radial Diffusivity (RD). Fractional Anisotropy measures the strength of a tensor going in one direction and Radial Diffusivity measures the strength of the tensor in the direction perpendicular to its strongest direction (how wide the tensor is/weak the connection is). We hypothesized that weaker white matter tracts (measured by fractional anisotropy and radial diffusivity) were correlated with higher measures of anxiety and depression using GAD and PHQ. We placed two regions of interest at the temporal hook and anterior portion of the uncinate fasciculus using anatomical markers. (Oppenheim, et al. 2007) and placed a region of avoidance posterior to the temporal hook to exclude the inferior fronto-occipital fasciculus. Upon analysis,  $t(6) = -2.4941$ ,  $p = 0.0548$ , which shows that our results are trending towards significance, but due to our small sample size probably have a very small effect size. Preliminary correlations between FA/RD ( $r = -0.9658$ ), FA/PHQ ( $r = -0.7446$ ), and RD/PHQ ( $r = 0.7989$ ). Judging based on the correlation alone, the results are trending in the correct direction to signal high tract strength correlation with low measures of depression and vice versa.



**SYDNEY SIMMONS** *Senior / Political Science*

*Research Mentor: Jan Sokol-Katz / Sociology*

**THE TREND OF GRADUATION RATES AMONG MINORITY AND NONMINORITY STUDENTS IN HIGHER EDUCATION**

The purpose of this study is to explore the various possible aspects as to why minority students drop out at higher rates than white students. After years of segregation and fights for equality, education is now an opportunity all minority students are able to receive. However, not all minority students are able to receive the same quality of higher education as their white counterparts. Minority students have the potential to go to college and graduate, yet there are multiple reasons why they cannot continue their education or they drop out multiple times before graduating. What are the trends that contribute to minority students drop out or prolonged graduation rates? I plan to identify these trends within multiple cohorts to see if there are consistent trends. I will examine data from the U.S. Department of Education College Scorecard and use SPSS version 26 to compare various factors such as age, financial aid status, full-time enrollment status, race and ethnicity, percentage of graduates after 4, 6, and 8 years, and students who return after their first year between minority students and white students. I expect to find a trend among minority students and provide guidance to begin to develop a more effective way to keep minority students from dropping out at high rates.



**ALEXA SKOLNIK** *Senior / Psychology & Gender and Sexuality Studies*

*Research Mentor: Kiara Timpano / Psychology*

### THE RELATIONSHIP BETWEEN HOARDING AND TRAUMA THROUGH A CROSS-CULTURAL LENS

Hoarding Disorder (HD) is characterized by extreme difficulties discarding possessions and a compulsive tendency to acquire new things, leading to a debilitating amount of clutter. While researchers have posited an association between hoarding and trauma, empirical findings in both clinical and non-clinical samples have been mixed. Limitations of prior research have included inconsistent measurement of traumatic events, issues in sampling, and a lack of consideration given to race and ethnicity. By addressing limitations of past research, we aimed to clarify the role of trauma as a specific risk factor for HD. Specifically, we aimed to understand the relationship between trauma and HD, considering not only whether trauma was experienced, but also the impact of that trauma. Additionally, we sought to understand whether race and ethnicity would moderate the influence of trauma on HD. We recruited a general psychiatric sample (N=183; 15.8% primary hoarding diagnosis) and utilized data from the SCID-5 diagnostic assessment, as well as several dimensional measures of hoarding and trauma symptoms. We found that the impact of traumatic events was associated with overall HD symptom severity ( $\beta=.28$ ,  $p=.008$ ), even after controlling for age, depression, worry, and OCD symptoms. The impact of traumatic events was also associated with each of the core symptom dimensions of HD ( $r's .27-.28$ ;  $p's .005-.007$ ). Contrary to expectations, neither race nor ethnicity interacted with trauma to predict HD. Nevertheless, our finding that traumatic stress symptoms may be associated with increased HD severity has important implications for improving upon current HD treatments.



**LAUREN ELIZABETH THOMAS** *Senior / Psychology*

*Research Mentor: Aaron Heller / Psychology*

### DEPRESSION PREDICTING ENVIRONMENTAL EXPLORATION WITHIN THE PERIPARTUM PERIOD

Physical movement and exploration have been linked with a myriad of positive health outcomes including both physical and mental health benefits. Likewise, this is often encouraged for women suffering from depression, postpartum childbirth. But understanding how environmental exploration may be predicted by depression and affective mood disorders in women who are pregnant is an important psychological question. Data was taken from a previously completed study of 94 women from a Women's Reproductive Mental Health Clinic. Participants filled out the Montgomery Asberg Depression Rating Scale (MADRS) and allowed their location to be passively tracked via an application on their phone. Psychosocial and environmental factors were also accounted for. Contrary to hypotheses and previous literature, results showed no relationship between environmental exploration and improvement of depression. However, psychosocial covariates seemed to have more influence than previously expected, demonstrating the importance of environmental factors on mental health.



**MONAI THOMPSON***Senior / Psychology**Research Mentor: Sannisha Dale / Psychology***GENDERED RACIAL MICROAGGRESSIONS AND SELF-SILENCING  
ASSOCIATED WITH SUICIDALITY AMONG BLACK WOMEN LIVING  
WITH HIV**

Black women represent 13.7% of women living in the U.S but the highest proportion (59%) of women living with HIV. BWLWH may also have an elevated risk of suicidality linked to the impact of psychosocial stressors experienced at the intersection of race and gender such as gendered racial microaggressions (GRM) and silencing the self (a gender role expectation to silence one's needs and prioritize others' needs). However, existing research on this issue is scant. We investigated the associations between self-silencing, GRM, and suicidality among BWLWH. As part of an intervention development study (Striving Towards EmPowerment and Medication adherence) 119 BWLWH in South Florida completed a baseline assessment. The assessment consisted of a clinical interview (e.g. Mini-International Neuropsychiatric Interview to assess symptoms of suicidality) and a self-report assessment battery (e.g. GRM Scale and the Silencing the Self-Scale). Multivariate linear regression analyses controlling for age and education indicated that higher GRM appraisal ( $\beta = 2.80$ ,  $p < .01$ ) was associated with current suicidality and higher self-silencing was associated with current suicidality ( $\beta = 1.05$ ,  $p < .01$ ) and lifetime suicidality ( $\beta = 1.03$ ,  $p < .01$ ). Our findings support the importance of understanding how gender and race specific factors may relate to suicidality. Structural interventions are needed to decrease GRM and self-silencing and future research is needed to examine potential moderating factors (e.g. coping strategies) that may be enhanced through interventions.

**KENDALL MATHER***Senior / Management & Psychology**Research Mentor: Debra Lieberman / Psychology***RETENTION RISK CALCULATION: CHALLENGING THE NOTION OF A FEMALE SHORT-TERM MATING PSYCHOLOGY**

Previous theoretical and empirical work suggests that both men and women possess distinct mating strategies that regulate decisions regarding with whom to engage in short-term versus long-term sexual relationships. The publication of theoretical papers discussing sexual strategies and of scales to measure one's tendency to engage in short versus long term sexual relationships have led evolutionary scientists to assume that women—by virtue of having one night stands and sometimes scoring high on behaviors associated with short term mating strategies—possess mental mechanisms that evolved for the purpose of engaging in short term relationships. When women are asked to consider potential long-term mates, it could be, however, that they take into account their own ability to obtain and retain a very masculine mate and then modulate their responses according to this risk assessment, leading, in some cases, to the selection of a less masculine male. We investigate this possibility by asking women about their preferences for short-term mates and long-term mates using the standard-worded questions from previous studies, and questions that make explicit retention risk. We found that question wording significantly affected women's preference for facial masculinity, such that with risk removed, women selected more masculine men for both long-term and short-term mating partners. This suggests that, as hypothesized, women take into account their ability to retain a more masculine man when choosing a long-term partner, leading to the selection of a less masculine partner than actually desired.



**ELINA KATRIN** *Senior / Journalism & Creative Writing*

*Research Mentor: Maureen Seaton / English*

### FOSTERING THE APPRECIATION OF MULTICULTURALISM THROUGH LITERATURE

This project is a selection of creative writing works from my senior thesis. Three selected poems are unified by themes of nationality and family relationships. The work explores the speaker's feelings of cultural loss, homesickness, and longing for a family, and the incorporation of foreign languages, Russian and Arabic, emphasizes those emotions. With the inspiration driven from bilingual poets, such as Ilya Kaminsky, the project came together as a reinforcement of pride and appreciation of one's cultural heritage and multinational background. It is crucial to develop these themes in literature, as in the current diverse world, sometimes people still try to hide from their ethnicities for various reasons. This project sheds light on personal stories of emotional acceptance that would hopefully inspire others to celebrate their nationalities and be proud of their family and ancestors.



**NATHALIE MAIRENA** *Senior / Journalism & English*

*Research Mentor: Joel Nickels / English*

### THE ZIT -- AN EXPLORATION OF LONELINESS

The short story, "The Zit", is meant to explore topics of anxiety and loneliness, and the self-destruction that can amount from such feelings. The story uses something everyone has experienced -- acne -- to explore how fixation on flaws and the past can lead to wasted opportunities in the present and future.



**WILLIAM STICKLE** *Senior / Communication Studies & English*

*Research Mentor: Joel Nickels / English*

### INCOMPLETE SENTENCING

This presentation will be an extension of the short story paper that I will be presenting at the 2020 Sigma Tau Delta Annual Convention in Las Vegas, NV. The short story concerns the brother of a murder victim who, on the stand at the murderer's prison sentencing, recalls the relationship he had with the murderer and reflects on how things could have been different. It is a story of restraint and strength, yet sadness and vulnerability. I want to present this paper here at this forum not only as a testament to my hard work, but also as a pathway for my fellow University of Miami peers to access my work on campus. I think that presenting my paper at the forum will allow me the confidence to continue to write successfully.





**CARSON COUDRIET** *Senior / Broadcast Journalism & Psychology*

*Research Mentor: Amanda Jensen-Doss / Psychology*

**EXAMINING THE RELATIONSHIP BETWEEN PARENTING BEHAVIOR  
AND PARENT/CHILD PSYCHOPATHOLOGY**

The current study aims to find if parenting behaviors mediate the relationship between parent and child psychopathology. Across sites in Connecticut and South Florida, 199 guardian-child dyads participated in a parent study from which data for this study was pulled. After partaking in a phone screen to ensure eligibility, which was premised around the adolescent having an anxiety or depressive disorder, all dyads completed questionnaires which measured anxiety, depression, and parenting behaviors. Six different parenting behaviors were measured through the Coping with Children's Negative Emotions Scale (CCNES). These behaviors were then correlated with parent and child psychopathology, and mediating regressions were also run for each parenting behavior mediating parent and child anxiety/depression. Punitive reactions, Distress reactions, and Minimization reactions to adolescent's emotional distress were significantly correlated with parent psychopathology. Meanwhile, Punitive reactions were found to be negatively correlated with child depression ( $p = .038$ ). While no other correlations between parenting behaviors and child psychopathology were significant, child depression was still negatively correlated with Distress and Minimization reactions. Punitive reactions mediating the relationship between parent and child depression was the sole significant regression. While this study consists of a few limitations, such as the potential for social desirability bias and generalizability across populations, the results indicate that parenting behavior is much more indicative of the guardian's psychopathology than the adolescent's, although further research is needed to verify these findings.

**CAILIN MURPHY***Senior / Exercise Physiology**Research Mentor: Kevin Jacobs / Kinesiology & Sports Sciences***INVESTIGATING THE DIFFERENCES BETWEEN ALTERNATING APPLICATIONS AND BILATERAL APPLICATIONS OF ISCHEMIC PRECONDITIONING**

Ischemic preconditioning (IPC) involves brief, repetitive manually-imposed blood flow restriction of the limbs, capable of enhancing local blood flow and oxygen delivery. To compare the influence of alternating-leg IPC versus bilateral IPC on local muscle oxygen saturation ( $SmO_2$ ) and multiple ventilatory measures. METHODS: Four recreationally aerobically-trained males ( $23 \pm 2$  y,  $180.4 \pm 3.9$  cm,  $83.2 \pm 5.4$  kg) underwent a total of eight 5-min intervals of alternating-leg blood flow occlusion using a manual blood pressure cuff on the upper thighs. Secondly, thirteen recreationally aerobically-trained males ( $25 \pm 4$  y,  $178.1 \pm 6.2$  cm,  $78.3 \pm 8.5$  kg) underwent four rounds of 5-min bilateral occlusion/reperfusion using an automatic cuff system on the upper thighs. Preliminary results indicate that during occlusion, those who underwent bilateral IPC experienced greater physiological reactivity from baseline than those who underwent alternating-leg IPC, respectively ( $[\Delta VO_2 (L \times min^{-1}) .051 \pm .049$  vs  $-.048 \pm .008]$ ;  $[\Delta VCO_2 (L \times min^{-1}) -.058 \pm .051$  vs  $-.050 \pm .007]$ ;  $[\Delta VE (L \times min^{-1}) -1.82 \pm 2.17$  vs  $-1.17 \pm .39]$ ). The same trend exists during reperfusion ( $[\Delta VO_2 (L \times min^{-1}) .041 \pm .049$  vs  $.019 \pm .021]$ ;  $[\Delta VCO_2 (L \times min^{-1}) -.002 \pm .043$  vs  $.002 \pm .006]$ ;  $[\Delta VE (L \times min^{-1}) .40 \pm 1.59$  vs  $.40 \pm .59]$ ).  $SmO_2$  during occlusion is the only measure that demonstrated an augmented response with bilateral IPC versus the alternating-leg group ( $\Delta -70.0 \pm 2.5$  vs  $-78.9 \pm 1.9\%$ ). Preliminary data suggests that bilateral IPC is more capable of enhancing ventilation than alternating-leg IPC.

**DELANEY SHAW***Senior / Exercise Physiology**Research Mentor: Wesley Smith / Exercise Physiology***POTENTIAL CONTRIBUTIONS OF A HEALTHY USER BIAS TO PLANT-BASED HEALTH OUTCOMES**

Red meat consumption has been repeatedly associated with increased risk of all-cause mortality, cancer mortality, and cardiovascular disease mortality. However, a healthy user bias may arise when low frequency red meat-eaters are healthier due to lifestyle factors other than red meat consumption. The intent of this study is to investigate the following: Do individuals who consume more than one palm-sized servings of red meat per week participate in significantly more unhealthy co-behaviors, demonstrating a healthy user bias for those with infrequent red meat consumption? In this epidemiological study of 2,660 male and female University of Miami employees, data was collected via self-administered questionnaires concerning participants' diet, behaviors, and physical activity. Red meat intake was dichotomized and compared to participation in the following unhealthy cobehaviors: alcohol consumption, tobacco use, BMI, sodium intake, and level of physical activity using a t-Test. Frequent red meat consumption (more than 1 serving weekly) had statistically significant positive association with participation in other unhealthy cobehaviors (t-Test=10.001,  $p < 0.001$ ). High frequency red meat-eaters ( $n=1790$ ) participated in a mean of 1.612 unhealthy cobehaviors, whereas low frequency red meat-eaters ( $n=870$ ) participated in a mean of 1.239 unhealthy cobehaviors. However, it is unlikely that the magnitude of this statistical difference has a clinical significance. According to the Cochran index, at least 100% increase should be present to interpret a meaningful association. This study found 30.1% increased participation in unhealthy cobehaviors upon increased frequency of red meat intake.



**ELOISE DAVENPORT**

*Senior / Exercise Physiology*

**GABRIELA AKLEPI**

*Senior / Exercise Physiology*



*Research Mentor: Brian Arwari / Kinesiology & Sport Science*

## THE EFFECTS OF SMARTPHONE SCREEN-TIME ON WORKING MEMORY

Research suggests that smartphone screen-time may be correlated with decreased global cognition, increased rates of depression, and even decreased measures of brain structures which support language and emergent literacy skills in children. Before iOS12, there was no objective measure of smartphone screen-time, and prior studies had to rely on self-reporting. This study aims to be the first to use this data to accurately evaluate the relationship between iPhone screen-time and its effects on cognitive performance. Subjects were recruited from the School of Education and Human Development at the University of Miami. 50 right-handed, English-speaking, 18 to 30 year old subjects were included. Subjects performed a series of common cognitive tasks on a computer in randomized trials, including the Flanker Task, Stroop Test, n-Back Test, and Sternberg Item-Recognition Task. The trials were presented with E-Prime stimulus presentation software after collecting the iPhone-tracked screen-time data. No significant relationships were found except that between screen-time and the Sternberg working memory test ( $p < .05$ ). There was no significance between types of screen-time use and cognition, nor between any of the other cognitive tests and screen-time. The results of this study indicate that increased smartphone screen-time may reduce working memory. Considering the sheer number of people who rely on smartphones throughout the day, the implications of this pilot study call for more investigation of the specific relationship between working memory and screen-time.



**ALYSSA GREANEY**

*Senior / Elementary and Special Education*

**MARISSA STEINBERG**

*Senior / Elementary and Special Education*

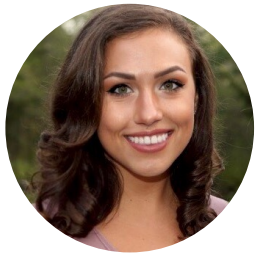


*Research Mentor: Jennifer Krawec / Teaching & Learning*

## INTEGRATING INQUIRY-BASED MATHEMATICS INSTRUCTION FOR ELEMENTARY STUDENTS

As schools push towards opportunities for students to engage in meaningful and hands-on mathematical experiences, students with learning disabilities (LD) are typically excluded, as direct and explicit instruction remains the primary instructional approach in special education curriculum. Inquiry instruction has become increasingly popular within STEM-related subjects, but research has not fully demonstrated its effectiveness for students with LD. This pilot study investigates the effectiveness of an inquiry-based approach – specifically, Problem-Based Learning (PBL) to improve the mathematical knowledge and skills of students with and without learning disabilities. A PBL unit focusing on area and perimeter at the fourth-grade level was implemented in an inclusive classroom. Though more distal measures of mathematical proficiency did not show significant growth from pretest to posttest, qualitative rubrics and student discussions demonstrated students' conceptual understanding of critical concepts. Implications for practice and future research are discussed.



**GRACE MIGLIOZZI***Senior / Elementary and Special Education**Research Mentor: Wendy Cavendish / Teaching & Learning***THE ACADEMIC SUCCESS OF FOSTER YOUTH: AN ANALYSIS OF WHAT POSITIVELY AFFECTS FOSTER YOUTH'S ACADEMIC PERFORMANCE**

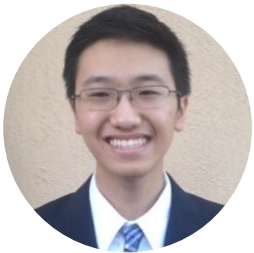
It is well-known that foster youth are an educationally vulnerable population. The high school drop out rate for foster youth who are in, or formerly in, foster care is astonishingly high in comparison to that of the general youth population. If youth do not drop out altogether, they frequently fall behind their peers academically. Addressing the extenuating circumstances and subsequent consequences that foster youth face is essential for understanding the academic patterns of students who are currently or were formerly in the foster care system. The cohort this study has followed is a group of 16 adolescents, all in their junior year of high school, who have consistently participated in the University of Miami First Star Academy since they finished eighth grade. Descriptive statistics and qualitative coding were used as method. Thematic categories that arose from coding of youth focus groups transcriptions include: 1) Goals for the future; 2) Challenges of the foster system; 3) Concerns about transitioning out of high school; 4) Self awareness and personal development; 5) Sources of motivation to succeed; and 6) Academic and emotional supports. Thematic categories that arose from coding the youth transition plans include: 1) Academic goals; 2) Academic supports received and needed; 3) Personal goals; 4) Personal supports received and needed; and 5) Career goals. Information from programming surveys contributed to the triangulation of the data which provides a clearer picture of the effective supports the youth are currently receiving and what supports they still need in order to succeed academically.

**SADE PRITHWIE***Senior / Human and Social Development & Spanish**Research Mentor: Blaine Fowers / Human and Social Development***MODERN DATING: ATTACHMENT THEORY AND INSTAGRAM IN DATING RELATIONSHIPS**

“Attachment theory is inherently life span developmental in scope because attachment relationships are important across the entire life course” (Klohen & Bera, 1998, p. 211). Attachment styles are factors that help us describe and understand how we relate to others within relationships. The four main attachment styles are as follows: secure attachment, anxious attachment, dismissive avoidant attachment, and fearful avoidant attachment. Secure attachment describes confidence and ease in creating new relationships. Anxious attachment may stem from the lack of nurturing as a child and promotes uneasiness in trusting new partners. Dismissive avoidant attachment promotes emotional distance within relationships. Fearful avoidant attachment brings ambivalence and unpredictability in the way partners choose to relate to one another. The increased use of Instagram has sparked interest in the realm of dating and romantic relationships and how attachment theory can be used as a lense to investigate the way in which millennials utilize their Instagram accounts. This study was designed to investigate the relationship between Instagram use and attachment theory within romantic dating relationships. Participants (n=200) will complete an online questionnaire consisting of a Relationship Style Questionnaire and Instagram Activity Self-Report that will help determine the participants attachment style, the way they interact with their partner's Instagram account, if they interact with it at all, and the feelings that arise from their partner's activity on Instagram. The data is being collected in the coming weeks.

**JULIA BUAN***Sophomore / Mechanical Engineering**Research Mentor: Shahriar Negahdaripour / Electrical & Computer Engineering***ENHANCING 2-D VIEWS AND 3-D OBJECT MODELS USING MULTIPLE 2-D FORWARD-LOOK SONAR IMAGES**

Due to the poor visibility in underwater environments, it is impossible to complete underwater operations with the sole use of optical imaging. Therefore, enhanced sonar technology is vital for conducting visually guided missions in turbid waters, including: surveillance, navigation, and identification of small objects. Among suitable technologies is a family of high-frequency 2-D forward look sonar video cameras, producing target images with high details. By implementing various computer processing techniques, this innovative imaging technology will facilitate effective use of subsea robots in carrying out visual tasks, involving inspection of underwater structures. However, some images include unwanted artifacts due to the nature of the sonar data acquisition process and noise coming from other sources, such as the wall of the pool in which the object resides. In our project, we process a multitude of sonar video images to enhance target signal-to-noise ratio (SNR), and thus the visual appearance and details to enable robust and accurate identification. The goal is to improve accuracy of estimating the 3-D locations of object surface points from overlapping images, thus generate images with higher SNR. The method makes use of an initial 3-D model devised and based on the space carving paradigm in computer vision. Our method involves enhancing this initial model by properly adjusting the surface patches, through the application of a suitable energy function. The aim is to minimize the discrepancies between sonar data measurements and predicted surface backscatter values generated by adjusting the space carving solution. To assess accuracy, the solution is compared to the 3-D model of each of several test objects generated by a Kinect camera. Based on the energy function value, similar minimum-energy solutions have been found between our optimized solution and Kinect model, supporting that the performance significantly improves after executing the optimization.

**BRANDON CHOU***Junior / Biomedical Engineering**Research Mentor: Marco Ruggeri / Biomedical Engineering***SOFTWARE PLATFORM FOR A COMBINED OCT AND WAVEFRONT ABERROMETER SYSTEM**

Modern cataract surgery has generated the need for intraoperative optical coherence tomography (OCT) imaging and wavefront aberrometry for surgical guidance. Wavefront aberrometry reduces guesswork in cataract surgery by allowing surgeons to confirm or revise intraocular lens (IOL) power choice. On the other hand, OCT imaging ensures proper IOL placement. Consequently, a combination of both systems would yield significantly better surgical results. Currently, these two technologies are not simultaneously available in the ophthalmic surgical microscope. In addressing this technological need, we developed a table-mounted prototype of a combined OCT system and wavefront aberrometer in a configuration suitable for integration with an ophthalmic surgical microscope. The combined system uses a custom-made OCT to generate images of the anterior segment of the eye. We optically coupled a commercial Hartmann-Shack sensor to the OCT beam delivery system to measure wavefront aberrations of the eye concurrently. A pupil camera and a ring illuminator facilitate eye centration during measurement. A custom developed software platform in LabVIEW provides a graphical user interface for controlling and synchronizing the operation of all devices. The platform relies on graphics processing unit (GPU) accelerated processing to display OCT images and wavefront measurements in real-time. Proof-of-concept testing of the custom-made software with the combined system demonstrated successful simultaneous OCT imaging and wavefront measurements on an eye model. Human subject testing is underway to translate the system from benchtop to bedside to improve patient outcomes.



## CAROLYN NIOSI

*Senior / Biomedical Engineering*

*Research Mentor: Bianca Maceo Heilman / Biomedical Engineering*

### MEASUREMENT OF OCULAR BIOMETRY IN PATIENTS BEFORE AND AFTER CATARACT SURGERY

With an aging global population, the number of cataract surgeries performed each year is increasing. In 2010, over 24 million cataract cases were reported in the United States and that number is projected to grow to 40 million by 2030.<sup>1</sup> During cataract surgery, the natural lens is removed from the eye and replaced with an intraocular lens (IOL) implant. IOLs vary in power and there are different methods to determine the suitable IOL power for an individual patient based on the biometry of their eye. This poster will detail the methods used to create a standard protocol for processing OCT images to obtain ocular biometry measurements for patients before and after cataract surgery. Ten OCT images of each eye were taken pre- and post-operation, segmented using custom software in MATLAB, and the measurements were recorded in excel and graphed in MATLAB. This method allows for easy comparison between pre-op and post-op biometry measurements as well as between individual eyes. The average measurements of the corneal thickness, anterior chamber depth, lens thickness, and vitreous chamber depth were taken and outliers outside of 2.5 STD of the mean were eliminated. The results from this study will be used to improve the current methods used to determine the power of the IOL implanted in a patient during cataract surgery.



## DISHA PATEL

*Senior / Biomedical Engineering & Physics*

*Research Mentor: Fabrice Manns / Biomedical Engineering*

### REGIONAL VARIATION IN THE ATTENUATION COEFFICIENT OF THE SCLERA MEASURED IN VIVO USING OPTICAL COHERENCE TOMOGRAPHY

Optical coherence tomography (OCT) has been used to image the ciliary muscle through the sclera, but the imaging depth is limited due to optical attenuation of the sclera. A better understanding of the factors that contribute to scleral attenuation can help optimize transscleral image quality. The purpose of this study was to determine if there are regional variations in the scleral attenuation coefficient. Using an IRB-approved protocol, images of the sclera were acquired on the left eye of 46 healthy subjects (average age  $36.8 \pm 17.0$ , range: 16-79) using a Spectral-Domain OCT system (1320 nm, Telesto 1, Thorlabs Inc.). Software was developed to enable manual selection of regions of interest (ROI) within the sclera containing 10 neighboring A-lines covering a depth of 0.4 mm above the boundary of the sclera when measuring the attenuation coefficient at the inner apex. The average intensity profile of the ROI is calculated and fit exponentially to calculate the scleral attenuation coefficient. The attenuation coefficient was quantified in an ROI centered on the ciliary muscle apex and an ROI located on average  $0.34 \pm 0.25$  mm temporally from the apex. In each ROI, the measurement was repeated 5 times. The average values obtained in the two regions were compared. The attenuation coefficient was  $3.06 \pm 1.10 \text{ mm}^{-1}$  at the apex and  $3.22 \pm 1.52 \text{ mm}^{-1}$  at the temporal location. Using the t-test, the p-value was found to be 0.50, and the variation in attenuation coefficients regionally was not found to be statistically significant.





## **SANDESH SHRESTHA**

*Sophomore / Mechanical Engineering*

*Research Mentor: Ali Ghahremaninezhad / Civil, Architectural & Environmental Engineering*

### **A BIO-INSPIRED APPROACH FOR GENETICALLY ENGINEERED INFRASTRUCTURE CONCRETE**

Bioinspired approaches are gaining increasing attention lately due to their wide range of applications in materials engineering. The goal of this research is to understand and explore the effect of different kinds of proteins on cementitious materials. In our study four different proteins: Whey Peptin, Bovine Immunoglobulin, Collagen Peptide, and Sodium Caseinate were used. Several cubes of 2" X 2" X 2" were cast with 0%, 0.25%, 0.50%, and 1.0% concentrations of proteins using water to cement ratio of 0.40. Samples were cured in a saturated lime solution in a moisture room for 28 days after casting and several tests were performed on the samples. Compressive strength test, electrical resistivity test, and thermogravimetric analysis were conducted to determine the strength, resistivity, and water and CH content of the samples, respectively. Flow test was conducted to determine changes in the flowability caused by the addition of the proteins. The foaming capacity and stability of the protein samples in both distilled water and alkaline solution were also tested. It was observed that control has the highest compressive strength compared to samples containing proteins, but the protein samples had higher resistivity than the control indicating less pores/voids in them.



## **MATTHEW UVA**

*Junior / Civil Engineering*

*Research Mentor: Ali Ghahremaninezhad / Civil, Architectural & Environmental Engineering*

### **INNOVATIVE MARTIAN CONCRETE USING IN-SITU MATERIALS**

As travel to Mars grows closer and closer, with more funding being put into programs like NASA and SpaceX to advance the timeline, the question of how humans will be able to settle on Mars must be answered. Building structures on Mars is essential to its settlement and due to the high cost of moving materials into space cannot be done in the same way structures are made on Earth. This study aims to determine if materials readily found on Mars can be used as an alternative through analysis of their compressive strength and microstructure. The materials chosen were Martian simulant and sulfur, where samples were made by melting sulfur and mixing Martian simulant in, with the weight ratios of Martian simulant to sulfur (MS-S) being made as high as possible due to Martian soil being more available than sulfur on Mars. Half of the samples made were also put through liquid nitrogen freezing cycles to simulate the colder temperatures on Mars surface. Samples were tested to determine their compressive strength, density through the use of EIS, and were looked under SEM to determine the microstructure and void distribution within samples. This study is ongoing, but preliminary results show that a lower MS-S ratio leads to higher compressive strength results. They also show that despite the significant void distribution, freezing cycles have largely had a small effect on compressive strength, suggesting that a sulfur concrete Martian mix would be able to withstand the temperatures found on Mars.



**AARON VALDES** *Sophomore / Computer Engineering & Chemistry*

*Research Mentor: Mason Klein / Physics*

### DROSOPHILA LARVAE ELECTROTAXIS

The main objective is to see if *Drosophila* larvae alter their behavior in response to electric fields, and if so, what causes this responses at the cellular level. Understanding the effects of electric fields would provide us with a more comprehensive understanding of how simple animals behave, as a first step towards understanding the brain and behavior in “more important” animals such as humans. Furthermore, there are practical implications to your findings, in particular for pest control of insects, if they can be made to move in certain ways by controlled electric fields. Our electrotaxis assay consist of a simple electrode in each end of our experimental agar gels connected to a voltage source and a recording system on top of the gels to track their behavior. For each trial, we are using between 20 to 25 2nd instar larvae and we are placing them in the center of our electrotaxis assay. After thorough analysis of our data, we have found that maybe their behavior is not due to electrical fields but due to the formation of a pH gradient. We noticed this when we measured the pH on both sides of the agar gel which changed dramatically from 6 to 8. Our next step in this project is to examine how electric fields correlate to changes in pH, performing behavior assay with mutants, and imaging relevant neurons while delivering electric fields to immobilized animals



## ANGEL CARRASQUILLO

*Sophomore / Marine Science & Biology*

*Research Mentor: Douglas Crawford / Marine Biology & Ecology*

### HERITABILITY OF CRITICAL THERMAL MAXIMUM TEMPERATURE IN FUNDULUS HETEROCLITUS

Global climate change caused by human activity over the course of the last hundreds of years has been damaging natural environments in sometimes irreversible ways. Thus, as habitats become altered by human activity, various organisms will have to adapt or face extinction. In environments where the average temperature is expected to increase, certain animals will have to adapt to be more tolerant to heat stress. This adaptation requires heritable variation in phenotypic traits that mitigate the effect of increase in temperature. One trait of susceptibility to heat stress is critical thermal maximum temperature (CT<sub>max</sub>) defined as the temperature at which an animal displays loss of equilibrium. CT<sub>max</sub> is a phenotype that has been found to be highly variable in *Fundulus heteroclitus* a brackish killifish. However, there have been no such studies on how heritable this trait is in this species. These data are important because they will give us insight into how fish species will change as environmental temperatures increase. This requires a large population of fish which will be used for testing, and their offspring from breeding pairs which will then be tested. The CT<sub>max</sub> in parents will be quantified, and then they will be selectively bred. For this study, fish with the highest, lowest and an intermediate CT<sub>max</sub> will be separated into different groups for breeding. After the fish are bred, the offspring will be raised until they are mature enough to have CT<sub>max</sub> tests performed on them. To determine heritability, the breeder's equation,  $\Delta Z = h^2 S$  will be used.



## EVE JOHNSON

*Sophomore / Marine Science & Applied Mathematics*

## PATRICK DAHLMANN

*Senior / Marine Sciercer*



*Research Mentor: Robin Faillettaz / Ocean Sciences*

### ONTOGENY OF PHOTOTAXIS IN EARLY LIFE STAGES OF MAHI-MAHI

Larval fish orientation remains a poorly understood mechanism. It is critical for studying larval dispersal but has, surprisingly, never been tested in any pelagic species. This laboratory experiment investigates the ability of *Coryphaena hippurus* L. larvae, hereafter 'mahi-mahi', to orient in relation to a sun-like light source through ontogeny. Larvae were tested using the Drifting In Situ Chamber (DISC), which was initially developed to tackle larval fish orientation in situ. It is equipped, among others, with a GoPro that captures the position of the larvae every second during a 10-minute observation period, and three compasses to track their directionality. Here, the DISC was adapted to conduct laboratory in a large (3 m<sup>3</sup>) circular aquarium filled with seawater. As such, the stimulus perceived by the larvae could be thoroughly controlled and the larvae's behavioral response identified at both the individual, age and population levels. A total of 82 individual larvae, ranging from 7 days to 23 days post hatching, were exposed to a directional, and alternating (by 180°) light, meant to mimic the sun's changing position in the sky. The results show that larvae respond to the light over any other directional stimuli and that this ability is especially prominent in older individuals. The findings imply that the Mahi-mahi larvae possess a sun-compass and may be able to orient themselves in the open ocean. These results will be implemented in a biophysical, particle-tracking model to estimate the extent to which these larvae can control their advection by ocean currents.





**PATRICK KIEL** *Senior / Marine Science & Biology*

*Research Mentor: Diego Lirman / Marine Biology & Ecology*

**STRUCTURAL RESILIENCE OF NURSERY-REARED ACROPORA CERVICORNIS - A COMPARISON OF GROW-OUT PLATFORMS**

Reef rugosity has been severely degraded along the Florida Reef Tract (FRT) leading to the loss of key ecological services that protect the South Florida coastline and support the tourism-driven economy. The field of coral restoration, which has reached an ecologically significant scale in recent years, may offer a way to mitigate the decline of coral populations and restore ecosystem function and services. Researchers are investigating the efficacy of restored reefs to bolster shoreline protection and coastal resilience. A restored reef may become both more resilient and more effective at attenuating wave energy if the outplanted coral stock is itself resilient to physical disturbance. In the 'Coral Gardening' method of restoration, this resilience may be tied to the growth phase of coral fragments in offshore nurseries, which primarily employs two types of coral grow-out platforms: mid-water floating "tree" structures and bottom-attached "block" structures. Previous research highlighted the highly plastic morphology of these nursery-reared fragments. In this project, we perform measurements of coral structural strength to investigate the differences between these two grow-out platforms in mechanical strength and resilience to wave loading. Block-reared corals averaged 35% more dense and 58% less porous than tree-reared corals. On-going testing shows that these differences may also align with increased structural integrity and resistance to higher flow velocities in block-reared corals. Therefore, we recommend that coral restoration practitioners consider the use of block-reared corals as a potential means to create more physically resilient reefs.



**ANASTASIYA PLOTNIKOVA** *Senior / Marine Science & Biology*

*Research Mentor: Danielle McDonald / Marine Biology & Ecology*

**THE IMPACT OF PAH EXPOSURE ON GULF TOADFISH, OPSANUS BETA, ON POST-STRESS PLASMA CORTISOL, GLUCOSE, AND LIVER GLYCOGEN LEVELS**

Oil released into the Gulf of Mexico from the 2010 Deepwater Horizon disaster exposed marine teleost fish to toxic polycyclic aromatic hydrocarbons (PAHs) that are known to inhibit their glucocorticoid stress response. The objective of this study was to better understand how the stress response of teleost fish, particularly the Gulf toadfish, *Opsanus beta*, is impacted by PAHs by measuring plasma cortisol and glucose levels as well as liver glycogen concentrations in PAH-treated fish following exposure to an acute stressor. We hypothesized that PAH exposure would result in a downregulation of cortisol release under after acute stress and would consequently impact blood glucose and liver glycogen levels. Toadfish ( $n = 16$ ) were intraperitoneally injected with control peanut oil or peanut oil with either naphthalene, fluorene, or phenanthrene, three PAHs commonly found in DWH oil, and  $n=8$  toadfish from each treatment were exposed to one of two acute stress regimes, either a manual simulated predation chase or a more consistent automated simulated predation chase. Blood samples and liver samples were then analyzed via colorimetric assay for glucose and glycogen and radioimmunoassay for cortisol. It was found that phenanthrene may interfere with the release of liver glycogen and subsequently decrease plasma glucose in response to Stress Regime #1. Overall, the presence of environmental pollutants may hinder an organism's ability to respond to stressors, which ultimately impacts populations and marine ecosystems.



**DIETRICH KUHLMANN** *Senior / Geological Science & Marine Science*

*Research Mentor: Donald McNeill / Geological Sciences*

HETEROGENEITY IN HYDRAULIC CONDUCTIVITY OF OOLITIC GRAINSTONE OF THE MIAMI LIMESTONE: RESULTS FROM THE CONSTANT-HEAD METHOD

Bed-scale fluid flow in carbonate formations such as the Miami Limestone is a complex process with a multitude of controls, including grain size, porosity, degree of cementation, and degree of dissolution. As this formation consists of several facies (e.g. bedded, mottled, or a mixture of the two), porosity and permeability values can range considerably with depth and lithofacies. Understanding local limestone hydrogeology is pertinent to water resource management, storm drainage, and sea level rise in South Florida and nearby Bahamas, which contains analogous formations. A core 3.8 meters in length was extracted from the high point of the Miami Limestone in Coconut Grove, Florida, part of the ancient barrier bar when sea level was 7 m higher. Scanning electron microscopy (SEM) was performed to analyze grain size and magnitude of diagenesis in the core. The core was divided into fourteen segments, each undergoing bulk density analysis and constant-head hydraulic conductivity testing. Hydraulic conductivity of unconsolidated ooid sands was measured as a permeability baseline prior to cementation and diagenesis. Permeability values of core samples ranged from a low  $8.19 \times 10^{-7}$  cm/sec to a high of  $4.35 \times 10^{-4}$  cm/sec. These values are compared to the sand hydraulic conductivities, being  $8.25 \times 10^{-3}$  cm/sec and  $6.22 \times 10^{-3}$ . A decreasing downward trend in permeability was found in the core. Cores with higher hydraulic conductivity exhibit larger ooid grains, and the higher hydraulic conductivity correlated with higher bulk density. This latter correlation may relate to less dissolution of the original ooid material.



**NAJA MURPHY** *Senior / Marine Science and Chemistry & Chemistry*

*Research Mentor: Donald Olson / Ocean Sciences*

LAKES AND COASTAL CANALS AS NITROGEN SINKS FOR BISCAYNE BAY: PUTRID LAKES AS BAY PROTECTORS

Nutrient discharge into coastal waterways stems from eutrophication, groundwater, and adjacent, high nutrient water masses. These factors play a significant role in water quality in Biscayne Bay (BB), Florida, and the Coral Gables Waterway (CGW). However, the contribution due to groundwater flow in Coral Gables and the seasonal variation of nutrient concentrations is largely unknown and unexplored. Therefore, this research aims to understand nutrient sources and sinks along the CGW and BB. To address the research aims, water quality and nutrient concentrations along four clusters (upstream, downstream, dead-end, and lake) were measured in June, August, September, and October. Salinity, temperature, chlorophyll, and DO measurements were recorded with a YSI Pro 30 handheld multi-parameter meter. Nutrient concentrations were determined by gas segmented continuous-flow colorimetric analysis. Preliminary results indicate that the downstream site of Lake Osceola has consistently lower  $\text{NO}_3$  concentrations than the areas adjacent to the bay and the upstream golf course. This is evident in the average  $\text{NO}_3$  concentrations of the downstream lake site, the mouth of the bay, and the area adjacent to the upstream golf course which are  $27.55 \pm 17.06$ ,  $36.31 \pm 18.57$ , and  $36.91 \pm 16.73$  ( $\mu\text{M}$ ), respectively. Although high nitrate and phosphate concentrations exist in the lake due to fertilizers used to treat the vegetation in the Biltmore golf course and the lawns at the University of Miami Coral Gables campus, there is a decrease from BB through the lake and upstream clusters, indicating that Lake Osceola acts as a nutrient sink for Biscayne Bay.



**SABRINA UFER** *Junior / Marine Science & Chemistry*

*Research Mentor: Kimberly Pependorf / Ocean Sciences*

RELATIONSHIP BETWEEN MICROCYSTIN AND NUTRIENTS DURING  
HARMFUL ALGAL BLOOMS IN SOUTH FLORIDA WATERWAYS

Harmful algal blooms (HABs) have become increasingly familiar to the marine and freshwater communities of South Florida. During a HAB, water becomes contaminated with toxins that vary depending on the algal species and have a range of toxicities and environmental fates. One well-studied biotoxin that has heavily impacted South Florida in recent years is the hepatotoxin microcystin, produced by *Microcystis* and other freshwater cyanobacteria. A known factor influencing algal bloom occurrence and density is nutrient concentrations; the relationship between nutrients and bloom toxicity is less well-defined but is critical for the health of communities impacted by HABs. To study the relationship between microcystin concentrations and nutrient concentrations, field samples were acquired from Lake Okeechobee, the Caloosahatchee river, and Cape Coral. Samples were collected on three different days across the intense HAB events in South Florida in 2018. Water was filtered to collect particulate material for toxin analysis, and the filtrate was analyzed for nutrients. Microcystin was quantified via an extraction in methanol and analysis by liquid chromatography triple quadrupole mass spectrometry, analyzing for eight different microcystin congeners. Nutrient analyses included phosphate (molybdenum blue spectrophotometric analysis) and dissolved organic phosphorus (by persulfate digestion followed by phosphate analysis). Next, nitrate and nitrite measurements will be performed via NOx box. By analyzing the relationship between nutrients, nutrient ratios and toxin concentrations, we can better understand the mechanisms that lead to HABs so that we can protect aquatic and human lives in the future.





**EMILY BREWER** *Senior / Music Therapy*

*Research Mentor: Shannon de l'Etoile / Music Therapy*

THE EFFECT OF GROUP INSTRUMENTAL IMPROVISATION ON  
SOCIAL INITIATION WITH PEERS IN CHILDREN HOSPITALIZED FOR  
LONG-TERM CANCER TREATMENT

Children with cancer demonstrate challenges with initiating peer interactions due to frequent and lengthy hospitalizations. Social initiation occurs when a child initiates an interaction with a peer or initiates a change during an ongoing interaction. Overlapping brain structures that are active during both instrumental improvisation and social initiation are the mirror neuron system, premotor cortex, and primary motor cortex. The purpose of this study is to examine the effect of a group instrumental improvisation experience on social initiation with peers in children hospitalized for long-term cancer treatment, specifically (1) establish eye-contact with peer, (2) pose a question to peer, (3) imitate peer behavior, and (4) expand on peer's social responses. This study utilizes a randomized control pre-test/post-test design. Children ages 7 to 9 years-old with confirmed cancer diagnoses from a pediatric oncologist will participate in this study. The participants will be randomly assigned to the music condition and play control condition. In the music condition, the participants each will receive 15 minutes of structured group instrumental improvisation. The play control group will receive structured toy play. Data will be coded using the Brewer Child-Peer Social Initiation Coding Scale during the pre-test and post-test conditions which consist of unstructured toy play.

**BIOLOGICAL SCIENCES**



**PHOEBE COHEN** *Senior / Double Bass Performance*

*Research Mentor: Lucina Uddin / Cognitive & Behavioral Neuroscience*

CREATIVITY THROUGH FUNCTIONAL MRI AND THE FIVE-FACTOR  
MODEL OF PERSONALITY

The present study will use both psychological and imaging data to explore the relationship between psychologically derived key terms relating to the openness factor of the FFM and their corresponding mechanisms within the brain. We will utilize the WU-Minn HCP Dataset, which includes data from 1,200 healthy adults. From HCP, we will study a subset of 415 participants whom have both imaging and FFM data accounted for, and whom are not related to other participants in the database. Using meta-analysis software neurosynth to analyze large-scale data of functional MRI data, we will utilize the terms theorized by behavioral literature to study the neural correlates and their structures. For the purposes of this study, we will "imagine", "musical", and "personality" as the facets for openness to experience. We will use DPABI: a toolbox for Data Processing & Analysis for Brain Imaging to extract the time courses from the corresponding regions of interest based on the coordinates of the facets analyzed through neurosynth. Looking at several ROI's related to openness, creativity, musicality, and personality, we will correlate the individual ROI's and quantify the relationship using a pearson correlation value. Then, comparing the pearson correlations from each subject's individual imaging data, we will correlate each ROI value ROI to their FFM score of openness, analyzing the strength of functional connectivity through the time series of the ROI. Doing so will allow us to quantify a measure of connectivity strength of the ROI pairings which correlates functional connectivity with the five-factor-model of personality.



## TATIANA ESPARZA

*Senior / Public Health*

*Research Mentor: Ashley Falcon / Public Health*

### A LITERATURE REVIEW ON JUUL, AND OTHER E-CIGARETTES, ON COLLEGE STUDENTS AND HOW IT CALLS FOR INTERVENTION DEVELOPMENT

Within the past five years, the popularity of vaping has grown in the young adult population through advancements of e-cigarette designs. JUUL is the most popular e-cigarette on college campuses, as it takes up 73.4% of its marketplace. Though e-cigarettes were first developed as a cessation tool to decrease smoking, it is still found to have negative health impacts on nicotine addiction, brain development, and lung illness. The information presented in the paper and poster is a result of a literature search conducted between 1 February 2020 and 3 March 2020. The databases used were Mendeley and PubMed, with terms such as 'JUUL,' 'college students,' 'young adult,' 'intervention,' and 'health risk.' The e-cigarette outbreak has caused young adults to face several serious health problems. Due to the unique flavors, peer pressure, and normalized perception, the use of e-cigarettes has grown in popularity on college campuses in disregard to the growing health risks. Facilitators include FDA warning labels on product and raising legal age of purchase. Barrier include its perceived safety and under 21+ individuals still have access to e-cigarettes despite regulation. Interventions that educate the young adult population on why and how to quit e-cigarettes are needed. This can be done by drawing inspiration from public health efforts used to reduce rates of tobacco smoking. Working with the Sandler Center, an educational health reference on campus, an intervention for e-cigarette use called a "Health Hut" is being developed to reach students on April 9th.



## LYDIA FRANKLIN

*Senior / Public Health*

*Research Mentor: Andrew Porter / Public Health*

### USING PODCASTS AS A TOOL TO ADDRESS SEXUALITY EDUCATION DISPARITIES IN MARGINALIZED POPULATIONS

In the United States, many adolescents have little access to comprehensive sexuality education or receive abstinence only until marriage sexuality education that disseminates negative sexual health messages. Marginalized populations (i.e. women, people of color, LGBTQ+) are perpetually neglected in sexuality education curricula and most at risk for receiving inadequate sexual health education. Many people, especially marginalized groups, utilize the internet to obtain this information, where much of it can be incorrect. However, podcasts and social media platforms are able to transcend geographic barriers and reach a broader population. The Sex Wrap Podcast uses the power of the internet and social media platforms (Instagram, Twitter, Facebook) to provide evidence-based sexual health information directly from licensed sexual educators and doctors. The goal of this podcast is to bridge informational gaps, address marginalized populations, reduce the stigma around sexuality education and disseminate positive, accurate and diverse sexual health information. This study uses social media engagement data like Instagram insights and podcast streams to examine the increases in social media reach and interaction. The increased engagement of this podcast and its social media platforms indicate that more people have been consuming the positive sexual health information provided by The Sex Wrap that aims to fill these educational gaps. These positive messages work against the negative sexuality information provided by the US educational system by including populations of diverse sexualities and achieving better sexual health outcomes. Podcasts such as The Sex Wrap can be used as educational tools to address the gaps in sexuality education



## EMILY HAWVER

*Senior / Public Health*

*Research Mentor: Andrew Porter / Public Health*

### MEMEIFICATION OF SEXUAL HEALTH MESSAGING: A CASE STUDY OF THE SEX WRAP

Heteronormative abstinence-only-until-marriage (AOUM) and abstinence-stressed sex education in the United States has historically limited access to inclusive and accurate sexual health information for sexual minority and marginalized populations (Keiser, Kwon, & Hobaica, 2019). The Sex Wrap (TSW) is a multimedia sexual health podcast educating its followers on sexual health and ancillary themes including sexuality, relationships, and communication. TSW's Instagram account repackages the evidence-based sexual health information from the podcast as original or reposted content, reaching an audience of nearly 30,000 followers. With internet memes becoming a driving cultural force among young adults aged 18-29, the podcast capitalizes on its Instagram social media presence to effectively stage online health-based social marketing. According to Yus (2018), memes have presented an effective way of accomplishing this; an intuitive form of online communication, memes employ media (usually images or gifs) to capture a relatable sentiment, then paired with a specific situation or experience creating a ubiquitous form of humor that can spread virally. Comedic value aside, the highly accessible nature of memes makes them a powerful tool for information dissemination. The meme-based sexual health intervention via TSW's Instagram is expected to increase engagement, improve reach, and convert followers to podcast listeners. Evaluating Instagram's insight data can elucidate methods of utilizing social media to enhance access to sexual health education for those notoriously underserved in institutionalized U.S. sex education. This case study presents the potential for social media-based public health interventions to fill social and legislative gaps in sex education and warrants further exploration.



## MARYAM JAWID

*Senior / Public Health & Biochemistry*

*Research Mentor: Rosina Cianelli / Public Health*

### TOBACCO CONSUMPTION AND ENGAGEMENT IN PREVENTATIVE BEHAVIORS WITH PATIENTS AMONG CHILEAN HEALTHCARE WORKERS

Smoking is responsible for the deaths of 12,000 Chileans each year. Healthcare workers are known to play an integral role in assisting patients with smoking cessation via hospital-based smoking cessation interventions. As part of Chile's first hospital-based smoking cessation intervention, healthcare workers in Santiago, Chile were surveyed about demographics, smoking habits, and engagement in tobacco preventative behaviors with patients. The survey utilized multiple-choice questions and the Common Practice Scale, a four question Likert Scale (Chronbach's alpha: 0.856). 65 healthcare workers (82% female) completed the survey. Tobacco use prevalence was 32%, with 48% of users consuming 1-5 cigarettes daily. The average preventative behavior engagement score was 9.5/16. No significant differences in preventative behavior engagement scores between smokers and non-smokers ( $t=-0.78$ ;  $p=0.44$ ) or between preventative behavior engagement scores and daily number of cigarettes smoked ( $r_s=-0.169$ ;  $p=0.53$ ) were found. The small sample size of this study was a limitation, but the average engagement score of 9.5/16 indicates much room for improvement and supports the need for intervention considering the massive global disease burden of tobacco use.



**MEGAN NGUYEN***Senior / Public Health***MAEHER GREWAL***Senior / Nursing***JULIANA BYERS***Senior / Nursing**Research Mentor: Ashley Falcon / Public Health*

## EVALUATION OF A FLIPPED CLASSROOM EXPERIENCE TO EDUCATE UNDERGRADUATE NURSING STUDENTS ON SEXUAL ASSAULT AND THE CARE OF SEXUAL ASSAULT VICTIMS

Undergraduate Nursing students report a lack of confidence in their abilities to handle sexual assault cases. This study aimed to evaluate the impact of a flipped classroom experience on undergraduate nursing students' knowledge, attitudes, and perceptions of sexual assault and care of sexual assault victims. Accelerated nursing students enrolled in NUR412 completed four online training modules, an in-class session, and online pre- and post-surveys. Surveys assessed knowledge using true/false questions, and attitudes/perceptions using 5-point Likert scales. Wilcoxon Sign-Rank tests assessed intervention impact. Sixty-five students completed pre/post-surveys. Participants reported improved confidence in their ability to care for victims ( $p < 0.001$ ). Participants showed improvement in knowledge for three of six questions aimed to test understanding of: (1) nurses should not document major details of the assault for law enforcement ( $p < 0.001$ ;  $r = 0.724$ ) (2) non-therapeutic care of victims of sexual violence can lead to re-victimization ( $p < 0.001$ ;  $r = 0.469$ ) (3) nurses should not strongly encourage victims of sexual violence to report their assault to law enforcement ( $p < 0.001$ ;  $r = 0.620$ ). Participants also showed improvement in five of twelve attitudes of sexual assault: (1) familiarity with support services ( $p < 0.001$ ;  $r = 0.583$ ) (2) the link between gender and sexual violence ( $p = 0.002$ ;  $r = 0.386$ ) (3) university support services for sexual assault survivors ( $p < 0.001$ ;  $r = 0.556$ ) (4) the role of societal norms in reinforcing gender power dynamics ( $p = 0.004$ ;  $r = 0.358$ ) (5) the role of language in perpetuating rape culture ( $p = 0.001$ ;  $r = 0.408$ ). The implementation of Sexual violence education may enhance undergraduate nurses' ability to care for sexual assault victims in a clinical setting.



## AZIN POORESMAEIL

*Junior / Health Sciences & Religious Studies*

*Research Mentor: Amishi Jha / Psychology*

### REMEMBER ME? : EXAMINING THE NEUROBEHAVIORAL BASES OF MEMORY

Cognitive control enables individuals to facilitate goal-relevant behavior and manage instances of cognitive conflict. Yet, this cognitive conflict appears to dynamically upregulate performance in subsequent moments. This dynamic upregulation is also shown when we experience demands on our working memory (WM). WM performance demonstrates dynamic adjustments in cognitive control in the face of high memory load (Jha & Kiyonaga, 2010; Witkin, Zanesco, Denkova & Jha, 2019). The objective of this study was to examine the effect of dynamic adjustments in WM performance in two experiments in which memory load was manipulated. Fifty-one undergraduate students were tested in-person. In Experiment 1, participants (N = 27) completed a WM task with memory load of one vs. two face stimuli. In Experiment 2, participants (N = 24) completed a WM task with memory load of one vs. three face stimuli. All participants also completed the same series of well-being questionnaires. The results from the study showed that WM performance in Experiment 2 was upregulated on subsequent trials when previous trials presented three face stimuli. There were no such dynamic adjustments in Experiment 1 on trials when previous trials presented two face stimuli. This indicates dynamic adjustments for the higher memory load.



## WILLOW WEBB

*Junior / Public Health & Sociology*

## KARINA CEPEDA

*Senior / Public Health*



*Research Mentor: Ashley Falcon / Public Health*

### USING THE THEORY OF PLANNED BEHAVIOR TO PROMOTE SEXUAL CONSENT AMONG UNDERGRADUATE GREEKS

Sexual assault is prevalent on college campuses, especially among members of the Greek system. This study aims to determine how effective posters based off the Theory of Planned Behavior are in changing attitudes, subjective norms, and behavior intentions regarding sexual consent. Forty undergraduate Greek students were randomized to either an intervention group who briefly viewed six educational posters on sexual consent that were informed by the Theory of Planned Behavior, or an attention control group who briefly viewed six posters on condom usage. Participants completed 28-item pre- and post-surveys assessing attitudes, subjective norms, perceived behavioral control, and behavioral intent regarding sexual consent and condom usage using 7-point Likert scales. Change scores were computed, and Mann-Whitney U tests were run to compare groups for the full sample and by gender. Ten females and ten males were randomly assigned to each group. Among male participants, two baseline between-group differences were found, demonstrating more favorable views of one of eight consent attitudes ( $p=0.045$ ) and one of four consent subjective norm ( $p=0.030$ ) within the control group. Change scores for the full sample demonstrated more favorable consent intention ( $p=0.024$ ;  $n2=0.131$ ) and consent subjective norms ( $p=0.04$ ;  $n2=0.109$ ) within the intervention group. Change scores for males showed a greater improvement in one of four consent attitudes ( $p=0.045$ ;  $n2=0.211$ ) within the intervention group. Brief exposures to theory-informed educational materials may help to improve attitudes, subjective norms, and behavioral intentions to seek sexual consent among undergraduate Greeks.

**NINA WOJTOWICZ***Senior / Public Health**Research Mentor: Andrew Porter / Public Health***THE SEX WRAP: A CASE STUDY USING PODCASTS AND SOCIAL MEDIA TO IMMEDIATELY ADDRESS SEXUAL HEALTH CONCERNS IN UNDEREDUCATED POPULATIONS**

The adaptation of abstinence only until marriage (AOUM) sex education in the U.S. has created barriers in addressing sexual risk behaviors, reproductive health outcomes, and condom and contraceptive use (Hall, Sales, Komro, & Santelli, 2017). Furthermore, AOUM provides inaccurate information regarding reproductive biology, contraception, and maternal health (Waxman, 2004). However, the increasing use of podcasts and social media among undereducated populations has challenged these knowledge gaps in sex education. This case study analyzes The Sex Wrap: a cutting-edge interventional podcast in which evidence-based and positive sexual health information is disseminated through supplemental social media platforms such as Instagram, Twitter, and Facebook. The success of The Sex Wrap's social media accounts in promoting podcast interaction and increasing listener counts illustrates a promising method to increase the impact of other online health interventions. Given the expansion in social media use and its ability to transcend geographic and social barriers, the utilization of supplemental social media accounts to promote and drive intervention participation via social marketing, as well as the social cognitive theory, has the potential to notably increase the impact and reach of many online interventions.



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