

PRESENTATION ABSTRACTS

PRESIDENT'S SHOWCASE of UNDERGRADUATE RESEARCH EXCELLENCE

October 1st, 2019 5:30 — 7:30 pm
Augustus Turnbull III Florida State Conference Center

ORAL PRESENTATION ABSTRACTS

CHASE BOYER

Supervising Professor: Dr. Kristina Buhrman

Representation of Hunters in Japanese Museums: Celebrated and Hidden
6:35-7:50 pm in Room 201

Hunting, as a means for survival, sport, or maintaining connections with heritage and tradition, has a long history on the Japanese archipelago as a socio-culturally significant activity. However, conventional portrayals of hunting in Japanese media and discourse reduce its impact and importance in the post-Jōmon period (14,000-300 BCE) to that of only two groups: the Matagi, a culturally distinct subgroup of Japan's majority Wajin population, or the Ainu, an ethnic minority inhabiting the northern island of Hokkaido. Despite the existence of a normalized hunting culture among broad cross sections of Japanese society throughout history, popular representation of hunters in Japan has othered them, downplaying their significance and prevalence. This research investigated whether the cultural belief that hunting has little place in Japanese tradition and history was reinforced or countered by Japan's various historical and cultural museums. I structured this research in the framework of museum anthropology and social history with a focus on museums' roles in interpreting historical materials and an understanding that museums have the power to create history as much as present it. For this project, I divided museums based on differences in size, funding sources, purpose, and locality into three categories: national, prefectural and local, and specialty. Though these museums are all meant to provide Japan's citizens with a view into their country's past, the parts of that past which they choose to emphasize or expunge differ considerably. While these museums serve to both celebrate and inform, they can also reinforce bias and intensify socio-cultural othering. Based on a comparative analysis of these museums, I drew conclusions on the current state of the representation of hunters within Japanese museums.

NIA HARMON

Supervising Professor: Dr. Thierry Dubroca

The Overhauser Dynamic Nuclear Polarization Domino Effect

6:10-6:25 pm in Room 103

Standard magnetic resonance techniques, such as magnetic resonance imaging (MRI), are commonly used in medical applications. Unfortunately, magnetic resonance suffers from low sensitivity, which limits the breadth of its applications, such as tracking molecules that indicate illness. However, thanks to recent advances in the development of higher frequency microwave sources and higher field magnets, the Overhauser effect is now being used to improve magnetic resonance sensitivity in modern spectrometers to count and identify molecules. The main ingredient needed for the Overhauser effect is called a polarizing agent. A polarizing agent is an organic molecule with at least one free electron. The focus of this work is to improve and optimize sample preparation to exploit the Overhauser effect, by using new polarizing agents. Samples were prepared with new biradicals (i.e. two polarizing agents bound together) before being exposed to microwave irradiation. Then, through the Overhauser effect, a large electron polarization was transferred to the nuclei of interest, producing a large gain in sensitivity of the studied molecule, carbon-13. In this work, we demonstrate that the use of biradicals as polarizing agents produces greater sensitivity than the use of traditional polarizing agents. Finally, drawing on these results, we show that with the use of biradicals, the future of magnetic resonance as a diagnostic tool for medical illnesses is very promising.

JACK FOX MARIA KEEN

Supervising Professor: Dr. Alan Lemmon and Dr. Richard Bertram

Excitation Models of Interval Counting Neurons

7:00-7:15 pm in Room 205

Acoustic communication in chorus frogs is heavily dependent on the ability of neurons to measure pauses and gaps within the frog calls. These temporal computations play a large role in the mating behavior and selectivity of frogs. Understanding the neurophysiology of this process provides insights into both the origins of numerical abilities and the driving mechanisms of evolution. The first part of this summer research project required the building of foundational neurological principles, such as ion movement across cell membranes. This was facilitated by the summer session of the Biomathematics Journal Club, a graduate seminar led by Dr. Richard Bertram, in which we covered *Dynamical Systems in Neuroscience*. The second phase involved applying these general neurophysiological principles to the specific neurons in frogs, as well as implementing the mathematical principles into programming languages. This required familiarization with the research papers of Dr. Gary Rose of the University of Utah, one of the leading researchers on interval counting neurons and a collaborator with Dr. Emily Moriarty Lemmon of Florida State University. The computational models were done with MATLAB and XPP, a general numerical tool for simulating dynamical systems.

HERBERT LOPEZ, PAOLA CHAVEZ, ANA VICTORIA DE LEON, AUSTIN RODRIGUEZ

Supervising Professor: Dr. Peter Cheetham

Environmentally Friendly Gas Filled Medium Voltage Cables

6:35-7:50 pm in Room 103

The configuration of the electric power grid is set for its most dramatic configuration change in the last 100 years. Electric power systems all over the world are transitioning from highly centralized infrastructures with bulk generation plants to increasingly distributed generation and storage solutions where renewable energy plays an important role. With this transition comes the need for more medium voltage cables. There are several types of cables, and this research focused on Gas Insulated Lines, or GILs. The problem with these cables is that they use a gas known as SF₆, and it has a high global warming potential, almost twenty-four thousand times worse than carbon dioxide. The first phase involved finding an environmentally friendly alternative gas with similar electrical properties compared to SF₆. We found several gases such as: trifluoriodomethane (CF₃I), g₃, and Nitrogen gas. The second phase consisted of designing several GIL configurations and modeling their electric field using specialized software. This method allowed us to find the minimal properties a gas must have in order to work safely at medium voltages. As a long term goal, we would like to continue this research and test several prototypes of environmentally friendly gas filled medium voltage cables.

SEBASTIAN MEJÍA

Supervising Professor: Dr. Anasa Hicks

Decolonizing Land & Re-indigenizing Body: The Recuperation of Indigenous Identities in Brazil

6:10-6:25 pm in Room 114

Racial whitening, or *branqueamento*, as a nation building tool served to disappear Indigenous communities and turn these individuals into “modern” Brazilian citizens. Many of these communities would be labeled as Caboclo or other non-indigenous identities as an effort of the state to confiscate their lands. These acts of assimilation were, and continue to be, resisted by communities of Indigenous descent. Since the 1920s, more than 50 groups have come out and resisted these imposed labels and have demanded ethnic and territorial recognition from the Brazilian government. “Decolonizing Land & Re-indigenizing Body” examines the historical and contemporary struggle of Indigenous communities as they take back the meaning of *indigeneidade* and their accompanied struggle of land repatriation. This research draws from archival research, secondary sources, and discourse to understand this phenomenon as part of a larger historical process of resistance against byproducts of colonization that moves towards decolonization.

CELINA MEYER

Supervising Professor: Dr. Julia Sheffler

The Role of ACEs and Household Stability on Emotional Regulation in Adulthood

6:35-7:50 pm in Room 205

Adverse childhood experiences (ACEs) such as physical abuse, emotional neglect, and childhood trauma have been linked to a variety of psychological disorders characterized by emotional and behavioral

dysregulation. Separately, researchers have noted household chaos in childhood is a factor that may interfere with children's ability to develop the capacity for emotional and behavioral regulation. Considering the negative outcomes associated with ACEs, the identification of mechanisms underlying these associations may contribute to the development of early interventions targeting these outcomes. The current study aims to identify potential factors by examining whether household chaos moderates the relationship between ACEs and the use of maladaptive emotion regulation (ER) strategies. Young adults (N=60) in Tallahassee and surrounding areas were asked to complete a survey via Qualtrics. The ACE Scale was used to assess adverse childhood experiences, the CHAOS Scale was used to assess household chaos, and the CERQ was used to assess emotion regulation strategies. Regression analyses were conducted to examine the relationship between ACEs and emotion regulation strategies and to determine if household chaos moderated this relationship. Preliminary results indicated a significant positive correlation between ACEs and household chaos ($r=.57$, $p=0.01$), consistent with previous findings. We found that as ACEs and household chaos increased respectively, so did the reported use of maladaptive emotion regulation strategies (i.e. Self-Blame, Catastrophizing, etc.); however, we found that the relationship between ACEs and emotion regulation strategies did not depend on household chaos. This study examined two important risk factors, ACEs and household chaos, and identified that these factors have distinct relationships with maladaptive ER in adulthood. Consideration of these distinct relationships may be integral in the development of interventions targeting maladaptive ER strategies.

SABINE H. NEMOURS

Supervising Professor: Dr. Maxine Montgomery

The Female Backbone of Immigrant Communities

6:10-6:25 pm in Room 201

The term melting-pot has been a staple in our American vernacular. Historically, the term supports an antiquated view of our nation united by "the people" and not by their ethnic or cultural ties. Used in this way, the term is meant to placate and to sweep under the proverbial rug that our differences don't separate us as much as we say they do. Despite the usage of this term, there is no such thing as a melting pot in the United States. One example of a so-called American melting pot is Miami, Florida. A major port of entry for immigration into America, Miami's entire ethnic and national demography has been subjugated by the term melting-pot for decades. The purpose of my project was to probe into Miami's conglomeration of cultures and see if the communities that made up Miami's geographic, economic, and social background fit into the melting-pot definition. Focusing primarily on the community of Little Haiti, my research discovered deeply divided along the lines of race, color, identity, and immigration status. Through interviews with curators of businesses and cultural centers, live observations, and historical data gathered on Florida immigration policies from the Haitian Heritage Museum, I found that communities like Little Haiti serve as independent islands of culture. Despite traditional thinking of immigrant communities, Little Haiti exists in a fragile state of fierce ethnic independence and uncompromising financial dependence. The culture is "Haitian", but the economy of Little Haiti is not. Moreover, I found that the ethnic survival of Little Haiti rested on the backs of Haitian women, as women serve as an uncompromisable element of social conditioning in Little Haiti. What my research project discovered was that there is no such thing as an American melting pot, but there is an American backbone and such backbones are disproportionately female.

ELISÉ J. NGUYEN

Supervising Professor: Stephanie James, MFA

"We Write The Ends To Our Stories": Launching a Sole Proprietorship that Aids the Fight Against Sexual Assault and Sex Trafficking at Florida State University

6:35-7:50 pm in Room 114

6:35-7:50 pm artwork in Creative Room, 115

Alarming statistics show that not only is sexual violence prevalent in society, but the NSVRC also estimates that 20% - 25% of college women are victims of rape during their time in college. Even sadder, they also announced that more than 90% of victims on college campuses do not report the assault. Unfortunately, these statistics included me when, during my freshman year at Florida State University, I was drugged for three days and raped by a stranger. Although this event has had a traumatic impact on my life, I have directed my experience to support a humanitarian cause. After receiving the IDEA Grant, I have launched a sole proprietorship that sells art with conceptual themes about my sexual assault experience at FSU to fund organizations that aid the fight against sex trafficking in Tallahassee. Thanks to the IDEA Grant funding, my business will help make Florida State University a safer campus and will allow students to interact with a first-hand account of how rape occurs to students while addressing problems with party culture, racial fetishism, the objectification of women, and social conceptions of sexual assault survivors.

ATALYA SANTOS

Supervising Professor: Dr. Turner De-Vera

Redeveloping Las Colonias

7:00-7:15 pm in Room 114

Throughout the twentieth century, the defining characteristic of "colonia" communities in Texas's Rio Grande Valley was a lack of standard government services like running water, sewers, electricity, and trash collection. Starting in the 1980s and continuing to the present day, community organizers in the colonias have fought the state government for infrastructure improvements and better building codes, steadily bringing their communities up to standard. This project will use the documentary medium to demonstrate the replicable methods colonia organizers use to engage with families and use the community's collective will to convince politicians to implement their policy solutions.

ZOE LEE ZIRLIN

Supervising Professor: Dr. Patrick Merle

The Big Lie(s): A Quantitative Analysis of the Visual Imagery Employed to Propagandize Nazism

6:10-6:25 pm in Room 205

Daily life in Nazi Germany during the rise of Hitler's administration can be better understood by researching the state-sponsored media of the time. By analyzing the messages communicated to citizens of the Third Reich in the years leading up to World War II, we can identify what type of sociopolitical environment incubates fascism and totalitarianism. This project is a content-analysis of the visual imagery in a sample of 72 Nazi Propaganda posters distributed from the years 1933 to 1938, framed through the

tropes highlighted by Kenneth Burke in his piece “The Rhetoric of Hitler’s Battle”. This past summer, I traveled to the United States Holocaust Memorial Archive outside of Washington, D.C to photograph several of these posters. This research will enable discoverance of the frames through which Hitler convinced the German people to embrace a totalitarian state, how often those frames were utilized by the Reich Ministry of Propaganda, which frames were most utilized from year to year, and if the dominating frame of that year can be hypothesized from the political events that were occurring at the time. 11 million people perished in the Holocaust (the Shoah), including 2 million children. This project is dedicated to children like Suzanne Zloty, who died at the age of twelve in a cattle-car destined for Auschwitz after being deported from Paris on August 17th, 1942.

FSU iGEM TEAM

Roderick Meyer, Jacob Gottlieb, Cameron Conroy, Jamale Youmas, Tyler Mitchell, Derica Parathundil, Jessie Griesheimer, Juan-Martin Portilla, Shams Dhanani, Hannah Pascoe, Kathleen McClellan, Conner Quinlan, Alyssa Klein, Mezindia-Blessing Nkembo, Nicholas Vasquez
Supervising Professor: Cesar Rodriguez, M.D.

FLOEMA: The antimicrobial peptide cocktail designed to save Florida’s citrus
7:00-7:15 pm in Room 103

Citrus greening is a bacterial disease occasionally referred to as Huanglongbing (HLB) caused by the bacteria *Candidatus Liberibacter asiaticus*. The bacteria has been found in the phloem of infected trees and in the salivary glands of the Asian citrus psyllid. The psyllid vector picks up the bacteria from an infected source and transmits it when it feeds again. This creates a continuous cycle capable of destroying thousands of acres of crops and turning states, such as Florida, into citrus quarantine zones. Greening has devastated citrus industries from Florida and California to parts of Asia and Africa due to the shorter lifespans of crops, premature fruit drop, and a reduction in fruit quality. Our initial ideas included creating an early detection biosensor for the bacteria in citrus crops but experts in the industry advised us that once the tree is infected, it’s too late. Knowing this, we moved our efforts to creating a treatment for the plants. We aimed to engineer a cell-free system to secrete foreign antimicrobial peptides (AMPs). AMPs are a potent alternative to traditional antibiotics, secreted naturally by most biological systems, in an age where antibiotic resistance is on the rise. We are specifically engineering these systems to secrete AMPs as a solution for the immediate causal agent of citrus greening. Using commercially ordered AMPs found in honeybees, moths, and toads, we tested their efficacy on the closest culturable relative of *L. asiaticus*, *Liberibacter crescens*, while also attempting to create systems capable of secreting singular AMPs and cocktails of AMPs. Our “FLOEMA” AMP cocktail is a reflection of our ongoing efforts to save Florida’s iconic oranges and bring the citrus industry back home.

POSTER PRESENTATION ABSTRACTS

AQUESHA ADDISON

Supervising Professor: Dr. Timothy Megraw

The Role of Ninein in the Formation of Non-centrosomal MTOCs in Endothelial Cells

Both the centrosomal and non-centrosomal microtubule organizing centers (MTOCs) contribute to various functions in mammalian cells. We are interested in how these MTOCs are used by the Flavivirus Zika virus (ZIKV) to infect and replicate in brain microvascular endothelial cells (BMECs). BMECs are a model organism for human disease assays that were used in this study to observe the localization of specific proteins and the formation of non-centrosomal MTOCs. During the Flavivirus infection cycle, the ER rearranges to form a compact structure called a viroplasm that is responsible for virus replication and assembly, and microtubules contribute to its formation. Golgi-derived microtubules appear to originate from the outside and center of the viroplasm. We observe differences in the structure of the viroplasm of ZIKV and a related Flavivirus Dengue virus (DENV). When treated with centrinone, a drug that results in centrosome depletion, viroplasm assembly is disrupted. While MTs have been shown to be important for Flavivirus infection, the individual roles of the centrosome and additional MTOCs such as the Golgi have not been well characterized. We are studying how the centrosome and the Golgi MTOCs and protein localization are affected by ZIKV infection, and determining how they contribute to viral tasks such as subcellular rearrangement and viral replication.

SERENA VIOLA CORSON

Supervising Professor: Carrie Ann Baade, MFA

An Artistic Investigation: Longevity and Contentment in Italy

Italians live on average 4.5 years longer than North Americans. Sardinia, an island off the coast of mainland Italy, is considered a “blue zone”, or one of five places where people live the longest. Unlike in the United States, it is uncommon to put the elderly into institutional care. The elderly are an essential part of the thriving communities. By traveling to Italy, talking to the locals, and observing the culture, I found out why the people there not only live longer, but live more fulfilled lives. For this project, I bound an art book to record drawings and findings of my experience each day. I also took photographs that captured the intimate moments shared between family and community members. There are many reasons I found that Italian culture breeds contentment: the unabashed national pride, the quality of food and air, how families tend to live closer together, and the frequencies of piazzas.

JESSICA DIXON

Supervising Professor: Dr. Aaron Wilber

Lost and Found: Exploring the Relationship Between Getting Lost and Pre-Alzheimer's Disease Brain Changes

Getting lost is the first symptom of Alzheimer's Disease (AD). Previous work in our laboratory has shown the AD mice are impaired at learning to use landmarks to figure out their location in space (spatial

reorientation), analogous to getting lost in new surroundings in humans with preclinical AD. However, the changes in brain function that underlie this impairment in AD mice are unknown. Therefore, I assessed spatial reorientation ability and brain function in the CA1 area of the hippocampus, which is critical for spatial navigation. I compared data from mice that were genetically altered to develop pathology similar to humans with AD with control (non-genetically-modified mice) that were trained on a task that requires learning to get oriented in space using the surroundings (spatial reorientation). My findings replicated our previously published navigation impairment in the AD mice. I utilized c-fos (an activation marker) immunohistochemistry to quantify the level of activation in the CA1 region of the hippocampus during the spatial reorientation task. Surprisingly, there was a marginally significant *elevated* activation in the CA1 area of the hippocampus of AD mice compared with controls ($p=0.06$). Further, I found a marginally significant correlation ($r=0.79$, $p=0.11$) between worsened navigation performance and increased levels of activation in the CA1 region of the hippocampus. Previous studies in humans have shown similar hyperactivation in the hippocampus of humans with preclinical AD, and some have interpreted these findings as reflecting a compensatory process. Since the AD mice may have a hyperactivation of the CA1 region of the hippocampus and showed impaired navigation, this suggests that if the hyperactivation in the CA1 region of the hippocampus is a compensatory process, then it is failing to prevent behavioral impairments. Alternatively, it is possible that this hyperactivation is simply a consequence of AD-related pathology. The correlation I found between hyperactivation and impaired performance suggests in AD mice it may be the latter, that hyperactivation is a consequence of AD-related pathology.

ROBERT FOURQUREAN

Supervising Professor: Dr. Thomas E. Miller

Greener Gardening: Turning Every Pot Into Plant Paradise

In the state of Florida, the agricultural industry often uses chemical fertilizers and pesticides in the production of their produce. These chemicals are often used in excess and help lead to the pollution of our ecosystem. This project investigated the effect of organic fertilizers and pesticides compared to their chemical constituents while testing an innovative application product design. A plant stake was first designed and modified with the intention of providing necessary plant support while administering effective nutrients and protection from pests. While the stake itself was used as a support structure, the underground portion contained a fertilizer which fed the root system, and the exposed stake contained a pest deterring chemical. To test my idea, 210 individual cherry tomato plants were propagated from seed for two weeks and then eventually moved to a field. Once moved each plant was assigned to one of seven test groups which were administered either chemical or organic pesticide and fertilizer treatments. The plants were then monitored for six weeks and then final measurements were taken for plant height, flower number, and fruit amount. At the end of the six weeks the data was analyzed. The results showed that while the use of either a chemical or organic pesticide under my application method had no significant effect on plant performance, the use of both the chemical and organic fertilizer had a very significant positive effect on the performance of my plants. It was also observed that the effect the organic fertilizer had on plant height, flower number, and fruit amount was exceptionally similar to the effect of the chemical based fertilizer. This is promising because these results show that chemical fertilizers can be substituted for organic counterparts. Furthermore, these results instill confidence in the effectiveness of my application method.

ARRIA HAULDIN, ANDREW TAYLOR

Supervising Professor: Dr. Elif Bulut

Me, Myself, and I: Multifarious Motherhood in Vietnam

The Socialist Republic of Vietnam is a country dominated by the concepts of community and family. Although motherhood is often praised, single motherhood often holds a stigma that gets magnified if women are from an ethnic minority group or a rural area. We aim to investigate the role single-motherhood plays in access to education for, majorly, ethnic minority women as well as the effects it has on the formation of personal connections. Overall, our study explores the experience of being a single mother in Vietnam and its impact on access to human capital (i.e. education), identity, and social capital (i.e. social relationships, social connections). Some themes we choose to focus on include the single-mother identity, both within one's community and within Vietnamese society as well as socioeconomic constraints of a one parent household in Vietnam.

EVA JOHNSON

Supervising Professor: Stephanie Sickler, MFA

Bonsai and the Art of Display

In shops or museums, objects are intentionally displayed to appeal to or convey a message to viewers. Similarly, bonsai, artfully cultivated potted trees, are displayed in intentional environments to facilitate careful observation. To improve display techniques for products, bonsai displays were evaluated in different environments to trace elements of effective display design. Observations tracked the use of design and space planning fundamentals in creating an effective bonsai display. A design framework, assembled from these observations of line, proportion, balance, route, and materiality, informs effective display techniques utilizing these fundamentals, and is designed to be applied to any display environment. The framework is written in a series of actionable design implications which are applied to the design of a sample display piece for retail goods, demonstrating the value of this framework in application.

HANNA JUSTUS

Supervising Professor: Dr. Veronica Fleury

Determining the Value of Virtual Reality Technology in Autism Intervention

Autism Spectrum Disorder (ASD) is characterized by impairments in social communication or skills. 1 in 51 people are affected by the disorder, and this has created a demand for more effective intervention strategies. Virtual Reality (VR) technology allows for a 3D simulation of real or imagined environments, and it has more recently been embraced for its potential therapeutic applications. This study examined the effectiveness of the use of Virtual Reality technology in Autism Intervention. This meta-analysis examined the existing literature to find if VR was effective in treating this population and specifically which demographic of participants it was most effective in treating.

ALEXA KELLENBERGER

Supervising Professor: Dr. Elizabeth Coggeshall

Moral Inheritance: Hereditary's Ancestry in Dante

The present study analyzes how Ari Aster's 2018 film *Hereditary* utilizes Dantesque themes of moral responsibility and self-imposed psychological punishment to explore the concept of inherited sin. While the film originally appears as a modern Greek tragedy on the inevitability of fate and the horror of grief, *Hereditary's* narrative and thematic parallels to Dante's *Divine Comedy* reveal the film's core as a morality play falling within the subgenre of surreal horror. Specifically, the film implements several distinctly Dantesque motifs: body horror, violent metamorphosis, and self-imposed psychological punishment, building up to its central question on the inheritance of sin from parent to child. Applying concepts from the work of Teodolinda Barolini and Leo Spitzer on the *Inferno*, this paper argues that the fate of *Hereditary's* protagonists is the result of each character's individual actions and choices rather than the mercy (or cruelty) of a tragic destiny imposed upon them. As surreal horror is currently an ill-defined subgenre, the present study ultimately aims to provide evidence to categorize works into this subgenre by identifying the common language of the *Divine Comedy* in notable surreal horror titles such as *Hereditary*.

ELIAS LARRALDE

Supervising Professor: Dr. Robinson Herrera

Melodies of Mirages: Exoticism, Folklore, and "Performing" Santeria

My research project looked in how the commodification and folklorization of the religious music of Santeria effected practitioners and Afro-Cuban musicians starting in the 1950s up into present day. During that time the musical genre known as Exotica was becoming popular in American Suburban communities. Exotica music was built on creating musical landscapes about different lands like Latin America in order to transport the listener. Santeria became a subject of Exotica by the usage and arrangements of the tune "Babalu Aye", a song that references a ritual to the Santeria deity of illness, but in the Exotica version, refers to him as a "voodoo goddess of love". This apparent contradiction was what guided this research in seeing how commodification can lead to misrepresentation of musical traditions in Latin America. By utilizing musical recordings of both religious ceremonies and the popular tune "Babalu Aye" with archival material from artist, academic, and government institutions, I saw that there was a complicated dynamic that arose and is still present today when it comes to Santeria in popular culture. I found that while Exotica was built on entertaining people by exaggerating fantasy and its use in government programs was for simple nationalistic propaganda, Cuban musicians also promote songs that talked about the role in Santeria in Cuban society and its part in defining an Afro-Cuban identity. These songs, coupled with the growing study of Santeria by academics like Lydia Cabrera and Natalia Bolivar, allowed a more inclusive conversation to take place about Santeria's influence in Cuba's society and culture.

MEGHAN LEGER

Supervising Professor: Dr. Lea Neinhaus

Green-to-blue photon upconversion sensitized by CdSe nanoplatelets

Due to the dependency of their optical properties on chemical composition, size or shape, nanomaterials are of great interest for potential application in photovoltaics, bioimaging, and other optoelectronic devices. In contrast to previously used spherical quantum dots, cadmium selenide (CdSe) nanoplatelets (NPLs) have optical properties which are dictated by only their thickness. This makes them an attractive option for a sensitizer when devising a triplet-triplet annihilation (TTA) upconversion (UC) system, due to a lack of energetic inhomogeneity. In this particular study, CdSe NPLs were first coupled to an organic transmitter ligand, 9-anthracene carboxylic acid (9-ACA), to assist in the triplet energy transfer process, then put into solution [ML1] with our emitter, diphenyl anthracene [LN2] (DPA). Through this device, we are able to achieve photon upconversion from green to blue light by TTA in DPA.

SABRINA MATO

Supervising Professor: Dr. Sean Ehrlich

Splintering Off: Catalonia's Search for Sovereignty

"Splintering Off" is an analytical narratives project that dissects Catalonia's declaration of independence in 2017 through individual stakeholders' lens' and deciphers the international impact this referendum and self-governing movement has had on Spain. In analyzing forty comprehensive case studies, I provide a deductive evaluation of the incentives and cost-benefit analyses of these leading members of the community and of the potential expected outcomes of Catalonian independence. Discerning the perspectives of individuals from a variety of demographics in areas of Valencia, Barcelona, and Madrid provides a representative sample and glimpse of invested entities.

JACK MILLS

Supervising Professor: Dr. Brendan Lantz

Oppression of Representing the Oppressor: An Examination of LGBTQ+ Elected Official Behavior

In the state of Florida, only twenty-one locally elected officials identify within the LGBTQ+ community. Many of these officials are newly elected or have served few terms, which calls into question the retainability of LGBTQ+ individuals in publicly elected office. With Florida being a swing-state, it has been unclear whether homosexuality is a switcher-issue for Floridian voters, meaning that no matter their individual policy, the sexual or gender orientation of a candidate could hinder their electability. While Florida will continuously sway in political identity, some evidence suggests that candidates identifying as gay, lesbian, or bisexual are normalized more often than if a candidate identified as transgender or a lesser known sexual orientation. These findings are comparable to the current roster of Floridan LGBTQ+ elected officials, all of which identify as either gay, lesbian, or bisexual and further extend the concern of electability for those who identify with a sexual or gender orientation that is not conventionalized. These findings also align with various periods of progression and regression of statewide LGBTQ+ legislation and adjudication processes; correlating approval or rejection of certain members of the LGBTQ+ community based on the current political climate and inclinations of Floridian voters.

ASHLEY MOSES

Supervising Professor: Dr. Elizabeth Hammock

Behavioral Analysis of Stimulus Mice in a Two-Choice Social Preference Test

The neuropeptide oxytocin is an important regulator of social behavior. In mice, oxytocin has been found to function in behaviors such as aggression, social memory, social recognition, lactation and milk ejection, cognitive flexibility, uterine contractions during labor, social attachment, and mother/infant bonding. Our experimentation was done in order to identify behavioral differences between mice with (OXT WT) and without (OXT KO) oxytocin as stimulus animals: a study never done before. Their behaviors were observed and quantified during a 30-minute, two-choice three-chambered social preference test with C57BL/6J subject mice. The behaviors quantified across time included social behaviors such as facial, anogenital, tail, body sniffing, and total investigation (all sniffing combined), and nonsocial behaviors such as nose poking, climbing, exploring, freezing, and autogrooming. OXT WT and OXT KO females and males demonstrated no significant differences in the social behaviors based on the presence of oxytocin. There were differences, however, in nonsocial behaviors based on the presence of oxytocin. It was found that female OXT KO mice spent more time exploring during the 10-20 minute time bin of the test. Additionally, male OXT KO mice climbed more than the OXT WT males throughout the entire test and autogroomed less during the 10-20 minute time bin and total time bin of the test. Also, the mice did demonstrate significant differences in social behaviors based on sex such as tail sniffing, anogenital sniffing, body sniffing, and total investigation time. This lack of difference in social behavior suggests that, in the experimental set-up used, the behavior of the OXT WT and OXT KO stimulus mice is not greatly impacted by the presence or absence of oxytocin.

ELI MYRON

Supervising Professor: Dr. Sandra Brooke

Understanding the Role of Underwater Architecture in a Coastal Ecosystem: How Do the Physical Characteristics of Man-made Structures Influence Benthic Communities?

It is widely accepted that coral reef systems are the most diverse ecosystems on the planet. The organisms that provide the foundation for that system are the corals themselves, along with many other benthic (bottom-dwelling) species. This remarkable “engineering” capability is due to the ability for these benthic species to secure themselves to a particular physical structure and thrive under very specific conditions. As conditions worsen in the marine environment, benthic organisms lose their capability of building such physical structure. This combined with the elimination of these ecosystems through coastal dredging, stress the need for understanding how additional measures can be taken to “recreate” the natural reef system. In this study, 20 “artificial reefs” of four different types (reef ball, culvert, layer cake, and lindberg cube) were compared in order to clarify the physical factors that optimize artificial reefs in the Northeastern Gulf of Mexico. Reef structures were compared according to orientation and artificial reef type to distinguish physical characteristics. Our preliminary data analysis implies significant differences in colonizing species among surfaces of different orientation, indicating that orientation plays a major role in determining the benthic community on artificial reefs in this region.

GRAHAM O'DONNELL

Supervising Professor: Dr. Jon Ahlquist

Rain, Rain, Go Away

In this project, we examined a US Government data set of hourly precipitation interpolated onto a 4-km grid covering the continental US. We looked for wetter and drier regions around the Gulf Coast and Tallahassee in particular. During 2002-2019, significantly enhanced precipitation occurred in the Apalachicola National Forest and along the coast southeast of Tallahassee. Reduced precipitation occurred just north of Lake Seminole. In winter months, no specific locations around Tallahassee exhibited increased or decreased precipitation, but storms generally weakened as they passed through the Tallahassee area. Because the data set is an imperfect merger of rain gauge and radar precipitation values, these results are at best qualitative.

VANESSA ODURO

Supervising Professor: Dr. Stacey Rutledge

Multilingualism and Education: A Closer Look at the Language Policy in Ghanaian Schools

This project is a qualitative research study based on the English-only language policy in Ghana, a multi-ethnic and multilingual society. There are many indigenous languages that are used within this society, making English a second or third language to most people. As of 2002, there was a policy change which mandated the use of English only as a medium of classroom instructions at all grade levels. This change was due to the notion of the government wanting Ghana to be part of the "Global Village." Though introducing English to students at an earlier grade would have significant benefits, this policy fails to see that "Second language acquisition research has shown that the level of proficiency in the L1 has a direct influence on the development of proficiency in the second language and that a disruption in first language development has been found, in some cases, to inhibit second language proficiency and cognitive achievement of learners" (Baker, 2001). This poster will highlight the language use in postcolonial Ghana, issues that influence literacy development in multilingual classrooms, as well as students' attitude towards mother tongue/bilingual education in both public and private sectors of education.

KEARA SEABOLD

Supervising Professor: Dr. Kurt Piehler

Female Higher Education in the 1920s: A Comparative Study of the Florida State College for Women and Radcliffe College

My project focuses on understanding the milieu of women's colleges in the 1920s. It is a comparative study examining the Florida State College for Women (Florida State University), and Radcliffe College (Harvard University) during the Roaring Twenties. It considers how institutions of higher education influenced youth culture through civil and political activism and involvement, racial prejudice, and the development of female sexuality. The project builds upon scholarship on youth culture and women's higher education by Paula Fass, Elene Farello, and Beth Bailey. This project draws extensively on

primary sources such as student publications, scrapbooks, and personal letters from the Florida State University Special Collections Archives, as well as Harvard's Radcliffe College Archives at Schlesinger Library. While examining these resources, the influence of regional divide between the North and South on the functioning of politics and society within these campus cultures became apparent, as the wider national issues of evolution, suffrage, and xenophobia translated to the smaller societies surrounding Radcliffe and FSCW in dramatically different ways.

JOSHUA SHULTZ

Supervising Professor: Dr. Ming Ye

Assessing Historical Changes in Floating Vegetation in Lakes Jackson and Iamonia with NDVI and its Relation to Aquatic Nitrate Concentrations

Water quality is an important factor in protecting our aquatic resources. It can be challenging to monitor bodies of water frequently and for long periods of time. This project looked at nitrate and NDVI values in Lakes Jackson and Iamonia over the last 30 years (1987-2017). Lake Jackson had increasing NDVI and nitrate values while Lake Iamonia had relatively stagnant nitrate and NDVI values. The results showed nitrate and NDVI values for each lake followed similar trends over the study period. It is difficult to claim that the relationship between NDVI and nitrate is directly correlated because of other variables in these complex natural systems.

SERGIO CARLOS TAMEZ

Supervising Professor: Dr. Svetla Slaveva-Griffin

Omina Imperii in the Age of Iconoclasm: Inside the Struggle for the Soul of an Empire

Who gets to be a Roman Emperor? Our historical sources of the Roman Empire, from the beginning of the Empire under the reign of Augustus and through its reincarnation in the Byzantine Empire in Constantinople, are obsessed with this question. The emperor was the Romans' connection to the divine, both a token and instrument of transcending power. He was responsible for the souls and salvation of the empire and its people, and his relationship with God determined the wellbeing of his subjects. Therefore, an emperor in the throes of heresy could not only threaten his own chance at eternal life in Heaven, but those of all the Christian Roman people. This project examines the consequences of the Iconoclast reigns of the Isaurian Dynasty and Leo V, when the Byzantine Empire underwent sustained rule by heretical emperors, through a study of the *omina imperii*, or "omens of power" that are described in the *Chronographia* of Theophanes the Confessor and the *Synopsis of Histories* by John Skylitzies. *Omina imperii*, in the pagan Roman Empire, were "signs that the gods had chosen their recipient to be emperor" (Lorsch 1993); in the Christian empire these signs served the same purpose, and they retained their function of legitimizing the *imperium* of emperors whose claims to the throne were in doubt. This study of the *omina imperii* will offer a new perspective for how the orthodox Roman Christian elite challenged the popularity and martial successes of the heretical emperors by establishing a connection between the content of these signs and those described in Byzantine Apocalyptic literature, particularly the omens associated with the Antichrist. I will argue that the orthodox historians delegitimized the Iconoclast emperors by identifying their presages of power with Antichrist-like tropes, and that these emperors threatened the souls of the Roman people.

NATALIA VALDERRAMA

Supervising Professor: Dr. Linda Rinaman

The Role of GLP-1 Producing Neurons in Regulating Anxiety-like Behaviors in Transgenic Mice

Glucagon-like-peptide-1 (GLP-1) is a neuropeptide expressed in preproglucagon (PPG) neurons in the nucleus of the solitary tract (NTS) in the lower brainstem. The GLP-1 system has been investigated for not only its robust role as an appetite suppressor but also its modulation of the sympathetic nervous system indicating a potential role in the response to stress. To further investigate the potential role of GLP-1 in mediating stress responses, a novel neuroscience tool, chemogenetics, was used to selectively manipulate the activity of PPG neurons via the expression of a designer receptor, hM3Dq, that is exclusively activated by its ligand, clozapine-N-oxide (CNO, 2mg/kg i.p.). Transgenic Glu-Cre/tdRFP mice were stereotaxically injected into both sides of the NTS with 200 nl of one of two viral vectors. One viral vector led to expression of a G-protein coupled receptor, hM3Dq (n=7) and the other vector was used as a control (n=7). Suppression of food intake after injection of CNO as well as immunohistochemical staining, confirmed the activation of hM3Dq-expressing PPG neurons. Anxiety-like behavior of mice following activation of PPG neurons was tested in an assortment of behavioral tests. There was no effect of PPG activation on the Acoustic Startle Response (ASR) or on Conditioned Placement Avoidance (CPA) test. Moreover, there was no statistically significant effect of PPG activation on time spent in the center of the Open Field, although this did approach significance ($p=0.06$). These findings suggest PPG neurons do not explicitly induce an anxiety-like effect in all behavioral assessments but rather allude to a limited emotional attribution in mediating stress response.

TECH FELLOW PRESENTATION ABSTRACTS

SHANIA ALINCY*The Relationship between Fear and the Failure of Startup Businesses*

This research study was conducted to illustrate the relationship between the failure of startup businesses and the emotion of fear. Through interviews with Melbourne based entrepreneurs, fear was identified as a clear factor as to why their businesses financially failed. While fear alone is a strong leading factor, there were other contributing factors that led to the failure of their businesses including a lack of support from the business community, effective planning of their business operations and individual confidence. Seven business owners within the Groundswell startup community participated in these interviews about entrepreneurial failure.

AYANNA CHUKES*The Potential Impact of Establishing a Social Media Presence and Mobile Applications Upon Store Front SME Companies*

As technologies such as social media and mobile applications become ever more influential in our economy, small businesses have begun incorporating these technologies to grow their brands. These technologies have made a substantial impact in the way that companies gain popularity and potentially

increase profits. This study focuses on the impact of establishing a social media presence and/or a mobile app upon store-front companies. Interviews with seven Tallahassee, FL area small business owners were conducted in the Summer of 2019. Their qualitative responses to questions regarding the impact of implementing these technologies were compared and contrasted with the goal of further understanding the nuance of their use. The business owners interviewed cited a significant increase in sales and general popularity. Ultimately, all interviewees credited these technologies to profit increase. .

LAVONDA DEAN

A Qualitative Look at the Impact of Orlando's Immigrant Entrepreneurial Community

Innovation and entrepreneurship are key elements to the health of any economy. There is much controversy within the United States regarding the role of immigration and how it affects the U.S. economy. Increasing evidence suggests that immigration plays a significant role in business innovation and entrepreneurship. Within the Orlando metropolitan area there are about 455,000 residents that may be identified as being a part of the immigrant community. It can be difficult to obtain a comprehensive estimate of how much of an impact immigrants may be contributing to innovation, invention, and Orlando's overall economy. In this study, a collection of economic data and interviews with local immigrant entrepreneurs will seek to identify the impact of the community on the Orlando area economy.

ASHLEY TAYLOR

Leadership Styles among Women Business Leaders and Entrepreneurs

There is a desire among students to be in high-status leadership positions within an organization. There have been many studies looking at gender differences in leadership traits and behaviors, but not many look at the traits that can lead to higher leadership positions for women. This study discusses the findings from a survey examining how women business leaders and entrepreneurs define leadership and how they describe their own personal leadership styles. The use of the Full Range Leadership Model aids in guiding the conversation on how these styles are determined and assigned.

ASHLEY ROSADO

Imposter Syndrome and Machismo: A Case Study on Latinas Navigating the Tech Startup Industry

This study examines the prominence of imposter phenomenon among Latina entrepreneurs in the technology startup industry as they navigate self-doubt in a male-dominated industry. Latinas have a strong dedication to their cultures, families, and identities. In Latinx culture, *machismo* is a concept used to describe the gender roles and power plays between sexes. *Machismo*, paired with an industry not reflective of their identities, was a factor in the self-doubt of these high-achieving women. These theories were evaluated through a collection of interviews with seven self-identified Latina entrepreneurs. These entrepreneurs- from various educational backgrounds, immigration experiences, age ranges, and based in Miami, Florida – offered their testimonies via 30-60 minute interviews. The data analysis revealed distinct themes: certain entrepreneurial ecosystems are diverse and inclusive because of geographical location, gender roles in Latin American cultures implicitly or explicitly inform Latinas' perception of self, and Latinas intentionally build community spaces in the technology startup industry to support themselves and each other. These findings reveal that Latina entrepreneurs navigate identity, culture, and profession while discovering outlets to combat their self-doubt and create pathways for other Latinas.

