



FORDHAM COLLEGE AT ROSE HILL 13TH ANNUAL UNDERGRADUATE RESEARCH SYMPOSIUM COMMEMORATIVE PROGRAM



AN INTERDISCIPLINARY CELEBRATION OF OUR STUDENTS AND MENTORS

In 1665, plague hit London. Cambridge University closed and sent students home. A young, Trinity College student went to his home at Woolsthorpe Manor, 60 miles away. During this time, that student discovered calculus and the laws of motion. His name was Isaac Newton (Washington Post, March 12, 2020). In spring 2020, during the COVID-19 pandemic, over 200 students continued in research at FCRH that they submitted for presentation at our Symposium, despite the incredible transitions in their lives. We honor their discoveries here.

The Thirteenth Annual Fordham College at Rose Hill Undergraduate Research Symposium Program | Spring 2020

Welcome to the program for the Thirteen Annual FCRH Research Symposium! We were excited for the chance to welcome you to the symposium itself. While the COVID-19 crisis upended those plans, we are still eager to honor our students' accomplishments. Even as it became clear that our symposium could not be held this year, students persisted on their projects and embraced the opportunity to submit abstracts. They and their mentors willed each other on. In honor of our students' achievements, and their commitment, we are pleased to present this program listing the projects of over 200 undergraduate students who worked with faculty mentors on independent and group endeavors. We are also thrilled to announce that the 10th volume of the *Fordham Undergraduate Research Journal*, chock full of impactful articles that were written, reviewed, and edited by Fordham students, was also completed remotely. We are in awe of how our students persevered during such unprecedented times.

In the 13 years since the first symposium, undergraduate research at FCRH has grown to become an integral part of the FCRH culture, expanding across disciplines and now accessible to all students. Thanks to generous support from donors, FCRH has provided over \$1.5 million in funding for students and faculty over this time, giving more students the opportunity to deeply engage in the process of inquiry and learning through discovery. In turn, over 175 students were first or second authors on external conference presentations and students co-authored over 125 publications with their faculty mentors. This spring, FCRH saw a record number of travel grant submissions and, for the first time, supported groups of students attending conference together with a faculty mentor. For the second year in a row, FCRH offered a "Foundations in Research Engagement" seminar (featured on the cover); students enrolled in this offering developed six fascinating projects that are described below. The resiliency our undergraduate research community is profoundly inspiring. We are so proud of our students' accomplishments and look forward to celebrating their research in person!

Our students' participation and flourishing in undergraduate research would not be possible without the dedication of so many people. We are deeply grateful to our generous alumni donors and to the Fordham College Alumni Association, who have provided financial support for the FCRH undergraduate research program. We would like to extend our tremendous appreciation to our students and their faculty mentors, as well as supporters from our faculty and staff, family, friends, and alumni. Special thanks are due to our amazing colleagues who work behind the scenes in support of undergraduate research: Jillian Minahan, Claire Dunphy, Susan Legnini, Miriam Milazzo, Christopher Gu, and Grace Little from the FCRH Dean's Office; the FCRH Undergraduate Research Grant Reviewing Team, which includes fifty faculty members and two alumni; and all who touch us each and every day with their dedication to our program and their companionship in this journey. Our student researchers were such a light to us during a difficult time – for this we are so thankful!

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American Studies

Abstract 1: Film le Quebec Libre: Multicultural Representation in 21st Century Quebec Cinema

Authors: Andrew Byrne

Mentor: Christopher Dietrich

College: Fordham College at Rose Hill

At the heart of the American Studies field is the question of American identity. In order to understand such a concept, one must address instances in which identity changes, is challenged, or even divides. Conflicts of national identity often stem from racial, religious, or political differences. However, one example of such national conflict in North America is characterized by a division of language. Canada's Quebec province is home to an intense debate of national identity in which French speaking people have advanced from being an impoverished minority to a powerful nationalist majority. Further, nationalism and other qualities of national identity have strong ties to cultural products. In Quebec, the 1960's Quiet Revolution describes a period of increasing French nationalism which in turn causes the region's first major boom in film production. Today, Quebec sense of identity is becoming more multicultural, and the province is currently experiencing a second period of increased film production. In my research, I hope to uncover the continuity and change between these two movements, which will inform the question of Quebec's changing national identity. In viewing multicultural representations in Quebec cinema, I hope to come to a better understanding of Quebecois identity.

Abstract 2: Progressive Politics Among Voters in New York City Ages 18-24

Authors: Genny Glembotzky

Mentor: Christopher Dietrich

College: Fordham College at Rose Hill

Last year, I conducted research for my American Studies Senior Thesis, a historical narrative of politics in New York City hinged upon an observed uptick in self-described "progressive" candidates elected into office in 2018. Anecdotal evidence I gathered as well as news coverage I canvassed suggested that much of the shift towards progressivism was propelled by a movement of young adults. Yet, even contemporary research suggests that young people ages 18-24 consistently exhibit the lowest turnout in national elections, despite making up almost a third of eligible voters in the United States. I sought to investigate the accuracy of these claims of youth-driven progressive mobilization by piloting a survey of New York City ages 18-24. The survey inquired about party registration, political ideology, immediate recent voting history, and hypothetical questions that ask respondents to gauge their associations with "progressive", "liberal", "moderate", or "conservative" political candidates. I planned to collect responses from the Fordham University community by advertising the survey both on campus and via email, and later supplement responses with online data collection services. Due to financial constraints of online survey distribution, I revised my initial goal of 1,000 responses to 300 responses in hopes of eventually expanding the pilot version of the project. Responses would be analyzed and summarized to understand to what degree a historically unresponsive group of voters could mobilize an ideological shift further to the left in New York City, and to develop the next phase of the historical narrative I began last fall.

Abstract 3: Making the Justice System Just: The Restorative Justice Movement in Chicago

Authors: Stephanie Simon

Mentor: Christopher Dietrich

College: Fordham College at Rose Hill

In a city plagued by pernicious injustice, it is no mystery why Restorative Justice practices and principles have become increasingly popular and important in Chicago. Over the past decade, this community driven method has been explored by Chicago's leaders as a feasible diversion method from traditional criminal court procedures. This is because Restorative Justice offers a unique alternative to traditional criminal justice by viewing crime as a breakdown of community and relationships rather than merely a violation of rules and law. Its principles compel the system to address not only the end result of a conflict, but also the circumstantial problems that lead to a crime, to provide reflection and growth opportunities for stakeholders facilitating conversations between them- usually in the form of peace circles, and to create rehabilitative groups and programs in schools, prisons, and Restorative Justice community hubs throughout the city that aim to assist victims, perpetrators, and community members before, during, and following conflict. Empirical data has not yet been collected, so the testimonials and experiences of people involved are the only tangible way of measuring the power of the movement. Those people, including former criminals, seasoned judges and attorneys, community leaders, and public-school teachers have all found the outcomes they have experienced encouraging and significant. The Restorative Justice Movement seeks to do more than merely put a band-aid on a problem. It creates a more just justice system by examining and addressing underlying problems as well as the crime and through meaningful relationship building.

Anthropology

Abstract 4: Birth Tourism: Birthright citizenship and its socioeconomic and political factors

Authors: Salma Youssef

Mentor: Daisy Deomampo

College: Fordham College at Rose Hill

Birth tourism is the process of women coming to the U.S. to give birth for the purposes of better healthcare and the child gaining U.S. citizenship. In recent years, birth tourism from East Asian countries has been increasingly covered by media and has given rise to discussions on U.S. immigration policies. This trend in birth tourism is now present in Egypt as more Egyptian women travel to the U.S. to give birth. The spread of birth tourism highlights growing transnationalism that is being addressed in the media. The effects of transnationalism on citizenship and healthcare are a central concern of this phenomenon as it relates to U.S.-Middle East relations. The agents and social forces that enable the spread of birth tourism in Egypt are a valuable topic of study to understand the motivations, means, and outcomes of this phenomenon. This study asks, what are the motivations and experiences of Egyptian women who give birth in the U.S.? Furthermore, the impact of U.S. foreign policy, citizenship, and media perception on birth tourism will be considered. More broadly, it will contribute to scholarly debates around citizenship and globalism.

Abstract 5: Reproductive Governance, Moral Agency and The Role of CPCs in the Abortion Polemic

Authors: Jennifer Grubman

Mentor: Daisy Deomampo

College: Fordham College at Rose Hill

My research involves studying how crisis pregnancy centers (CPCs) distance and defend themselves from the significant criticism directed towards their organizations. Criticisms of CPCs include but are not limited to: attempting to scare clients away from abortion using inaccurate medical findings on the physical and psychological risks of the procedure, posting misleading information online as to the nature of these facilities to draw in new clientele, and using shame tactics to coerce women into carrying to term. Drawing on several interview sessions over three months with employees from two organizations, I theorize that these centers justify their work by demonstrating how they give their clients the moral agency to make an informed and desired decision in the face of reproductive governance; the extent of this autonomy, however, must be analyzed in light of the misleading information distributed by these centers. My research allows for a nuanced conversation on CPCs, a subject that has been often excluded from consideration within the realm of anthropological thought and literature. One should note that while abortion is a multifaceted issue that warrants constructive dialogue, I will not be arguing for or against the procedure in my discussion of crisis pregnancy centers.

Biological Sciences

Abstract 6: Bat Activity in an Exurban Landscape and the Impact of LED Light

Authors: Rachel Pak

Mentor: J. Alan Clark

College: Fordham College at Rose Hill

Northeastern bats provide important ecological services, such as controlling insects, including mosquitos, which are vectors of several human diseases. Because northeastern bats are nocturnal, they are difficult to study. Consequently, basic natural history information about most bats species is lacking. To improve our understanding of bats, I conducted passive acoustic surveys during the breeding season at the Calder Center in Westchester County, NY – an exurban landscape. My survey included three sites with contrasting landscape features. Using acoustic analysis software, I analyzed my bat recordings and documented all six common New York bat species at the Calder Center. I also found that bat activity varied between my three sites. Artificial light impacts bat activity, and this impact varies by species. LED lights are increasingly prevalent, but little is known about how LED lights impact bat activity. To explore LED lights' impact on bats, I used a 5,000 lumen LED work light –the equivalent of a suburban street light – and alternated the light on and off for 30 minutes from 9:00 pm to 5:00 am over six nights. The LED light was directed skyward, and I recorded bat activity near the LED light. I found that Big Brown Bats were less active in LED light, but Eastern Red Bats were often more active in LED light. In the future, I hope to explore which landscape features correlate with increased bat activity and expand the study of LED lights' impact on bat activity to more sites and over a longer period of time.

Abstract 7: Brain Damage and Mitochondrial Dysfunction due to ELAC2 Mutations in Drosophila

Authors: Jack Nelson

Mentor: Edward Dubrovsky

College: Fordham College at Rose Hill

RNaseZ is an essential enzyme encoded by the ELAC2 gene that is crucial for proper maturation of both nuclear and mitochondrial tRNA. In humans, mutations of ELAC2 lead to severe health issues, including premature death. Throughout this project, I examined several models of ELAC2 mutations in Drosophila through histological analysis of brain tissue and a behavior test. I studied Drosophila who expressed two different ELAC2 mutations throughout all cells impacting both nuclear and mitochondrial tRNA, throughout all cells but only impacting mitochondrial tRNA, and I started on designing two fly models that would express the mutations only in nervous tissue impacting only mitochondrial tRNA. Histological analysis revealed visible brain damage of mutated fly models through vacuoles in the tissue. Due to the early closing of campus, brains of all the genotypes of Drosophila were preserved, but not every genome was completely processed for digital analysis of vacuolated space. The behavior test performed was a bang sensitivity stress test, which tested seizure and paralysis susceptibility after stress was applied. Seizure and paralysis were observed in all genotypes of mutant Drosophila. Both paralysis under a stress test and vacuolated brain tissue are signs of mitochondrial dysfunction. The work on designing a fly model that expressed the two ELAC2 mutations in the mitochondria of only nervous tissue would provide a way to confirm that the pathology was due to cell autonomous mitochondrial dysfunction. Significant progress was made on the process of creating the fly model, but due to campus closing was not completed.

Abstract 8: Effect of RNaseZ Knockout on Heart Morphology

Authors: Gabriella Fuentes

Mentor: Edward Dubrovsky

College: Fordham College at Rose Hill

Hypertrophic cardiomyopathy (HCM) is a condition where the left ventricular heart wall is thickened and inefficient at pumping blood. The RNaseZ gene is linked to HCM, and humans born with mutations in this gene typically die young. This project examined Drosophila melanogaster flies with the RNaseZ gene knockout in heart cells, with the rest of the organism unaffected. This allowed for the investigation of whether this HCM is caused by a mechanism originating in heart cells or from signaling by other tissues. Sections of fly hearts were prepared and placed on microscopic slides for observation. Mutant flies survived at least 20 days and appeared to have functional hearts. In their terminal larval stage, the larvae weighed from about 1-3 mg (wild type average weight is 2.1 mg). This project aimed to examine 20 hearts of each genotype, but only 4 of each were examined. However, some preliminary findings are that the transgenic flies had unusual structures attached to their hearts and the thickness of the heart walls did not appear abnormal. While there is not sufficient data at this moment to make any conclusions, there is reason to suspect that the RNaseZ gene in heart cells plays some role in the pathology. The transgenic flies in this experiment do not live as long as wild type flies and have some clear anatomical differences; if the pathology were only due to signaling from tissues outside the heart, it would be expected for the mutant flies to largely resemble wild type flies.

Abstract 9: Generation of Constructs Expressing Epitope Tagged JHE to Establish JH Deficient Flies

Authors: Kiran Srivastava

Mentor: Edward Dubrovsky

College: Fordham College at Rose Hill

The coordination of Juvenile Hormone (JH) with the hormone 20E plays an instrumental role in insect growth and development. It has been determined that JH is responsible for the activation of E75A, a nuclear receptor gene. However, the mechanism of JH signaling remains unknown. JH targets can be investigated by establishing JH deficient *Drosophila* using the GAL4/UAS system, in order to alter the level of JH in a specific tissue, and these JH deficient *Drosophila* are established with JH esterase (JHE). JHE is a naturally existing enzyme that is secreted into the hemolymph, and degrades JH in insects. An intracellular form of JHE was developed, so that JHE is only present inside the cell. This form was previously used to demonstrate that JH activates E75A gene expression through an intracellular pathway. In order to establish JH deficient flies, our goal was to generate constructs encoding JHE and employing the GAL4/UAS system. The GAL4/UAS system is a binary system that drives the expression of the GAL4 gene which binds to UAS, the enhancer. It allows for targeted gene expression in *Drosophila*, limiting the expression of JHE to a specific tissue. Transgenic flies of UAS and GAL4 strain are crossed in order to produce flies that express JHE tissue specifically. We designed and cloned a plasmid that encodes epitope tagged JH esterase using pBID-UASC as the backbone vector, which employs the UAS-GAL4 system. The sequencing results of both constructs containing epitope tagged JHE demonstrated that cloning was successful.

Abstract 10: GABAergic Activation of Basal Forebrain Promotes Food Consumption and Hunting Behaviors

Authors: Francesca Cinque, Ciorana Román Ortiz, Jessica Guevara, and Roger L. Clem

Mentor: Silvia Finnemann

College: Fordham College at Rose Hill

Over-eating has become increasingly common in the modern era due to the easy availability of relatively inexpensive, highly palatable, and energy-dense foods, with little risk of food scarcity. Obesity's development into a global public health concern suggests a dire necessity to elucidate the biological substrates of feeding as well as the brain regulatory mechanisms that govern food intake. While previous literature has reported that basal forebrain (BF) GABAergic neurons play a role in food consumption, the exact contribution of this non-cholinergic population remains under-investigated and not well understood. The present study seeks to address this gap in literature by investigating the precise involvement of basal forebrain (BF) GABAergic neurons in feeding and hunting behaviors in mice. Utilizing optogenetic methodologies and a series of behavioral testing, we evaluated the effect of BF GAD2+ activation. Here, we provide evidence that photoactivation of BF GAD2+ neurons increased food consumption of chow as well as gnawing of inedible material. Furthermore, photoactivation of BF GAD2+ neurons increased predation behavior, in terms of the amount of time hunting, accompanied by a reduced latency to hunt. Altogether, these findings demonstrate that BF GAD2+ activation increases food consumption and hunting behavior independent of caloric value.

Abstract 11: Investigating the Evolution of Self-Fertilization in Brassica rapa

Authors: Alexander Oruci

Mentor: Steven Franks

College: Fordham College at Rose Hill

Decreased pollinator availability is a major physiological stress which can contribute to the decreased fitness of animal-populated plants. *Brassica rapa* is an annual flowering plant in the Brassicaceae family. It has long been considered a self-incompatible species, meaning that self-fertilization is prevented and plants are obligate outcrossing. The mechanism of this self-incompatibility is the inhibition of pollen tube growth. *B. rapa* has evolved this ability in order to prevent problems such as inbreeding depression and reduced gene-pool variation. However, recent studies have shown that self-fertilization can evolve under limited pollinator availability. This study investigates the possibility that *Brassica rapa* can evolve the ability to self-fertilize and seeks to determine if it is possible to produce an experimental line which is capable of self-fertilization. Individual *B. rapa* plants were grown out under three experimental conditions. One treatment was pollinated along with other individuals in the same population. Individuals in the experimental treatment were covered with fine-mesh bags and were then pollinated with pollen from that individual only in order to control fertilization. Fitness measurements were then taken throughout the lifespan of the individuals in order to determine the effects of inbreeding depression and determine if the populations evolved the ability to self-fertilize. After three generations of a pilot study, it is evident that *B. rapa* does appear to evolve the ability to self fertilize. While fitness had decreased in the manually self-pollinated line, this fitness is now rebounding, demonstrating that the effects of inbreeding depression can be overcome.

Abstract 12: Selection on Plasticity of Gene Expression in Rice

Authors: Colleen Cochran

Mentor: Steven Franks

College: Fordham College at Rose Hill

The objective of the study was to use existing data on rice, the most important food crop in the world, to identify the type and number of genes with plastic gene expression in rice and to determine whether plasticity is adaptive. Plasticity refers to how a phenotype, or trait, changes across different environments for a given genotype. When plasticity is adaptive, individuals that show greater responsiveness to environmental variation are favored. Although much work has examined plasticity of traditional phenotypic traits, less research has focused on plasticity of gene expression. We hypothesized that we would find plasticity in genes related to drought and stress response and that plasticity would be adaptive in variable environments, meaning that more plastic genotypes will have greater overall fitness across drought and watered treatments. We analyzed data from a field experiment in which 230 varieties of rice were subjected to drought and watered treatments in common gardens, with replicates of each genotype in each environment. To determine if plasticity is adaptive and its associated costs, we regressed plasticity on fitness both across and within environments respectively. We observed significant plasticity of gene expression for many genes. However, there was a lack of evidence for selection on plasticity. These results suggest that plasticity of gene expression may be an important response of plants to environmental variation, but it did not appear that greater plasticity of gene expression would be favored across variable environments. The results of the study have important implications for establishing global food security as rice is increasingly exposed to variable, stressful environments due to climate change.

Abstract 13: Sex-Specific Effects of Early-Life Stress on Gene Expression: Focus on X-inactive Escapee Genes Kdm5c and Kdm6a and Their Y-Counterparts

Authors: Eric Purisic

Mentor: Marija Kundakovic

College: Fordham College at Rose Hill

Anxiety and depression are two sex-biased psychiatric disorders with females being twice as likely as males to develop these disorders. Previously, the Kundakovic lab examined sex-specific effects of early-life stress on later development of anxiety- and depression-like behavior in mice. The results showed that the effects of early-life stress were more profound in females in terms of behavioral changes and changes in expression of candidate genes linked to these disorders. This project continues this research by examining changes in expression of genes called X-inactivation escapees (Xi escapees). These genes escape the inactivation of one of the X chromosomes in females. The candidate genes examined are Kdm5c and Kdm6a, two epigenetic modifiers which regulate the expression of other genes through histone modification. Both genes have been shown in previous studies to be linked to the development of major depressive disorder and anxiety behaviors. In addition, the Y-linked paralogues of these genes were also examined in males. Our results indicate an increased expression of these two candidate genes in response to early-life stress with a trend for sex-specific changes in females only. Additionally, there was no change in response to early-life stress in the expression of the Y-paralogues or Xi escapees in males. These results indicate that early-life stress induces increased expression of these genes in females exclusively. Additionally, the results indicate a potential molecular mechanism behind sex-bias in the risk of developing anxiety and depression.

Abstract 14: The Effect of Ovarian Hormones on the Activity of Genes Regulating Metabolism

Authors: Olivia Doll

Mentor: Marija Kundakovic

College: Fordham College at Rose Hill

Obesity and its associated risks are a growing health concern in the developed world, and women become more vulnerable to this condition following transition through menopause. There is currently no treatment available for postmenopausal obesity without its own serious side effects. Previous studies using mice have shown that estrogen signaling in the brain maintains healthy weight by promoting physical activity and thermogenesis. Estrogen Receptor Alpha (ER α , ESR1) is the most important mediator of metabolic estrogen signaling in the brain. The Tac1 and Rprm genes are down-stream ER α targets important for regulating physical activity and thermogenesis. The Lepr gene encodes a receptor for leptin, a metabolic protein that interacts with estrogen in the Ventromedial Hypothalamus (VMH) to regulate energy homeostasis. To examine the metabolic effects of circulating ovarian hormones, this study will compare the levels of expression of these four candidate genes in naturally cycling, ovary-intact mice with those of mice that underwent ovariectomy. A previous study in Dr. Kundakovic's lab found that the ovariectomized animals showed higher body weight and lower physical activity levels than the naturally cycling animals. To examine the levels of expression of the genes of interest, RNA will be isolated from the hypothalamus, a brain region critical for regulation of energy expenditure, and quantified using qRT-PCR. Results of this study will provide a better understanding of the molecular mechanisms through which estrogen produces its metabolic effects on the brain.

Abstract 15: The Sex-Specific Effects of Early Life Stress on Gene Expression and Epigenetic Mechanisms Related to Depression- and Anxiety-like Behavior

Authors: Isabella Mascio

Mentor: Marija Kundakovic

College: Fordham College at Rose Hill

Early life stress can increase the risk for depression and anxiety disorders in later life. Women have twice the risk of developing these disorders compared to men. A previous study in Dr. Kundakovic's lab indicated that mice that experienced maternal separation stress exhibit behavioral alterations, gene expression changes, and epigenetic changes of relevance to psychiatric disorders. Female mice were more affected than males. DNA methylation, an epigenetic modification which alters the accessibility of genes, could be a potential mechanism underlying the observed differential gene expression. The current study aimed to: 1) identify the effects of early life stress on gene expression of candidate genes (Chd3, Dlk1, and Dkk11); and 2) explore whether DNA methylation may underlie the previously shown gene expression changes caused by early life stress in early growth response 1 (Egr1) gene. The analyses were performed in males and females. The ventral hippocampus was analyzed due to its critical role in emotion regulation. Gene expression of candidate genes was analyzed using qRT-PCR. Dlk1 in females lost its estrous cycle-dependent regulation in response to early life stress. Chd3 showed differential expression across the estrous cycle after early life stress, although this difference was not seen in control females. Dkk11 showed no changes. DNA methylation was analyzed upstream of Egr1 using bisulfite-pyrosequencing. One CpG site showed increased methylation in the early life stress group, particularly in females. This new information provides future directions for further studies involving the effect of early life stress on gene expression and underlying epigenetic mechanisms.

Abstract 16: Anti-Fungal Ability of *J. lividum* and *S. rhizophila* in Environments of Varying Nutrient and pH Levels

Authors: Sereene Kurzum and Elle M. Barnes

Mentor: J.D. Lewis

College: Fordham College at Rose Hill

Amphibians are an expansive and diverse class of organisms that play crucial roles in their ecosystems. However, they are currently under threat of mass extinction largely as a result of habitat degradation as well as the spread of the infectious disease, chytridiomycosis. Some amphibians, such as the salamander species *Plethodon cinereus*, have been found to possess bacteria that resist against the disease. Two such bacteria with high anti-fungal ability include *Stenotrophomonas rhizophila* and *Janthinobacterium lividum*. Both bacteria have been known to inhibit Bd on their own, but how they impact each other's growth and anti-fungal ability is still unclear. To test the impacts of the two bacteria on each other, as well as the effects of nutrient levels on their growth and anti-fungal ability, both bacteria were introduced first simultaneously, then sequentially, to two different media with high and low nutrient concentrations. qPCR was used to calculate population abundance, and Bd inhibition was measured by growing Bd in the presence of metabolites filtered from the media samples. I hypothesized that in sequential introduction, the species introduced first will have higher population abundance as compared to the abundance in simultaneous introduction, and that there will be higher Bd-inhibition in the higher nutrient media. Overall, this project will further inform not only how to treat this deadly disease, but how to prevent it from spreading and worsening the effects of amphibian mass extinction.

Abstract 17: Unlocking the Swab: Characterizing Amphibian Fungi

Authors: Jennie Wuest, Steve Kutos, and Elle M. Barnes

Mentor: J.D. Lewis

College: Fordham College at Rose Hill

Amphibians play an important role in ecosystems all over the globe. However, they are being threatened by the rapid spread of a deadly wildlife disease caused by the fungus *Batrachochytrium dendrobatidis* (Bd). Many studies have shown that certain cutaneous bacteria provide a natural resistance against Bd, as a result of competitive interactions. However, we know little of the fungal diversity (beyond Bd) that exists on their skin and how those fungi interact with the disease and other cutaneous microbes. To fill this gap, we explored the culturable fungal diversity and function of the skin microbiome of the eastern redback salamander (*Plethodon cinereus*) at various sites in the New York City area. Individuals were swabbed and these swabs were then plated on two different types of media (PDA and MMN) to maximize culture diversity. Following morphological isolation of the fungal cultures, we extracted, amplified, and sequenced the entire ITS region and will perform a challenge assay with Bd to determine inhibitory potential. We hypothesized that salamanders in our area would have a species-rich fungal microbiome that varies in composition by location and at least some of these fungi would be inhibitory to Bd. This would suggest that fungi play a critical and often overlooked role in the microbial defense of amphibians to Bd. In the future, we hope to quantify the complex interspecific interactions between bacteria, fungi, and microbial pathogens.

Abstract 18: Chitinase Genomics and Proteomics: Delving into the Mechanisms of Disease Protection against the Chytrid Fungus

Authors: Mary Lally, Erin Carter, and Elle M. Barnes

Mentor: J.D. Lewis

College: Fordham College at Rose Hill

Amphibians across the globe are at risk due to the fungal wildlife disease *Batrachochytrium dendrobatidis* (bd), also known as the chytrid fungus. Interestingly, it has been shown that skin bacteria from some amphibians, such as the redback salamander (*Plethodon cinereus*), provide a natural immunity to bd. Bacteria inhibit bd by producing anti-fungal compounds. Chitinases are one group of bacterially-produced compounds that likely play a key role in bd-inhibition by targeting and breaking down chitin found within the cell walls of bd. Of interest now is determining the diversity of chitinases produced by bacteria and exploring how they may vary over space. For this study, we explored chitinase genomic diversity in the common soil bacteria *Stenotrophomonas rhizophila* which has been shown to protect amphibians from fungal diseases. To understand this microbe-pathogen interaction amongst different strains of *S. rhizophila*, we developed primers to isolate the chitinase gene in each strain. Amplified fragments of the gene were then sequenced, and we analyzed the chitinase genes' sequences. We found variation in the sequences of *S. rhizophila* chitinase gene, and analysis revealed that only some of the strains definitively code for a chitinase protein with three domains: a catalytic domain, a fibronectin-like domain, and a chitin-binding domain. These results support that variation in the chitinase genes of *S. rhizophila* strains may contribute to a slight variation in anti-fungal ability. Given that anti-fungal function is more important for conservation than sequence, we believe some strains may be better suited for conservation applications, such as probiotics.

Abstract 19: Investigation of HPV16 L2 Protein Structure and Possible Role in Transcription

Authors: Nora Kuka and Sandra Ivanov

Mentor: Patricio Meneses

College: Fordham College at Rose Hill

The human papillomavirus (HPV) is one of the most common sexually transmitted infections. The virus infects human epithelial cells, like those of the genitals and mouth. Some types of HPV can cause genital warts and several types of cancer. HPV16 is a high-risk genotype of HPV that accounts for a majority of cervical cancer cases. The HPV virus has two capsid proteins: the major capsid protein (L1) and the minor capsid protein (L2). Previous research showed that the L2 minor capsid protein plays a critical role in viral entry and trafficking of viral DNA to the host cell nucleus, enabling the virus to infect the host cell. Previous research also suggested that L2 protein may have an additional role as a transcription factor. To determine the function of the L2 protein, we cloned constructs of the L2 gene and observed any changes in transcription in the mutants of the L2 protein. Additionally, we would use Superoxide dismutase 2 (SOD2) and Transforming Growth Factor-Beta (TGF- β) to observe gene expression by transfecting the cells and examining the transcriptional levels by real-time polymerase chain reaction (rtPCR). The upregulation or downregulation of these proteins will give us insight into the role of L2 in HPV infection.

Abstract 20: NO2 Levels in Comparison to Asthma Hospitalizations in NYC

Authors: Tiffany Conigliaro, Roman Khaimov, Kareem Hassan, and Francesca DePalo

Mentor: Usha Sankar

College: Fordham College at Rose Hill

As airborne pollutants have received increasing media coverage, there is concern of how different contributors to climate change could affect morbidity of different populations. NO₂ is a highly reactive gas that is present in open air, due to the burning of fossil fuels. In New York City, an industrialized city, there is an increased potential of NO₂ exposure compared to less urban areas. Breathing air with high concentrations of NO₂ can cause detrimental health effects, particularly to the respiratory system. According to the EPA, "Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms." The purpose of this experiment is to observe the affect of NO₂ levels on asthma hospitalizations in NYC. High NO₂ levels would produce an increased amount of asthma hospitalizations. By using previous data collected by the Environmental Protection Agency and New York State's Department of Health, the number of asthma hospitalizations can be compared to NO₂ levels at specific points in time. Preliminary data collection demonstrates that both NO₂ levels and asthma related hospitalizations rise during the winter months and fall during the summer months. A pearson correlation test on SPSS yielded an r value of 0.538 with p=0.071, which shows that there is a moderate correlation. The limitation of this correlation is due to the data available by the NYC Dept. of Health on asthma hospitalizations. Even so, there is still a visible relationship between NO₂ levels and asthma related hospitalizations, although more data collection is necessary. This data is consistent with similar studies conducted on the topic and supports the claim that NO₂ exposure increases respiratory distress in asthma patients.

Abstract 21: Correlation Between Economic Status and Respiratory Health in NYC

Authors: Celia Hans, Usha Sankar, Abigail Fontana, Hayden Idom, and Bridget Alex

Mentor: Usha Sankar

College: Fordham College at Rose Hill

Over the past ten years, respiratory health data from New York City has reported the highest numbers of asthma related hospitalizations (ARH) in the nation. Our goal was to analyze the various social and economic factors that contribute to the amount of ARH per hospital within NYC, specifically pediatric hospitalizations. We hypothesize that in lower income areas, ARH will be more prevalent, most likely due to preventable disparities that exist between high income areas and low income areas, such as quality of healthcare, quality of living spaces, number of individuals per household, etc... We obtained data from the New York Department of Health that provided us with 2016 ARH numbers ranging from mild to moderate to severe for ages 0-17 in the Bronx and Manhattan. We also obtained data that lists the average income of each neighborhood in Manhattan and the Bronx. A scatter plot illustrated a moderate negative trend: as average income increases, the number of ARH decreases. The Pearson correlation coefficient was -0.414 , showing a medium strength of association. This correlation means that the preventable disparities that exist between lower income areas and higher income areas could be the cause of pediatric ARH. However, since it is not a strong correlation, there are still other factors relating to the cause of pediatric ARH. With our findings, our hopes are to raise awareness of the preventable disparities that exist in the frequency of ARH in less wealthy areas and to continue to investigate methods that could alleviate these issues.

Abstract 22: Influenza and Air Pollution: Exploring Influenza Rates and PM2.5

Authors: Jack Nelson, John Cerjak, Lawrence Drejaj, and Bilguutei Enkhsaikhan

Mentor: Usha Sankar

College: Fordham College at Rose Hill

According to the CDC, the “influenza season” peaks between December and March, and while cases of influenza follow a seasonal pattern, weekly and daily fluctuations point toward additional factors that impact influenza rates. Previous research conducted in New York City, London, East Germany, and Hong Kong explore the effect of air quality on influenza rates. Our research focuses on comparing levels of PM2.5 (particulate matter with a diameter less than 2.5 micrometers) and influenza cases in the Bronx and Essex county. Influenza virions can become trapped in microdroplets around PM2.5 particles and breathed into the lungs. Publicly available information on weekly influenza cases and PM2.5 were obtained. Preliminary findings suggest a positive correlation between levels of PM2.5 and influenza rates in the Bronx ($R = 0.655$, $p = 0.001$), but not in Essex County ($R = 0.265$, $p = 0.246$). Data from the Bronx was used to construct a time-series LSTM (long short-term memory) predictive model for the current influenza season. This predictive model incorporates predicted levels of PM2.5 into seasonal data to more accurately predict influenza rates on a weekly basis. Further research is needed to establish whether the correlation between PM2.5 air pollution and influenza rates is seen in other cities and whether or not PM2.5 is a causative agent in influenza rates. Additionally, more research is needed to look into whether the time-series LSTM model proves to be more accurate than other models.

Abstract 23: The Effect of Central Air Systems and Kitchens in Residential Halls on the Amount of Indoor Air Pollutants

Authors: Anne Marie Prentiss, Nia Johnson, Caroline Romano, and James Murphy

Mentor: Usha Sankar

College: Fordham College at Rose Hill

Indoor Air Quality can be negatively influenced by the presence of air pollutants such as formaldehyde(HCHO), particulate matter, and volatile organic compounds(VOCs). Chronic exposure to air pollutants causes increased nasal and throat irritations, which can lead to more serious conditions such as emphysema, bronchitis and asthma. Previous studies in New York City found that there are high concentrations of VOCs and nitrous oxides indoors in densely populated areas. This was hypothesized to be due to high amounts of energy use and cooking. Another study found that central air conditioning with filtration is an effective way to remove potentially harmful pollutants. Our study examines, for the first time ever, the effect of central air conditioning and the kitchenettes on the rates of particulate matter, formaldehyde, and VOCs in four residential halls at Fordham. Pollutants were measured using a Temtop air quality monitor. Preliminary results found significant differences in the amounts of particulate matter between buildings with ($M = 9.95\text{ppm}$, $SD = 1.23\text{ppm}$) and without central air systems ($M = 18.5\text{ ppm}$, $SD = 9.61\text{ ppm}$), $t(12) = 2.16$, $p < 0.05$. We also found significant differences in the amounts of HCHO and TVOC between buildings with kitchenettes ($M = 2.29\text{ppm}$, $SD = 0.94\text{ppm}$) and those without kitchenettes ($M = 0.148\text{ppm}$, $SD = 0.124\text{ppm}$), $t(12) = 5.53$, $p < 0.05$. If we were able to continue our study, we would like to obtain data for all residential halls on campus so students, especially those with underlying respiratory issues, could make more informed choices.

Abstract 24: PM2.5 and Emergency Department Visits in New York City Region

Authors: Kara Hebbe, Gabriella Fuertes, William Pascal, and Victoria Wozny

Mentor: Usha Sankar

College: Fordham College at Rose Hill

The purpose of our experiment is to discover the correlations between the levels of PM2.5 and asthma emergency department visits in the areas of Westchester, Bronx, and Manhattan. PM2.5 is particulate matter with a diameter of less than 2.5 micrometers and comes from various sources, including vehicles. It is especially important within the regions that we have selected because fine particles stay in the air longer than heavier particles. We hypothesized that areas with higher rates of vehicle traffic would also be the areas with the most respiratory-related ED visits. We used data from the New York City and New York State Departments of Health for annual means of inhalable particulates, and data from the CDC on the number of asthma ED visits. The results do not seem to support this hypothesis as Manhattan had the highest PM2.5 concentrations but the Bronx had the most respiratory-related ED visits. In 2018, Manhattan had $8.46\text{ }\mu\text{g}/\text{m}^3$ of PM2.5 and 103.4 ED visits per 10,000 population, while the Bronx had $7.25\text{ }\mu\text{g}/\text{m}^3$ and 227.5 ED visits per 10,000 population, suggesting that other types air pollution may have had a larger influence on ED visits. Westchester did, however, have the lowest PM2.5 concentrations, $5.8\text{ }\mu\text{g}/\text{m}^3$ in 2018, and the lowest respiratory-related ED visits, 58.2 per 10,000 population in 2018, which does support our hypothesis that there is a correlation between PM2.5 concentrations and respiratory problems.

Abstract 25: The Relationship between Asthma-related Hospital Visits and Income Level in the Bronx and Westchester County

Authors: Cassandra Comey, Reshad Ahmed, Jacob Bartz, and Jacqueline DeRusso

Mentor: Usha Sankar

College: Fordham College at Rose Hill

When air quality is low, meaning higher pollution, respiratory illness rates increase, and subsequently, hospital emergency department (ED) visits increase correspondingly. Air quality can vary considerably in the New York City area, especially between the Bronx and Westchester County, located to the immediate north of the Bronx. Between the Bronx and Westchester, average household income differs greatly, with Westchester's average being higher than that of the Bronx. Household income can play into where an individual can live and their access to asthma medication. The goal of the study is to investigate how asthma incidences are related to income levels of the population in the Bronx and Westchester counties. This study compared data of annual household income from each zip code of the Bronx and Westchester through ZipAtlas and compared it to asthma-related emergency department visits in each zip code for adults between 18-64 years old. There was a moderate correlation between median income and asthma ED visits in both the Bronx and Westchester with an R² value of 0.61 and 0.44 respectively. Using a one-tailed t-test on StatPlus, we found a statistical difference between relationships in the Bronx and Westchester with a p-value of < 0.0001. The data show that poorer people are more likely to live in areas with lower air quality and have more asthma ED visits. This data can be used to help determine how much groups are affected the most by the lower air quality in New York.

Abstract 26: Impact of Fires on Air Quality and Respiratory Distress Hospitalizations

Authors: Yianni Flouskakos, Kiley Forrest, Emily McGovern, and Saige Mitchell

Mentor: Usha Sankar

College: Fordham College at Rose Hill

It is well documented that an increased frequency of fires negatively affects air quality. There have also been studies linking decreases in air quality with an increase in asthma-related medical emergencies. However, there is a gap in the literature when it comes to examining the relationship between fire prevalence and frequency of respiratory distress incidents. We looked for a causal relationship between these two variables in the Bronx, an area with increased rates of respiratory emergencies compared to the other boroughs of New York City. We hypothesized that the more fires that occur, the worse the air quality will be, leading to an increase in the number of hospitalizations for respiratory distress. Data from fire incidences, air quality indices, and hospitalizations was obtained from the Fordham University EMS call database, FDNY database, NYS Department of Health, and NY Department of Environmental Conservation. A correlational analysis was performed to determine a relationship between air quality and fire incidence and a two-tailed t-test was run to determine if the number of respiratory distress hospitalizations was significantly higher on days where there was a structural fire compared to days without one. Our data showed an increase in the rates of respiratory distress calls over time, as well as a decrease of AQI. However, the correlation between structural fires and rate of respiratory distress is weak and not statistically significant. Further research is required, but the data suggest that respiratory distress incidents increase in relation to poor air quality.

Abstract 27: Assessment of Air Quality Monitoring Stations in the Bronx

Authors: Shubarna Akhter, Sean Carroll, Emily Kobylski, and Victoria Major

Mentor: Usha Sankar

College: Fordham College at Rose Hill

The Bronx is known to have high rates of air pollution compared to other boroughs of New York City. Poor air quality has been linked to physiological outcomes, such as increased rates of asthma. Given these health implications of air quality, it is important for air quality measurements to be accurate so that the research is valid and regions of poor air quality can be targeted for intervention. The New York State Department of Environmental Conservation (DEC) has four air quality stations in the Bronx, reporting every two hours. Based on previous literature showing variability of air quality within a neighborhood, it was hypothesized that state-provided air quality measures from Morrisania aren't representative of Belmont due to local variations. Using a citizen-scientist approach with an inexpensive, easy-to-use monitor (TemTop LKC-100), the Air Quality Index (AQI) and Particulate Matter (PM_{2.5}) levels were measured around Belmont at three time points and statistically compared to Morrisania reports. Preliminary results support the hypothesis, showing Belmont has significantly higher AQI and PM_{2.5} levels compared to Morrisania. Belmont had an average AQI of 60.3 and PM_{2.5} of 17.1 while the Morrisania site reported an average AQI of 46 and PM_{2.5} of 9.76. Although the monitor wasn't calibrated with the DEC's industrial quality devices, these findings underscore the need for more focus on smaller neighborhood measurement stations to achieve a more granular study of Bronx's air quality.

Abstract 28: PM(2.5) and Mental Health Disorders in Medicaid Participants by County in New York State

Authors: Ryan Ehrlicher, John Franke, Owen Socher, and Dimitrios Stroumbakis

Mentor: Usha Sankar

College: Fordham College at Rose Hill

Worsening outdoor air quality (OAQ), a measure of atmospheric pollutants and particulate matter, is correlated to numerous physiological health disorders, such as asthma. However, the relationship between environmental factors like air quality and their broad range of effects on mental health is far less understood. In the current study, we set out to find the relationship between particulate matter less than 2.5 microns in diameter (PM_{2.5}) and the prevalence of mental health disorders by county in NY. PM_{2.5}, unlike larger airborne pollutants, can penetrate into lung tissues and impair respiratory function. This study allows us to identify some of the potential risk factors for mental health disorders and allow others to implement possible preventative measures in high-risk areas. This study also aims to highlight more negative aspects of air pollution and draw attention to those affected. Supported by previous research, we hypothesized that lower air quality--higher levels of PM_{2.5}--will correlate with an increased rate of mental health disorders. To determine the relationship, we correlated annual averages for PM_{2.5} from the EPA and the number of individuals using Medicaid mental health services from the NYS Department of Health by county. Preliminary results of the study indicate a strong direct correlation between PM_{2.5} levels and the prevalence of mental health disorders. Future studies should attempt to differentiate between different mental illnesses and their relationships to air quality; longitudinal data would be particularly helpful, as it would more effectively correlate measures of air quality with severity of psychological symptoms over time.

Abstract 29: The Impact of Median Household Income on Asthma-Related ED Visits and Asthma Prevalence in Adult and Pediatric Patients in NYC ZIP Codes

Authors: Dylan Garvey, Alexander Oruci, Sydney Souness, and Baran Ak

Mentor: Usha Sankar

College: Fordham College at Rose Hill

One out of every eight New York City residents reports a diagnosis of asthma at some point throughout their lifetime, which is significant compared to the rest of the United States where one out of every thirteen individuals is diagnosed with asthma. We sought to investigate a correlation between median household income and rates of asthma-related emergency department visits (AREDVs) and average asthma prevalence among adult patients in New York City's five boroughs. Our study looked at data from ZIP codes in order to partition New York City boroughs into the smallest measurable units of a population given that median household income varies greatly between neighborhoods. We compiled median household income data from the United States Census Bureau with AREDV data among pediatric patients from the New York City Community Health Profiles of NYC Health and the average asthma prevalence among adult patients from the 500 Cities Project of the Centers for Disease Control and Prevention. We analyzed the data using a bivariate correlation from the SPSS software and found a negative correlation between the median household income of NYC ZIP codes and average asthma prevalence among adult patients. The data showed no correlation between median household income and AREDVs among pediatric patients. This may suggest that there is an underdiagnosing of asthma, which is likely due to the inadequate access to healthcare for families in lower-income communities. The results of our study demonstrate that there is a profound effect of income inequality on health outcomes in New York City.

Abstract 30: Deciphering the Causes of Harmful Cyanobacterial Blooms

Authors: Julia Sese

Mentor: John Wehr

College: Fordham College at Rose Hill

Cyanobacteria blooms have become a globally recognized water quality crisis, causing a range of serious environmental and public health issues. In order to understand their causes and provide information to control harmful algal blooms, we conducted a 4 x 2 factorial experiment to test the effects of different forms of dissolved nitrogen (NH_4^+ , NO_3^- , NO_2^- , NH_4^+ , urea), and at different concentrations, to microcosms with lake water (with added P) collected from Calder Lake, NY in July 2019. We measured responses in phytoplankton chl-a concentration, particulate CNP, dissolved nutrients, and algal species composition. No significant effects of adding P (+ 2 μM) were observed in containers without added N ($t = 0.292$, $p=0.601$), indicating that nitrogen is the main factor contributing to algal blooms in Calder Lake. Of those microcosms with both high and low added N treatments, NO_3^- addition yielded the greatest increase in chl-a concentration (ca. 20 $\mu\text{g chl-a /L}$). But contrary to predictions, NH_4^+ addition had the least effect on algal or cyanobacterial growth (ca. 2.5 $\mu\text{g chl-a /L}$). Overall, the effects of N concentration (15 vs. 50 μM) had a consistently positive effect on chl-a concentration among all forms of N tested ($p < 0.05$). Based on our results, we suggest that in high-phosphorus systems, nitrogen is an important bloom-forming factor that should be further investigated to manage lake eutrophication.

Chemistry

Abstract 31: Developing Polyphenol-peptide Based Drug Delivery Vehicles for Targeting of Breast Tumor Cells

Authors: Lucy Hart, Saige Mitchell, and Paige McCallum

Mentor: Ipsita Banerjee

College: Fordham College at Rose Hill

Current breast cancer treatment therapies take a serious toll on patients' overall health. Methods such as nanoparticle drug delivery vehicles have shown promise due to their ability to reduce harm to healthy cells. Peptide nanocarriers possess the unique ability to selectively target tumor cells. In this work, we have created two novel polyphenol-peptide targeted drug delivery systems for targeting MCF-7 breast cancer cells. These nanocarriers are composed of different polyphenols conjugated with a single MCF-7 cancer cell targeting peptide. The nanoassemblies were then encapsulated with the chemotherapeutic drug topotecan for delivery to the cells. The formation of the polyphenol-peptide assemblies was confirmed by FTIR, NMR, and DSC analysis. We found that the structure of the polyphenol played a role in the morphologies of the nanoassemblies formed. Dynamic light scattering showed that the assemblies formed ranged from 80-100 nm in diameter. Drug encapsulation efficiencies varied from 27% to 73% depending upon the polyphenol used. Drug release over a period of two weeks showed a sustained release pattern most effectively at higher concentrations of the drug. Cytotoxicity studies carried out confirmed that these polyphenol-peptide based systems efficiently targeted MCF-7 breast cancer cells and accelerated apoptosis of tumor cells.

Abstract 32: Conductive Ionic-Liquid-Peptide Nanofiber Composites for Potential Applications in Neural Tissue Regeneration.

Authors: Rachel E. Daso and Margaret S. Whalen

Mentor: Ipsita Banerjee

College: Fordham College at Rose Hill

Ionic Liquids, bulky salts that are liquid at room temperature, have many unique thermal and mechanical properties. Increasingly, ionic liquids have been conjugated with various biomaterials to increase their biocompatibility for applications in biological systems. We believe such charged materials could have potential applications in the emerging field of neural tissue engineering. In this work, we have developed two novel ionic liquid (IL) peptide nanogels in which the cationic portion of the IL was varied (betanium and imidazolium) while the anionic component was kept the same (trifluoromethylsulfonyl imide). The ILs were each incorporated with a newly synthesized peptide bolaamphiphile, containing boc-Lysine as the N-terminal protected amino acid component, Type IV collagen, and a sequence of laminin. The synthesis of the hybrids was confirmed with AFM imaging as well as NMR and FTIR. The mechanical properties of three different hybrid ratios were probed with Rheological techniques. Results indicate that the hybrids' Young's Moduli fell within the range of typical neural tissue stiffness. The nanogels were also tested for biocompatibility and axonal growth by examining interactions with mammalian neural cortical cells. A custom CAD-designed 3D-printed PLA ribbed template was used to create linear patterns in the nanogels and a custom electrical stimulation chamber was constructed to carry out electrical stimulation studies. Both nanogels showed low cytotoxicity and increased axonal outgrowth over a 10 day period. Our nanogels demonstrate potential as biocompatible nanoscale scaffolds in neural cell regeneration.

Abstract 33: Synthesis, Decomposition Studies, and Crystal Structure of a 3D CuCN Network Structure with Protonated N-methylethanolamine as the Guest Cation

Authors: Leena Rachid and Christina Sheedy

Mentor: Peter Corfield

College: Fordham College at Rose Hill

We present structural data and chemical decomposition studies for a three-dimensional anionic Cu(I)CN network. This network contains non-coordinated protonated N-methylethanolamine guest cations which provide charge neutrality. Structural analysis shows spiraling units of cuprophilic copper atom pairs bridged by the carbon atoms of μ_3 -cyanide ligands. The two other cyanide groups link the spirals together into a 3D anionic network. The guest cations are linked together by spiraling hydrogen bonds and interact with the 3D anionic network through hydrogen bonds to one of the μ_2 -cyanide groups.

Thermogravimetric (TGA) studies to 130-250C result in a mass loss that corresponds to the mass of free meoen base cation plus one cyanide as an HCN molecule, ultimately leaving behind CuCN. Through sublimation under argon and analysis of the mixture using GC/MS and IR spectroscopy, we recovered a mixture of 3 species. Both GC/MS and IR spectroscopy indicate the presence of meoen, as 80% of the mixture had a fragmentation pattern very similar to the typical pattern of meoen, and the IR spectrum had peaks typical of meoen. We were unable to identify the two minor components of the mixture; however, we believe these species were byproducts of thermal decomposition.

Abstract 34: Composition-Dependent Catalytic Activity of Binary Pt-Based Nanowires for the Electrochemical Oxidation and Detection of Small Organic Molecules

Authors: Adam Rosen, Nicole Smina, William Beatrez, Kathryn Kingsbury, Rosario Troia, and Lukasz Sztaberek

Mentor: Christopher Koenigsmann

College: Fordham College at Rose Hill

Platinum is an effective catalyst for the oxidation of SOMs such as glucose and methanol but suffers from issues such as high cost and catalyst poisoning by intermediates produced in the oxidation process. Binary alloys of Pt paired with transition metals such as Au have been shown to reduce these costs and improve the catalytic properties of Pt-based catalysts by lowering the overpotential associated with the oxidation of the carbon monoxide (CO) intermediate. In this project, we synthesized, characterized, and electrochemically investigated the catalytic properties of nanowire (NW) catalysts composed of binary transition metal alloys of various compositions of Pt and Au. The alloy NWs were synthesized using an ambient, solution-based technique that allowed for the fine-tuning of their size and composition. The NWs were characterized using scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDX), and powder X-ray diffraction (XRD). The kinetics of the NW catalysts toward the oxidation of SOMs were investigated using linear sweep voltammetry and it was found that the trends in catalytic performance and the mechanism of oxidation of these SOMs were dependent on the morphology and composition of the alloy NWs. The limit of detection (LOD) and sensitivity for glucose detection were determined as a function of wire composition and were consistent with or better than those of other Pt nanostructures. We are currently investigating the potential of binary nanowires as multifunctional catalysts for a variety of biologically relevant SOMs.

Abstract 35: Core-Shell Platinum Coated Nickel Nanowires as Electrochemical Catalysts for Fuel Cells and Glucose Sensors

Authors: Kathryn Belcher, Julia Mayes, and Brett Musialowicz

Mentor: Christopher Koenigsmann

College: Fordham College at Rose Hill

The oxidation of inorganic molecules, such as ethanol, is integral to many devices such as fuel cells and blood glucose meters. As it currently stands, fuel cell reactions require platinum as a catalyst, but platinum is expensive and is not abundant, which has prevented widespread commercialization of these devices. In addition to the high cost, catalysts with Pt are easily poisoned by partially oxidized carbon species such as carbon monoxide formed during the oxidation of small organic molecules. To remedy this, we have prepared a core-shell catalyst consisting of a Ni nanowire core with a thin platinum shell. This allows the structural and catalytic properties that make Pt such a viable choice as a catalyst to be combined with more abundant and less expensive transition metals to reduce cost. We employ a modular synthesis method to prepare uniform Ni nanowires with diameters of ~80 nm and we subsequently deposit a thin platinum layer utilizing a solution-based technique. This semester, with the aid of a spring research grant from Fordham, we began to investigate the electrochemical properties and catalytic activity of the core-shell nanowires toward the oxidation of methanol in comparison with pure Pt nanowires. In the future, we will also examine the catalytic activity with glucose in contrast to pure Pt wires. We anticipate that the core-shell structure will not only decrease the Pt loading but will also increase the tolerance of the catalyst to poisoning by partially oxidized intermediates.

Abstract 36: Thermodynamic Sampling of the Configuration Space of Au-Pt Alloy Nano-slabs Using Metropolis Monte Carlo Simulations

Authors: Nicole Smina

Mentor: Joshua Schrier

College: Fordham College at Rose Hill

Nanomaterials of platinum (Pt) alloyed with other inert transition metals such as gold (Au) have been shown to be effective catalysts in a number of industrial and commercial chemical reactions, including the oxidation and reduction reactions in fuel cells and in glucose meters. However, one of the major challenges in working with alloyed nanomaterials experimentally is that little is known about how atoms are distributed within the material. The high surface area-to-volume ratio and the irregularities in coordination number and bond length of surface atoms renders characterization through traditional means difficult. Thus, means of predicting or deducing the arrangement of atoms on the surface, where catalysis occurs, offers valuable information in the field of catalysis. This project employs computational models to study the atomic distribution and properties of alloyed nanomaterials, specifically slabs of 900 atoms composed of Au and Pt in varying atomic ratios. We generate a random configuration, then use parallel-tempering Metropolis Monte Carlo simulations to statistically sample the possible configurations and associated cohesive energies. This allows us to determine the thermodynamic distribution of configurations as a function of nanoparticle size, geometry, and composition. Preliminary results suggest that in vacuum, the surface is enriched in Au, whereas in oxidizing conditions, the surface is enriched in Pt.

Communication and Media Studies

Abstract 37: Instagram Use and Adolescent Male Body Image

Authors: Ashley Chenery

Mentor: Lewis Freeman

College: Fordham College at Rose Hill

This study looks at the relationship between Instagram use and adolescent male body image. Previous research has failed to study adolescent males due to a greater focus on adolescent female body image. So, this study aims to contribute research focused solely on males to democratize gender representation in this field. The objective of this study was to find a relationship between Instagram use and adolescent male body image dissatisfaction. The group considered included young males ages 13 to 20. The expected results were that the surveys completed by adolescents who use Instagram more would indicate more body image dissatisfaction than the surveys of adolescents who use Instagram less or not at all. Additionally, it was anticipated that the adolescents who reported following appearance-related Instagram accounts (such as “fitspiration” accounts), and those who reported comparing themselves with their peers on Instagram, would have greater body image dissatisfaction (indicated by higher scores on the survey) than adolescents who did not follow appearance-related accounts and did not report comparing themselves with peers. The data collected for this study suggest that adolescent males who do not use Instagram tend to be more body-dissatisfied than Instagram-using adolescent males—who tend to be more body-satisfied (though decreasingly so with increased time spent using Instagram). There does not appear to be a strong relationship between following appearance-related accounts and body image dissatisfaction in adolescent male Instagram users. Nor does there appear to be a strong relationship between making social comparisons on Instagram and adolescent male body image dissatisfaction.

Abstract 38: Intertextuality and the Reappropriation of the Italian-American Ethnic Identity in Cake Boss

Authors: Carly Johnson

Mentor: Jacqueline Reich

College: Fordham College at Rose Hill

Historically, films and television shows depicting Italian-Americans have centered around criminality and immorality – especially the gangster film. Such films portray an image of the Italian-American family as one that relies on illegal dealings and violent enforcement to make money, following in the tradition of the Mafia that originated in Sicily. Another place we see the influence of a crafted Italian-American identity is in American restaurant culture with the rise of Italian “ethnic” restaurants. Such establishments utilize elements from their southern Italian immigrant culture to cater to their middle-class Anglo-Protestant customers, constructing an Italian-American narrative focused on family, tradition, artistic skills, and emotional exuberance. Beyond these eateries, the American interest in culinary arts infiltrated reality television with the more recent phenomenon of the cooking and baking show. While programs like these have served to build upon the Italian-American identity as chef, reality television has also presented the image of the outspoken, over-the-top Italian-American on shows such as Jersey Shore that capitalize on the New Jersey aspect of the Italian-American Identity. The television show Cake Boss combines the culinary genre with aspects of reality television to follow baker Buddy Valastro through his life managing his family-run bakery. This project examines the ways in which Cake Boss employs the contemporary cooking and New Jersey reality genres as a means of establishing a novel Italian-American representation based on the merging of the Mafia movie and Italian-American restaurant tradition, ultimately reappropriating the mob boss figure.

Computer and Information Sciences

Abstract 39: Wall Detection In Autonomously Flying Drones

Authors: Jason Hughes

Mentor: Damian Lyons

College: Fordham College at Rose Hill

The use of unmanned aerial vehicles (drones) is expanding to commercial, scientific, and agriculture applications, including surveillance, product deliveries and aerial photography. One challenge for applications of drones is detecting obstacles and avoiding collisions. A typical solution to this issue is the use of camera sensors or ultrasonic sensors for obstacle detection or sometimes just manual control (teleoperation). However, these solutions have costs in battery lifetime, payload, and operator skill. This study explores if and how data mining techniques can be used to detect which side of the drone a wall is. This was done by analyzing the air flow of the drone's rotors and modeling the flow mathematically. Data was collected from a drone's internal sensors while flying near walls to its left, right and front. From the modeling, certain data can be targeted and the data can be processed to better fit the data mining classifier and thus achieve higher accuracy when predicting which side of the drone a wall is located on. With this the need for camera and laser sensors is no longer needed, thus decreasing the weight and increasing the battery life of the drone.

Economics

Abstract 40: Fiber-Optic Broadband: New York City's Digital Divide

Authors: Sophie Cote

Mentor: Mary Beth Combs

College: Fordham College at Rose Hill

On July 15th, 2008, Verizon Inc. agreed to pass every residential building in New York City with its fiber-optic broadband service Fios. In 2017, The City of New York filed a lawsuit against Verizon for failing to successfully uphold its role in the agreement. The purpose of this investigation was to assess the state of fiber-optic broadband in New York City as a whole, with a specific supplementary study of City Council District 15, home to Fordham University's Rose Hill campus. From the analysis of public documents and data detailing the state of broadband within New York City, this study has concluded that Verizon has not complied in providing the citizens of New York City with fiber-optic broadband. The multiple public documents confirming Verizon's failure cited poor communication with customers, dismissal of non-standard installation requests, and a loose definition of the term "pass" as key factors in preventing their competency, among others. Additionally, after selecting one hundred and eighty properties from District 15 to survey, only thirty-four percent were found to have Verizon Fios. A lack of fiber-optic infrastructure in New York City has the potential to delay the advent of 5G technology, which could decrease New York's educational and communicative capacity compared to other major U.S. cities. Furthermore, the COVID-19 crisis has shown how important reliable internet service is to educational equity in this country. Due to these concerns, the author recommends New York City investigate the possibility of supporting municipal and community run broadband initiatives.

Abstract 41: Does Freedom in Choice of Task Improve Worker Productivity and Pro-social Behavior?

Authors: Andrew Souther

Mentor: Subha Mani

College: Fordham College at Rose Hill

In a typical labor market, an employer dictates the task to the employee, who decides on the effort levels but has little choice over the task itself. This lack of freedom can be detrimental to all parties involved in exchange. In this project, we investigate the impact of worker freedom in choice over task on workers' productivity and pro-social behavior. Our laboratory experiment mimics a stylized workplace environment where, in stage 1, subjects are offered a choice between multiple real-effort tasks. Across treatments, we experimentally vary the amount of control subjects are offered in choosing the task. Subjects can choose for themselves, decide by majority vote, or receive the task chosen by someone else (the computer or the employer). In stage 2, subjects choose to allocate a certain portion of their future earnings from the task towards a public good that is shared by all workers and the employer. Lastly in stage 3, subjects complete the real-effort task and a short survey. By varying the amount of employee participation in stage 1, we can isolate the effect of varying degrees of worker autonomy on workers' productivity, pro-social behavior, and job satisfaction. We hypothesize that workers with higher amounts of control over their task will: (a) contribute more to the public good, (b) exert more effort, and (c) depict higher levels of job satisfaction. Our findings have important implications for improving worker productivity, design of incentives and wage contracts, and hiring and retaining productive employees in the labor market.

Abstract 42: Venezuelan Migrant Crisis

Authors: Christian Hartigan

Mentor: Darryl McLeod

College: Fordham College at Rose Hill

This research paper is an examination of the economic impact on receiving-countries in a migrant crisis. The research question is can a receiving-country benefit economically from the inflow of migrants and refugees? Specifically, this research focused on the impact of the Venezuelan migrant crisis on neighboring countries in Latin America, and what the implications are for other countries in a position to help with a migrant crisis. A thorough examination and analysis of economic indicators in neighboring countries will be the research method used to contribute something to the discussion on this topic. While many countries around the world are implementing stricter border policies, it was determined that the influx of migrants actually has positive effects on GDP growth in receiving countries while contributing downwards pressure on price levels for consumers. Additionally, governments who welcome migrants with open arms demonstrate an act of good-will that is not quickly forgotten by the people of the country in need. The biggest limitation of this study was the fact that when analyzing the economic indicators in a country, it cannot not be done through a traditional experiment; where a cause-and-effect reaction is singled out through a test group and a control group. But analyzing the economic indicators in multiple countries, as done in this research paper, helps to offset this and show trends that are applicable to the desired variable. This research is significant because of how many people in the world have been driven from their homes, 3.5 out of every 1,000 people in the world today are refugees. The United Nations High Commissioner for Refugees estimates that 25.4 million people were in refugee situations in 2018, the most since World War II. This number will likely grow in the future as climate change will contribute to more instances of displacement as natural disasters become more frequent and severe.

English

Abstract 43: The Manifestation of Middlebrow: The Beach Read During the Progressive Era

Authors: Lauren Reagan

Mentor: Glenn Hendler

College: Fordham College at Rose Hill

In this thesis I aim to research the creation of “beach reads” within American culture and why they became delegated to a lowbrow category within literature. The term “beach read” was not fully developed until the late twentieth century, and heretofore has not been connected to the rise of “Summer Reading Lists” published by the New York Times at the turn of the twentieth century. I analyzed the archive of these lists from 1900 to 1910, also known as the Progressive Era, as well as the societal and cultural considerations during this time period. In this thesis, I show that the creation of the New York Times’ “Summer Reading Lists” existed within the rise of the middle class, during burgeoning conceptions of lowbrow and highbrow within American literature and culture. A case study of these lists results in a construction of “ideal” white female middle class identity at the turn of the twentieth century. Because the beach read immediately became associated with the feminine, it was automatically associated with lowbrow reading. I argue, instead, that the beach read demonstrates and celebrates middlebrow reading because of its importance within middle class culture. Overall, these lists help expose the fluidity of cultural constructions such as the middle class and middlebrow; these two “middles” simultaneously construct and define one another.

Environmental Studies

Abstract 44: The Methodological Challenges of Quantifying Hurricane Displacement Impacts

Authors: Joseph Odegaard

Mentor: John van Buren

College: Fordham College at Rose Hill

Hurricanes Irma and Maria devastated Puerto Rico in 2017 and caused a mass exodus of the island’s residents to the U.S. mainland, including the Northeast. While much attention has been given to the economic impacts of displacement, comparatively little has been focused on the social and psychological wellbeing of evacuees in a radically different physical and social environment. In our attempts to quantify these impacts, we encountered significant methodological challenges that point to broader issues with research, disaster relief, and service delivery. Organizations that worked with evacuees in the wake of the 2017 hurricane season and specialize in Puerto Rican studies identified several reasons for recruitment challenges, the most important being the inadequate response to Hurricanes Irma and Maria. Slow relief efforts, invasive bombardment from the media, and empty promises from researchers and relief organizations traumatized evacuees and caused them to distrust these entities. The result has been an unwillingness not only to participate in research studies, but also to accept aid from relief organizations. This unwillingness presents a significant methodological challenge to research that attempts to fully assess the impacts of displacement. More concerning, however, are the unmet needs of evacuees distrustful of entities offering assistance. Our findings suggest that swift, comprehensive relief efforts to hurricanes and similar disasters are essential in accurately quantifying impacts and ensuring victims receive immediate and long-term aid.

Abstract 45: Documentaries Making a Difference: Communication Effects of Environmental Film and Television

Authors: Lindsey Register

Mentor: John Van Buren

College: Fordham College at Rose Hill

This paper addresses the motives of environmental documentaries and their influences on public opinion and action regarding environmental issues and ethics. It suggests that through the communication platform of the environmental documentary, environmental education can further one's understanding of the environment and the human relationship with nature. Chapter 1 uses quantitative data on contemporary documentary filmmaking, as well as on coverage of environmental issues in all communications media. This chapter also includes the data from a survey conducted at Fordham University, showing the influence of environmental documentaries on students' mindsets and behaviors at this school/institution. Chapter 2 explores the history of documentary film and its representation of the environment, from the works of David Attenborough to the rising popularity of Netflix documentary films. Chapter 3 delves into contemporary communication theories on persuasion, as well as industry disinformation campaigns utilized by documentarists to target and sway audiences on environmental issues. Chapter 4 showcases the relationship between documentary viewership and environmental education, showing how viewership shapes one's environmental worldview and actions and determines an individual's contribution to environmental causes. Drawing on discussions and lessons learned in previous chapters, the concluding Chapter 5 addresses the overall success or failure of environmental documentaries to spark the minds and actions of the public to create positive change for the environment's benefit and makes policy suggestions on behalf of this medium as a communication tool within education.

Fordham College at Rose Hill

Abstract 46: Understanding Stressors for College Students and the Effectiveness of Mental Health Resources on Campus

Authors: Alysha Jhaveri, Manal Isa, Kristina Stevanovic, and Daphne Buitron

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Previous research has shown that stress in college students comes from intense academic pressure, financial aspects such as loans, major lifestyle changes such as being away from home and trying to find the right niche, and new relationships. Additionally, there have been several resources with an aim to aid students in reducing stress and improving their mental health. One such resource involves an online interactive portal based on making the college campus resources available to students. We sought to understand stress in college students and determine if there are successful resources that students can take advantage of, targeted mainly towards undergraduate students at Fordham University. We synthesized a variety of journal articles in hopes of better pinpointing sources of stress for the typical college student and the effectiveness of mental health resources offered on campuses. Upon analysis, we found that stress often stems from tuition costs, as well as areas of development, such as individuation, connectedness to the family, development of friendships and intimate relationships, and the pursuit of personal career goals (Hunt). In an attempt to comprehend the availability of resources and benefits of them, we examined the Florida State University (FSU) Student Resilience Project. Recognizing that the need for more accessible resources must mirror the upward trend regarding stress among college students, FSU has implemented a web-based portal to provide helpful information to the student body. The web-based portal guides students towards "campus-based support services, such as coaches, advisers, and counselors, or peer-to-

peer education and support and skill-building groups” (FSU). Through the web-based portal, the university is taking steps to create an awareness of resources and reduce the stigma surrounding mental health. Based on FSU’s online platform, we wish to make recommendations that will inherently help college students on any campus who are burdened by stress, especially those at Fordham University.

Abstract 47: Factors Affecting Infant Mortality Rate in the Bronx-A Systematic Review of Prenatal, Perinatal, and Postpartum Care

Authors: Max Luf, Mariam, Fahmy, Kaitlin Hiciano, Grayce Porretto, Christina Wing, and Afrin Yasmin

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

The infant mortality rate is a quantitative variable for the relative number of deaths for children under one year of age per total children born that year. This variable serves to show where discrepancies and deficits in healthcare exist, with the Bronx serving as a prime example of such a discrepancy. Infant mortality rates are the highest in the Bronx out of all New York City boroughs due to a variety of different factors, such as race and socioeconomic status which affect access to adequate healthcare for both mother and child. This systematic review will focus on the prenatal, perinatal, and postpartum standard of care in the Bronx as well as the intersecting variables which affect the overall health of both mother and child, and ultimately play into the disproportionate infant mortality rate of the Bronx. Evidence surrounding prenatal care indicates that it is the most influential stage for mothers, as those who do not receive adequate prenatal care are more likely to encounter complications with perinatal care and develop postpartum depression. This analysis demonstrates that the racial and socioeconomic statuses of Bronx residents are tied to a lack of available resources for expecting mothers, such as prenatal care, making this population more vulnerable than their peers in other boroughs. Future directions for this study and others may include developing a standard of advertising and distributing information and resources to expecting and new mothers as well as examining strategies implemented to correct similar disparities in other areas of the United States.

Abstract 48: Study on Impact and Allocation of Resources for School-Age Children with Auditory and Visual Impairments

Authors: Emma Reynolds, Alexandra Klapak, Victoria Krechting, Jonathan Reagan, Shannon Rodgers, and Laura Rodriguez

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

The impact of auditory and visual impairment on school age children necessitates significant intervention in order to bridge the gap in learning. Through further assessment of the allocation of resources for these students in schools across America, ideally a standard of due resources may be established. An issue arises in the inherent lack of a standard definition of hearing and visual impairment titling and discrepancies in these categorizations can be problematic to the resulting resource distribution. By comparing auditory and visual impairment allocations to the resources provided for student populations on the autism spectrum, with learning disabilities or mental health illnesses, we hope to better understand how to provide the best possible outcomes for students. One key criteria to consider is the Individualized Education Program which provides a specialized curriculum for each student dependent on their needs, however it is difficult to determine any national standards or benchmarks for this student population because of these programs. Possible metrics for measuring the quality of these outcomes include students’ mental wellbeing, quality of social relationships, or academic standing in comparison to established baselines. Early medical detection of auditory problems is essential for preventing long term consequences. Deafness or visual impairment in children leads to delayed development in motor and social skills that are essential for productivity in the workforce. The American Rehabilitation Act of 1973

and Americans with Disabilities Act of 1990 enforce fair and equal treatment of disabled individuals in academic and work settings.

Abstract 49: College Socializing at Fordham University

Authors: Micaela Artis, Jessie Ma, and Daphne Buitron

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

The purpose of this study was to examine college socializing habits amongst college students at Fordham University. We sought to determine what amount of college socializing is beneficial and what amount is counterproductive to academic success. Moreover, we wanted to learn if commuter students have a different perception of socializing than resident students. We hypothesized that college socializing was valued by residents more than commuters and that the number of hours that is beneficial for a typical college student should be 3-4 hours at most. The study was done through a self-reported questionnaire (survey) on college socializing completed specifically by Fordham students. The survey was distributed through email and messages and was completed by 20 students in total. Our results suggest that college socializing is usually counterproductive when it consumes the majority of one's week or extends beyond 5 hours per night. The most common outlets for socializing are clubs/ student-run organizations and attending on-campus socializing events.

Abstract 50: Squeezing Belmont: Gentrification in the Bronx and Fordham University's Stake

Authors: Chace Frazier and Petros Akosta

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

University neighborhoods consistently display many socio-economic attributes characteristic of vulnerable urban areas such as higher rates of female headship, unemployment, poverty, and renters. These lackluster conditions which were magnified during the fifties and throughout the seventies continue to trouble urban universities and neighborhoods today. However, rather than relocate or isolate themselves from their surrounding city environments like they have in the past, many urban universities have changed strategies to pursue independent revitalization initiatives. Studies have shown that neighborhood adjacency to urban universities and, most importantly, revitalization-targeted areas are associated with impactful housing and economic outcomes. Fordham University bordering Belmont, Bronx, NY has numerous off-campus housing options. Each off-campus university housing option represents less housing availability for Belmont native residents. When less availability is present in a housing market, prices for remaining units tend to rise. Fordham notwithstanding, The Bronx has begun to gentrify in recent years, further increasing cost of living. In a university neighborhood like Belmont, home to The Bronx's Little Italy, Fordham University should be cognizant of its role in affecting its neighborhood negatively by unintentionally displacing native residents. This research investigates Belmont, Bronx from the sides of recent economic and housing patterns in light of gentrification and its relationship with Fordham University. The aspiration is to produce a conscious policy prescription for both the university and New York City to not only dwell on if urban universities can have an impact on surrounding city neighborhoods, but what are and can be the hidden costs and possible opportunities.

Abstract 51: College Students and News Media: Election 2020

Authors: Gracey Zostant, Julia Tuck, and Alexia Arias

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

The purpose of this research project is to understand further the way college students consume news media and the effects of various factors on possible voting patterns for the 2020 United States presidential election. A survey assessing these factors, such as prior political beliefs, views on media and news outlets, current social-political situations, parental political influences, and the effects of current events, such as the coronavirus pandemic, on political beliefs will be sent to the undergraduate community of students at Fordham University. College students are often prime targets of the media, especially news and political media, around the time of elections. Surveying from this population would provide valuable data regarding potential voting outcomes for this demographic. This study aims to understand how college students interact with media sources and how this interaction and their fundamental beliefs will shape their voting choice in 2020. Questions will aim to answer whether college students view news sources as trustworthy and why, as well as which sources they prefer to receive news from, and how social influences might affect their political actions in the 2020 presidential election.

Abstract 52: Sources of Stress for College Students

Authors: Daphne Baker, Kristen Bohovich, Thomas Dang, Grace Denomme, Lakumi Dias, Emily Huegler, Michael L'Abbate, and Samantha Petruzzelli

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Today's college students are experiencing unprecedented levels of stress and a rise in the rates of mental illness. The present study (N=88) sought to better understand specific sources of stress for college students and if these vary by stage in college. Participants overall displayed high levels of stress, mean Perceived Stress Scale score of 23.53 (SD=6.45). There was no difference between first year students, 23.21 (SD=3.40), and upperclassman, 23.83 (SD=6.56), $t=-.42$, $p=.66$. The top sources of stressors as measured by totaling the percentage of students who endorsed feeling stressed "always" or "most of the time" were homework and grades (78.4%), general post-college plans (64.8%), and career selection (52.2%). Over 30% of the sample also listed sleeping habits, eating habits, preparing for graduate/professional school, balancing academics and activities, internship search, relationship with friends, necessity of job while in school, the impact of finances on social life, and distractions from smartphone use. In addition, Chi-Square tests were conducted to determine if there were any differences in stressors between the two groups. The only differences were more frequent stress related to preparing for graduate/professional school ($p=.05$) and internship search ($p=.04$) for upperclassman. Overall, a variety of stressors were identified, that were evenly endorsed by first year students and upperclassmen, indicating the need for global stress management and systematic changes to more broadly promote wellness.

History

Abstract 53: Naturalists, Natives, and Negotiated Access: William Bartram's Navigation of the Eighteenth-Century American Southeast

Authors: Hannah Gonzalez

Mentor: Claire Gherini

College: Fordham College at Rose Hill

Seeking to present a nuanced analysis of cross-cultural exchange in the eighteenth-century American Southeast, this paper centers on the question of how American naturalist William Bartram navigated native-occupied territories in search of botanical specimens and ethnographic understanding. Taking Bartram's autobiographical *Travels* account as my primary source, I analyze how Bartram gained access to, interacted with, and represented natives in the region. Ultimately, I argue that his access to native cultures involved a negotiation of political, social, and cultural contexts, entirely separate from the realm of the scientific. In a larger sense, Bartram's *Travels* speaks to a mediation between native culture and a white encroachment. Despite Bartram's attempts to position himself as a fluid and useful foreign correspondent for the Crown, he relies heavily upon imperial networks to gain access to native-occupied territories, and his need for intermediaries to access native cultures reinforces his outsider status. I analyze the language and context of Bartram's *Travels* in order to demonstrate how Bartram's perspective ties into larger naturalist perception of natives as both gatekeepers of the natural specimens and themselves features of the natural landscape. Bartram's interpretation of these cultures was formed during limited moments of encounter and informed by sexual fantasy. In the end, my paper finds that the great hurdle for late-eighteenth century Americans naturalists was no longer the transport of knowledge from one side of the Atlantic to the other; rather, the challenge was in gaining access to and understanding of the cultures they met face to face.

Abstract 54: Daughters of the Merchant Taylors' Company

Authors: Grace Campagna

Mentor: Maryanne Kowaleski

College: Fordham College at Rose Hill

This project uses database software to trace familial relationships among the merchant class of medieval London. The focus is on daughters of members of the Merchant Taylors' Company, a craft organization that was influential in the social, economic, and political life of the city. Using three linked tables that record over two dozen data points about each individual, the Merchant Taylor Families relational database tracks the marriage patterns of daughters in terms of the guild status and political rank of their fathers and husbands. Studying a specific group of daughters in the period 1450-1520 allows for a reconstruction of the options available to young women in this social class. An analysis of marriage patterns demonstrates that the vast majority of daughters born into the merchant class remained in it through all of their marriages. Unlike widows, who frequently remarried a member of their late husbands' guild to ensure the security of their inheritance, a daughter had a wider range of possible spouses. As long as a potential husband was part of the merchant class, his membership in her father's guild was not a requirement. Despite the difficulties associated with adopting a quantitative approach to familial relationships, this prosopographical project provides a solution to the lack of sources for individual daughters by constructing their 'collective biography' to use existing sources in a new way. The database contributes to the digital humanities field by providing a small-scale model for tracking various types of personal relationships when only quantitative material is available.

Integrative Neuroscience

Abstract 55: The Effects of Negative Life Events on Diet and Hippocampal Volume in Children and Adolescents

Authors: Sydney Taylor

Mentor: Amy Roy

College: Fordham College at Rose Hill

Adverse childhood experiences have been linked to altered hippocampal development (Dahmen et al 2018) as well as increased intake of foods high in fat and sugar, a dietary pattern known as a Western Diet (WD) (Cordain et al 2005). Little research has examined the possible effects of more frequent, but less severe, negative life events (NLEs) on diet and the hippocampus. Therefore, this study explored the hypothesis that NLEs are associated with increased WD consumption and decreased hippocampal volume in children and adolescents. Given the prevalence of NLE's, as compared to more severe adverse life events, these findings can potentially have a broader impact on understanding environmental influences on brain development.

Abstract 56: Consequences of Developmental Disruption of Cortical Interneurons

Authors: Celia Hans

Mentor: Amy Roy

College: Fordham College at Rose Hill

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder that compromises social and intellectual functioning. Stereotypic movements as well as deficits in social acuity and cognitive tasks are all central phenotypes of the disorder. *Mef2c* is a gene that has been linked to autism, and has also been implicated in patients with schizophrenia (Le Meur et al., 2010) (Mitchell et al., 2018). Mice missing one copy of *Mef2c* in all cells (*Mef2c* haploinsufficiency model) present dysfunctional behaviors similar to those of human patients with ASD including stereotypic movements, such as abnormal paw-clasping behavior and repetitive head dipping and decreased social preference (Harrington et al., 2016; Novara et al., 2010; Tu et al., 2017). Deletion of *Mef2c* in excitatory neurons recapitulates some, but not all the behavioral and synaptic phenotypes observed in the *Mef2c* haploinsufficiency model (Harrington et al., 2016), strongly suggesting that *Mef2c* loss in inhibitory GABAergic neurons contributes to the ASD phenotype. The relationship between *Mef2c*-signaling and GABAergic INs remains unclear and is a major aim of this project. When most fast-spiking PV-INs mature they become enwrapped by a specialized extracellular matrix called perineuronal nets (PNNs). These PNNs are aggrecan-enriched (Cabungcal et al., 2013) and function as regulators of synaptic input to these neurons (Choi, 2018). PNNs are also found to be promoters of interneuron maturation and synaptic and network stability (Cabungcal et al., 2013). In this study we will be investigating synaptic effects and perineuronal net alterations of *Mef2c* loss in PV-INs as a possible mechanism of ASD-like phenotypes.

Mathematics

Abstract 57: The Cross Ratio and Hyperbolic Geometry

Authors: Olivia Hughes

Mentor: Melkana Brakalova-Trevithick

College: Fordham College at Rose Hill

Oftentimes, geometry classes offer students coursework solely operating in Euclidean's geometry. Although undoubtedly valuable, such leaves most unacquainted with the plethora of other geometrical

systems that may be used to describe our world. The scope of this project included a consideration of hyperbolic geometry and utilized both the Poincaré disc model and the upper half plane model. Our consideration of this geometry was internal but also considered how it relates to Euclidean geometry. Our initial step was to study the axioms and properties of hyperbolic geometry and its objects. Of particular interest proved to be hyperbolic distance. Intrigued by these notions, we developed a function by which one may determine the relative positions of the centers of intersecting geodesics and so may readily apply rules of angle measurement without knowing the exact location of the geodesic centers. This function appears to be related to the cross ratio although a direct relation is currently inconclusive. The power of the cross ratio was again harnessed in considering and proving hyperbolic analogues of Euclidean propositions. In particular and in the spirit of mathematician Wilson Stothers, we worked with Menelaus's Theorem, the median concurrency theorem and Stewart's theorem, albeit by using trigonometry for hyperbolic triangles. Mathematician Marvin Greenberg explains that proofs assure that our beliefs are true and oftentimes gives more general results, but he also contends that proofs "give us tremendous insight into relationships among different things..." Hence, the insight garnered through the study of these proofs might provide a spirit of inspiration.

Abstract 58: Updating a Stochastic Model of the Isle Royale Biome

Authors: Charlotte Beckford

Mentor: Jason Gong

College: Fordham College at Rose Hill

In 1979 Beyer et. al. constructed a stochastic model of the Isle Royale Biome, constructing transition probability equations for wolves and moose pertaining to different age structures as well as plants. This semester I aimed to improve upon this model by updating it, expanding it, and addressing limitations attributed to their model. To update this existing model, I used actualized data collected by the ongoing Isle Royale project to rewrite the transition probability equations. In addition, when re-designing these equations, I addressed the principal limitation of the original model: the discrete nature of plants in the model. Finally, as an ongoing process, I worked to expand this model by considering factors which had not been included. Specifically, I believe that the inbreeding of the wolf population on Isle Royale is a significant factor. The wolves of Isle Royale have always been related: they are considered to most closely resemble one single family, despite living in different packs occupying distinct parts of the island. Due to a genetic rescue and the subsequent "flooding" of the gene pool when a wolf crossed from the mainland to the island in 1997 and successfully procreated, this inbreeding has augmented in recent years. This inbreeding has been tied with reduced fitness and reproductive success of the wolf population. Including such a factor in the model can improve predictions made about the continued existence of the wolf population, especially in light of a recent wolf re-introduction program.

Modern Languages and Literatures

Abstract 59: Effects of Western Culture and Sex Differences on Electrophysiological Brain Responses to Language-Induced Self-Positivity Bias

Authors: Henry Zink

Mentor: Sarah Grey

College: Fordham College at Rose Hill

Self-positivity bias refers to the human tendency to attribute positive characteristics and events to one's own character. While this is a highly robust behavioral effect, research on the neurocognition of the effect is not only sparse but offers variable interpretations of the effect's relationship with culture. Furthermore, research on the effect's relationship with sex is sparse and inconclusive. This study sought to determine

whether findings in Eastern (Chinese) samples could be replicated in a Western (American) sample and whether sex differences were present in neural responses for the self-positivity bias. The study tested a sample of native American English-speaking participants who read sentences of positive, negative, and neutral emotional valences and decided whether or not each sentence was in accord with their personality. Behavioral results showed that participants were significantly more likely to indicate that positive sentences were in accord with their personality and negative sentences were not, thus confirming a self-positivity bias in the behavioral data. ERP results indicated a frontally distributed negativity for both positive/like me and negative/like me conditions, with the onset later and duration longer for the negative/like me category. These results differed from recent ERP research using an Eastern sample. Sex differences were suggested by a larger negativity in the negative/not like me category in males, when compared to females, as well as the absence of a negativity in the positive/like me condition for males. These results offer insight to the cultural and sex-related impacts on the self-positivity bias and offer suggestions for future research.

Abstract 60: Tolerance of Ambiguity, Creativity, and Musical Syntax Ambiguity Processing in Bilinguals and Monolinguals: An ERP Investigation

Authors: Frederick Blunt

Mentor: Sarah Grey

College: Fordham College at Rose Hill

Tolerance of Ambiguity (TA) is a psychological measure of an individual's willingness to work with novel and ambiguous factors. Those with a higher TA are less likely to make blanket assumptions about new information and people and are more comfortable with integrating complex and unknown information (Furnam & Ribchester, 1995). TA has also been shown to correlate with creativity, and both TA and creativity have been implicated in bilingualism research (Ely, 1989; Zenasi, Besançon, & Lubart, 2011; Chapelle & Roberts, 1986). Previous research has stated that bilinguals display more creativity than monolinguals, and a higher TA (Leikin, 2012; Dewaele & Wei, 2013). The present study collected ERP data from bilinguals using ambiguous musical progressions from Ting (2016), the Torrance Test of Creative Thinking (TTCT), and two measures of TA to test the relationships between bilingualism, TA, and creativity. An ANOVA on grand mean ERPs showed a marginally significant effect ($p=.076$, $\eta^2=.498$ at 300-500ms; $p=.052$, $\eta^2=.562$ at 500-900ms) between anterior and posterior brain regions in response to ambiguous progressions. This anterior negativity could reflect increased working memory, which research has shown is stronger in bilinguals (Vos, Gunter, Kolk, and Mulder, 2001; Morales, Calvo, Bialystok, 2012). A correlational analysis revealed no significant relationships between TA scores, TTCT scores, and marginal ERP effects. More data collection is needed to demonstrate a stronger bilingual working memory effect on ambiguous progressions.

Music

Abstract 61: Suzy Creamcheese: Sixties Counterculture and Conservative America in the Early Music of Frank Zappa

Authors: James Ordway

Mentor: Matthew Gelbart

College: Fordham College at Rose Hill

Frank Zappa, though often eclipsed by the more immediately visible image of the Beatles in the public eye, has been the study of academic attention within a niche in musicology known as Zappology. Significant contributions to this field, notably Ben Watson's *The Negative Dialectics of Poodle Play*, are tasked with making sense of a massive canon of thematically connected albums and performances. This broad lens, while useful for an overview, leads certain small but nuanced details to be glossed over as

minutiae. The focus of the present study is to define and understand one such example: a character known as Suzy Creamcheese. In 1965's *Freak Out!*, Suzy is presented as a typical young American rock-and-roll fan, the subject of moral panic among conservatives. Zappa takes a satirical approach to representing this, asking in a condescending voice: "Suzy Creamcheese, what's got into ya?" This satirical function persists, and throughout the rest of the 1960s she reappears as a member of various countercultural movements and is chastised by the simple suburbanites she left behind. Though she would never reappear in later decades, her character is an important symbol of Zappa's feelings towards the numerous developing youth movements throughout the 1960s. The goal of this study is to perform a multi-layered close reading of each appearance of Suzy Creamcheese grounded in a synthesis of lyrics, music, liner notes, reviews, and interviews to flesh out this representation and understand Frank Zappa's attitudes towards American youth, counterculture, and moral panic in the late 1960s.

Physics & Engineering Physics

Abstract 62: Integrating a Closed Loop System and Micro Linear Actuators to Improve the Precision and Strength of a 3d Printed Prosthetic Hand

Authors: Rodolfo Keesey

Mentor: Stephen Holler

College: Fordham College at Rose Hill

The purpose of this study is to improve the mechanical design of a low cost, 3D printed electromyogram (EMG) prosthetic hand that has been developed over the past 18 months in Dr. Stephen Holler's Engineering and Design lab. As prior research has been focused on improving gesture classification techniques, the mechanical design of the hand has languished. The current prototype can mimic 10 common human gestures but lacks the precision and strength to perform them during practical applications. Grip strength is too weak to properly grab objects, and fine movements are inaccurate and variable. This study aims to increase the precision and strength of the hand by overhauling the motor design and adding a sensor system. Linear actuators will replace the current system of servos and cables, offering stronger and more precise movements in a smaller motor housing. A sensor system consisting of a network of pressure sensors, motor position sensors, and haptic feedback modules will allow for the hand to monitor its position and can alert the wearer when the hand is touching something. The sensor system will allow the hand to adjust its grip to grab different objects, augmenting the hand's fine motor movement. Increasing the prosthetic hand's mechanical capabilities to match the sophisticated classification system will take another step towards an inexpensive prosthetic hand capable of daily use.

Abstract 63: Lattice Quantum Chromodynamics Made Accessible

Authors: Sean Hannaford

Mentor: Christopher Aubin

College: Fordham College at Rose Hill

This research project is concerned with developing a package of programs that would allow students to perform numerical simulations of quantum chromodynamics. Quantum chromodynamics is the field of physics which studies the interactions of quarks and gluons, the particles that make up such particles like protons and neutrons. Due to the incredible strength of the strong force and because of the ability of gluons to interact with each other, it is only possible to study these particles using numerical simulations on a discrete spacetime lattice. The field which uses numerical simulation to study the strong force is known as Lattice Quantum Chromodynamics. In this project I utilized some of the work of a previous student to develop a program that would read in a configuration of $SU(2)$ gluon gauge fields and form it into a Dirac matrix which, when inverted, would output the data needed to study some of the observable quantities of

a particle in this system. Specifically, we hope to study the pion and its mass. These programs will hopefully be made available to other Fordham students who hope to perform their own particle physics experiments.

Abstract 64: NNLO Corrections to the Muon $g-2$

Authors: Samuel Altier

Mentor: Christopher Aubin

College: Fordham College at Rose Hill

I have been working to carry out a calculation of the next-to-next-to leading order finite volume effects on the anomalous muon magnetic moment on the lattice, with the goal in mind of increasing the precision on the numerical result for that physical value. In tandem with ongoing measurements being carried out at Fermilab to drastically increase the precision on the experimental value of the muon's magnetic moment, we hope to determine whether this anomaly represents a gap in the standard model that could bring needed advancements to its ongoing development. I have developed Mathematica code that generates the interaction vertices that are required to proceed with computation of corrections to the simulated data. Going forward, I will be working to finish setting up and to perform the required computations.

Abstract 65: Morphological Discrimination and Classification of Complex Aerosol Aggregates via Simulated Two-dimensional Multi-spectral Light Scattering

Authors: Emily Shipley

Mentor: Stephen Holler

College: Fordham College at Rose Hill

Light scattering patterns from non-spherical particles and aggregates are a complex speckle pattern resulting from the interference among the constituent particles. The variation in in the observed patterns vary from particle to particle. Previous experimental work indicated that some features in the scattering patterns can reflect aggregate morphology and are useful for classifying particle types. Promising experimental results have prompted a more extensive study that better control the aggregate parameters. Light scattering simulations have been performed across multiple wavelengths and the resulting patterns analyzed to produce morphological descriptors that reflect particle characteristics. These descriptors are processed using a multivariate statistical algorithm and the controlled particles are classified. This talk will focus on the descriptors and their relation to the simulated aggregates, and how the multispectral information may be used for classifying various particle types including those of biological origin.

Abstract 66: Towards a Plasmon Coupled Micro-Cavity Biosensor

Authors: Jaeda Mendoza

Mentor: Stephen Holler

College: Fordham College at Rose Hill

Plasmonics enables the enhancement of resonance shifts in cavity-based sensors in the presence of a foreign substrate, altering the refractive index of surrounding dielectrics. This method of sensing can be used for the sensing of biological and chemical agents. This research project aims to determine whether perforated gold plates as a plasmonic sensor platform will be an effective alternative sensor, when coupled with a microsphere resonator. The set-up will consist of a silica microsphere and two gold plates, one of which is perforated. We were able to construct a microscope that will allow us to observe the set-up. We then created said microsphere resonators through heating the tip of a 125 μm diameter optical fiber with a 14 W CO₂ laser while it is rotating. Due to challenges in acquiring the gold plates needed for the experiment, we branched out our experiment to heighten the involvement of fluorescence. Microspheres were coated with Rhodamine B, a dye designed to be fluorescent when held against green

light. This resulted in visible resonances, although more prominent resonances were expected. We also coated microspheres with red fluorescent protein (RFP) and gold nano-particles, allowing it to work as a biosensor upon the adherence of a substrate. Likely due to the design of the microscope, we were not able to see a significant shift in the surface's emission profile. At present, we are awaiting to acquire the gold plates needed to proceed with our original experiment, and make necessary changes to our supplementary experiments.

Abstract 67: Metallization of Chiral and Grooved Polymers at Nanoscale

Authors: Anthony Gray, Kyra Fuleihan, Benjamin Schutsky, Christopher La Fond, and Meghan Evans

Mentor: Petr Shibaev

College: Fordham College at Rose Hill

Different types of polymers with chiral or grooved pattern on the surface were covered (decorated) with metal nanoparticles (silver, gold) or thin metal films (gold) in order to create surfaces with increased light reflection. Decorated surfaces were inspected under the optical microscope and studied by atomic force microscopy (AFM). It was shown that for grooved and chiral surfaces the nanoparticles/metal films tend to arrange themselves along the grooves/spirals not only on the surfaces of original polymers with grooves/focal conic domains but also on their replicas made from different polymers. Changes in light scattering and transmission were attributed to the presence of metal inclusions on the surface.

Abstract 68: Electronic Nose: Study and Implementation of Directional Sensing

Authors: Matthew Liberto, Benjamin Schutsky, Anthony Gray

Mentor: Petr Shibayev

College: Fordham College at Rose Hill

MQ-9 sensors are used to detect the volatile organic compound (VOC) ethanol. Utilizing this sensor with an airway creates the possibility to detect the VOC's from a farther distance and creates a directional detection field. Placing two of these apparatuses rotated by an angle of 60 degrees with respect to each other creates a large detection field and the whole system transforms into an artificial electronic "nose". Through experimentation, it was possible to obtain data for the relationship between angular rotation and sensitivity as well as distance and sensitivity. This data allowed for the design of optimal "nostrils" which are able to detect VOCs with a high level of directional sensitivity. In order to create this electronic "nose" system, an Arduino board was utilized.

Abstract 69: Environmentally Sensitive Optical Fibers and Waveguides Based on Hydrogen-Bonding Compounds

Authors: Benjamin Schutsky, Anthony Gray, Kyra Fuleihan, Christopher La Fond, and Meghan Evans

Mentor: Petr Shibayev

College: Fordham College at Rose Hill

Novel optical fibers and waveguides were designed and created from blends of hydrogen bonding compounds (polyvinylalcohol, polyvinylpyridine, acrylic acid) with glassy polymers and low molar mass liquid crystals. Optical fibers display significant birefringence in their cores since the drawing procedure of the fibers lead to the higher concentration and orientation of liquid crystal inside the core of the fiber. The fibers were studied by differential scanning calorimetry and optical methods. It was shown that fibers gain additional stability if they are physically crosslinked with diacidic low molar mass compounds (sebacic acid). Optical response of the fibers (changes in propagating light intensity or additional leakage of light) to the action of volatile organic compounds (VOCs) was studied and discussed for different types of polar and non-polar VOCs. It was found that optical response depends on

structural re-organization of the fibers that starts in the outer layer and then propagates towards the core in a way similar to the response of liquid crystals.

Political Science

Abstract 70: Investing in Soft Power: The Effect of Chinese Foreign Direct Investment in Sub-Saharan Africa on Individual Attitudes Towards China

Authors: Stephanie Galbraith

Mentor: Ida Bastiaens

College: Fordham College at Rose Hill

Chinese foreign direct investment (FDI) into Sub-Saharan Africa (SSA) has increased drastically in the past two decades from 464 million to 18.5 billion dollars. While many studies focus on the macro-level effects of this investment, few scholars explore individuals' attitudes towards the growing economic influence of China. In fact, the limited scholarship on FDI preferences fails to assess variations in attitudes across the Global South and does not explore how the home country of multinational firms impacts public attitudes. To fill this gap, this study examines how Chinese FDI into SSA influences the attitudes of local residents towards China. I run statistical regressions of data from the PEW Global Attitudes Project survey and bilateral FDI stocks in ten nations across SSA in 2007 and 2013. I find that individuals who perceive China as having "a great deal" of influence on their country were nine times more likely to have a "very favorable" view of China than a "very unfavorable" view. My empirical findings point to how individuals in SSA have a relatively positive view of Chinese involvement in their countries and reinforce the importance of sociotropic determinants in individual attitudes towards globalization.

Abstract 71: A State-Specific Issue: The Impact of Permanent Disenfranchisement Laws on Former Felons' Civic Engagement

Authors: Leila Witcher

Mentor: Robert Hume

College: Fordham College at Rose Hill

This research examines how the variance in felony disenfranchisement laws influence the likelihood of civic engagement in former felons, focusing on the impact of permanent disenfranchisement laws. Voting rights restoration are only permitted on an individual basis through an appeal to the governor's office or clemency board. Iowa and Kentucky are the last two states with this system. In 2018, Florida passed an amendment overturning permanent disenfranchisement by offering automatic restoration upon probation and parole completion. In Kentucky, policies enacted by three different governors from 2001- 2015 provided more assistance to apply for enfranchisement or added more requirements. Following these changes, data showcased direct increases and decreases on applications and successful approvals, respectively. In Iowa, voter turnout in multiple elections was examined following policy changes. These ranged from automatic restoration to required applications, with some groups given certificates in the mail to inform them of their restored right to vote. Results mirrored the stringency of requirements, where voter turnout increased with more oversight and automatic voting rights restoration. To conclude, predictions were made for Florida's transition. If no additional restrictions are instituted, former felons' civic engagement in future elections can increase due to a streamlined process and less misinformation among felons on their voting rights. This research remains significant as it utilizes available data on former felons to exemplify the importance of administrative changes that impact former felons' ability and desire to vote.

Abstract 72: Who Joins Ethnic and Minority Bar Associations?

Authors: Abigail Lee

Mentor: Olena Nikolayenko

College: Fordham College at Rose Hill

This study examines motivations of first, second and third generation immigrants in joining bar associations. I argue that the individual's immigration history influences the logic of involvement in a professional association. Based upon in-depth interviews with ten immigrants holding membership in the Dominican or Puerto Rican Bar Associations, I find that ethnic identity plays a critical role in stimulating the involvement of first generation immigrants. The impact of ethnic identity, however, declines among second and third generation immigrants, as well as immigrants of mixed ethnicities. Instead, professional interests gain greater salience among second and third generation immigrants.

Abstract 73: Same Time, Different Place: The Growth of Far-Right Movements in the U.S. and Spain

Authors: Julia Hammond

Mentor: Olena Nikolayenko

College: Fordham College at Rose Hill

The main objective of this paper is to explore how far-right movements in Spain and the United States articulate their ideology and collective identity to understand the movements more broadly. The importance of collective identity is a key facet of prevailing social movement theories. This paper uses discourse analysis to analyze the rhetoric of different members of the two far-right movements and contextualizes its effectiveness using public opinion polling data. The paper argues that social movement theories do not adequately describe the two far-right movements, but that the way in which the movements construct their identity is integral to their current political and social prominence.

Abstract 74: The Impact of Political Polarization on the Environmental Movement in the United States

Authors: Catherine Rabus

Mentor: Olena Nikolayenko

College: Fordham College at Rose Hill

Environmental activism has long played a prominent role in American society, even before the inception of the conservation movement in the nineteenth century. Yet, April 22, 1970 stands out as a day that not only marked the inaugural celebration of the Earth Day, but also signaled the emergence of the modern environmental movement in the United States. That year, twenty million Americans, including many university students, participated in protest events against environmental pollution. The 2019 Earth Day also drew large, albeit smaller, crowds, demanding the protection of endangered species. Moreover, thousands of American students have recently become involved in marches and strikes to combat climate change. This study examines the impact of environmental activism on public policy in the United States from the 1970s to the 2010s. I argue that the increasing salience of partisanship in policy debates over environmental issues has significantly weakened the capacity of environmental activists to achieve the desired policy outcomes. Drawing on Congressional records, government publications and public opinion data, the empirical analysis demonstrates how partisanship influenced the adoption of legislative acts and mass support for environmental policies. This project contributes to American politics literature by exploring the detrimental effects of polarization on environmental policies.

Abstract 75: Generation Z's Support for Climate Change: The Impact of Families, School, and Experience

Authors: Allyson Ryan

Mentor: Olena Nikolayenko

College: Fordham College at Rose Hill

Over the past century, the level of carbon dioxide has dramatically risen, causing severe habitat degradation and a steep increase in the intensity and frequency of extreme weather events around the globe. Opinion polls indicate that Americans are divided over the content of climate change policies and the government's role in the implementation of these policies. Yet, the Generation Z, representing more than 60 million people born between the mid 1990s and the early 2010s, appears to be the strongest advocate of environmental policies. To date, however, little empirical research examined sources of youth's support for climate change. Addressing this gap in the literature, this project explores how family, schools, and local environments shape youth's attitudes towards climate change. The study hypothesizes that Gen Zers who had more access to nature as children, learned about the detrimental effects of climate change at school, and grew up observing their parents participate in environmentally friendly habits display a higher level of support for climate change policies. This study contributes to the academic literature and public policy debates by analyzing the effects of socialization on environmental attitudes of Gen Zers. Findings from this study supported the first hypothesis but contradicted the second and third. Findings also determined that understanding the threat of climate change and exposure to environmental degradation are determinants of Gen Z's support and knowledge of climate change.

Psychology

Abstract 76: How Do Objects within a Scene Affect Neural Representation?

Authors: Tess Durham

Mentor: Elissa Aminoff

College: Fordham College at Rose Hill

Previous studies have found brain regions of interest (ROIs) to be associated with high-level visual processing. Amongst these, the lateral occipital complex (LOC) is sensitive to object processing, while the parahippocampal place area (PPA), retrosplenial complex (RSC), and occipital place area (OPA) are sensitive to scene processing. The purpose of this study is to understand to what extent object variance in real-world scenes is reflected in the activation patterns of these ROIs. This study utilized data from BOLD5000, an fMRI dataset of 5,000 real-world scenes (Chang et al., 2019). We extracted 20 scene categories that had at least 35 scene exemplars ($M=57.6$). For each category, images were manually labeled for objects to yield an object-scene category matrix. Matrices for each scene category were cross-correlated to produce a measure of object variance. The object variance measure was compared to the voxel activity within each ROI, separated by hemisphere, to determine how object variance affects representation in the brain. Analysis was conducted using a repeated measures ANOVA. The results demonstrate a significant main effect of hemispheres $F(1,4)=6.17$, $p=.023$, with higher similarity in the right ($M=.043$, $SD=.014$) than the left ($M=.025$, $SD=.010$). Among the different ROIs, the LOC ($M=.073$, $SD=.018$) showed significant high levels of activation followed by the OPA ($M=.036$, $SD=.016$). These results suggest the right hemisphere is involved in representing objects within real-world scenes. Moreover, the LOC and OPA are sensitive to object variance. This work proposes a new framework for understanding how category selective brain regions process high-level scenes features.

Abstract 77: The Representation of Micro-Valences in High-Level Visual Processing for Everyday Images

Authors: Lauren Chan

Mentor: Elissa Aminoff

College: Fordham College at Rose Hill

Are complex properties, such as micro-valences, integrated in the neural representations of high-level visual stimuli? If so, does this predict behavioral preferences? Micro-valences are the subtle affective valences towards seemingly neutral stimuli (Lebrecht et al., 2012). In order to investigate the effect of micro-valences on visual processing of complex images, we examined the affective ratings (“like”, “neutral”, or “dislike”) and fMRI data of participants from the BOLD5000 dataset, in which they viewed 5000 “everyday” visual scenes taken from well-established computer vision image datasets such as COCO, ImageNet, and SUN (Chang et al., 2019). Initial analyses showed that affective judgement significantly modulated the BOLD response of at least two category-selective regions: the lateral occipital complex (LOC), a region selective for objects ($F(2, 1788) = 13.43, p < .01$), and the parahippocampal place area (PPA), a region selective for scene-processing ($F(2, 1788) = 48.35, p < .01$). The BOLD response from the PPA was higher in “disliked” compared to “liked” images; the BOLD response from the LOC was higher in “liked” compared to “neutral” images. From these results, we hypothesized that in “everyday” images, object-focused stimuli would elicit positive micro-valences, while scene-focused stimuli would elicit more negative micro-valences. Follow-up ANOVAs revealed that object-categorized COCO images had a more positive affective rating compared to scene-categorized COCO images, $F(1, 4186) = 41.66, p < .01$. From this analysis, we suggest affect is an important component of high-level visual processing and should be incorporated into understanding the organization and representation of the ventral visual stream.

Abstract 78: Emotion Reactivity and Momentary Subjective Reactivity to Negative Stimuli: The Moderating Role of Depression

Authors: Kate Sheehan

Mentor: Peggy Andover

College: Fordham College at Rose Hill

Research has found that many mental disorders are characterized by abnormal emotion reactivity. For example, individuals with major depressive disorder were less reactive to sad stimuli than those without MDD (Rottenburg, 2005). Further, studies suggest blunted physiological reactivity in severely depressed patients, indicated by decreased HPA axis activity in depressed inpatient participants (Huber et al., 2006) and decreased cardiovascular reactivity following a stress task (Phillips, 2011). Although anxiety is associated with heightened emotion reactivity, comorbid depression may mitigate this effect (Taylor-Clift et al., 2011). The current study explores the role of depressive symptoms in emotion reactivity. Specifically, we aim to investigate whether depressive symptoms moderate the association between self-reported emotion reactivity and momentary, subjective reactivity to negative stimuli. Data are drawn from a larger study on emotion regulation. The sample consists of 74 women between the ages of 18 and 55. Although emotion reactivity did not statistically predict momentary subjective reactivity, $B = -0.01, SE B = .009, t = 1.07, p = .29$, level of depressive symptoms did significantly moderate the relationship, $B = .002, SE B = .0007, t = 3.23, p = .003$. Specifically, at high levels of depression, but not at moderate or low levels, increased reactivity was associated with increased momentary subjective reactivity to negative stimuli. This suggests that the association between self-reported reactivity and momentary, subjective reactivity to negative stimuli is important for individuals with greater levels of depressive symptoms. Thus it is important to identify how psychiatric symptoms impact emotional experiences and participants’ judgements of their own reactivity.

Abstract 79: Validation of an Injury Severity Scale for Non-Suicidal Self-Injury (ISS-NSSI)

Authors: Michael Mullinax

Mentor: Peggy Andover

College: Fordham College at Rose Hill

Nonsuicidal self-injury (NSSI) is the intentional destruction of bodily tissues, absent of suicidal intent. Though there are some minor discrepancies in the reported prevalence of NSSI in the general population, it is believed that about 15 to 20 percent of adolescents and 6 percent of adults have engaged in NSSI during their lifetime. NSSI engagement has proven to be a significant risk factor and correlate for suicidal ideation and attempts. Despite its importance, no measure has previously been developed to capture the medical severity of various NSSI methods, including cutting and biting, among others. A novel measure, the ISS-NSSI, has been developed to fill the gap in the literature. The measure rates the medical severity of various NSSI according to scales ranging from one being the least severe, and five being the most severe. Since its development, the measure has received support from focus groups, and is currently undergoing a wider survey and assessment by various medical professionals. Medical professionals who fit the following inclusion criteria are participating in the study: (1) 18 years of age or older, (2) certified or licensed medical professional, and (3) have had direct patient contact within the past 6 months. Participants are being recruited through medical organization newsletters and targeted postings on sub-Reddit forums. This online study asks participants to determine how the measure corresponds with different indices of medical severity (e.g., treatment by a medical professional, hospitalization). The present study is still ongoing, but current data collected will be analyzed and discussed.

Abstract 80: Accept or Discard? The Role of Bias and Risk Classification in Solid Organ Transplantation Amidst the Opioid Epidemic

Authors: Jack Franke

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

The waitlist for organ transplant in the United States is growing ever longer, and increased wait times are predictably associated with higher mortality. Meanwhile, a record number of young, otherwise healthy individuals are dying from drug overdose as a result of the worsening opioid epidemic. One of the few ways to help mitigate the tragedy of such deaths is through organ transplant, in which one donor can save the lives of many recipients. Due to misunderstanding regarding risk classification and broader stigmas, however, the viable organs of drug overdose victims are being unnecessarily discarded. Since it seems unlikely that the crisis of the growing transplant waitlist or the opioid epidemic will subside soon, it is imperative that medical students and pre-health undergraduates—the future leaders of the medical field—are educated about the use of organs associated with drug overdose in transplantation. Educating students now could save lives in the future.

Abstract 81: The Effects of Stigma on Children Living with Epilepsy

Authors: Catherine Gassiot

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Close to 3.5 million people in the United States are living with epilepsy, and approximately 470,000 of these people are children. Research has demonstrated that those living with epilepsy suffer from the stigma associated with their diagnosis of epilepsy. This literature review aims to further understand the negative effects of stigma on children living with epilepsy in the United States. Stigma is a commonly studied concept in the field of psychology, and in the medical field stigma affecting those living with epilepsy is often perpetuated by stereotypes, labeling, and discrimination based on actions that they are

unable to control. Analysis of qualitative studies on the experiences of children and adolescents living with epilepsy demonstrated that stigma from peers, employers, and especially family members causes isolation and depression. Further, the felt stigma suffered is often compounded by treatment regimens that often further accentuate social exclusion from peer groups such as social limitations. The results indicate that one of the primary causes of the stigma affecting children and adolescents living with epilepsy is a lack of familiarity or knowledge of the condition. Due to these results, it is recommended that further research focus on possible interventions that effectively reduce stigma surrounding epilepsy such as targeted education delivered in diverse settings.

Abstract 82: Sexual Orientation and its Effects on Stress and Sleep

Authors: Stephanie Perez

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Individuals that identify with a nonheterosexual identity, as opposed to a heterosexual identity, tend to experience different stressors related to this sexual minority status. While previous studies have examined the role of sexual identity status in accordance with stress or sleep, few have examined these three variables in a single, coherent study. In this study, a sample of 155 participants completed an online survey which contained questionnaires regarding stress, sleep quality, and active coping. Results showed that sleep was correlated with stress, while active coping was not. Also, perceived stress and sexual minority distress were not correlated. These results indicate that sexual minority individuals are experiencing two different types of stress, pointing to trends of poorer outcomes for this group. Further research in this area is needed to examine the different stressors of sexual minorities in order to create targeted strategies that can assist them.

Abstract 83: Perceptions of Refugee Integration in the Rural United States: A Case Study of Missoula, Montana

Authors: Rosemarie McCormack

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

With a record-breaking number of refugees in the world today, national and local governments are struggling to meet the needs of migrants and maintain social infrastructure. There is a significant body of research on refugee resettlement and services in urban centers, but refugee integration in rural areas has not been adequately considered. Smaller cities and towns may have unique advantages for refugees, such as lower housing costs, stable job opportunities in manufacturing or agriculture, and strong community ties. The present study utilizes mixed methods to examine whether rural refugee resettlement is a plausible alternative to metropolitan resettlement in the United States, using Missoula, Montana as a case study. This research investigated Missoula residents' attitudes about refugee integration via online surveys (n = 111) and semi-structured interviews (n = 9). Findings suggest that 85.9% of host community members are in favor of resettling refugees in Missoula. Ninety-two percent of respondents feel that refugees benefit their town culturally, and 76.2% believe refugees benefit their community economically. While over 75% of residents agree that Missoula has the resources to integrate refugees, interviewees had different opinions about how resources should be allocated to support them. This pilot study is one of the first examining rural host community attitudes towards refugee integration in the United States. It lays the groundwork for further research on rural refugee resettlement and offers insights for policymakers who seek to create programs that will satisfy both refugees and host community members.

Abstract 84: An Analysis of University Social Media Growth and Engagement

Authors: Grace Little

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Social media is quickly becoming the number one way to market your product and get your brand out there. This is no different for universities. This study looks at the Fordham College Rose Hill Instagram page (@fordhamfcrh) from its start in October 2018 to now. We tracked the growth of and engagement with followers. Our goal was to determine which type of content on the page received the most interactions in order to try to increase user engagement, followers, and build the FCRH brand. We broke down each post by date, category, and number of likes and tagged the posts with one of the ten category labels: Campus Event Postings- Academics, Event Postings- Clubs, Event Postings- Social, People- Students, People-Faculty/ Deans, People- Other, Fundraising, Inspirational and Other. The results showed significant growth. The number of posts grew 600% from 2018 to 2019 and is on pace to grow another 74% in 2020. The number of likes grew ~1500% from 2018 to 2019 and is on pace to grow another 118% in 2020. The number of likes per post has also grown considerably, nearly tripling between 2018 and 2020. Over the course of the study, the Campus Event category had both the greatest number of posts and the greatest number of likes. The Category People-Faculty/Deans had the greatest year-over-year increase in likes for both 2019 and projected in 2020. Perhaps unexpectedly, the second most popular subject was “Other” which in general captured by was happening that day, ex: MLK post for MLK day. In conclusion, the greatest amount of interest was in the categories Campus, Other, People-Faculty/Deans and People-Students. While Inspirational was ranked third out of five categories in 2018, it fell throughout the study as new categories were introduced, currently ranking eighth overall. The results of the study have important implications for establishing and growing university social media efforts.

Abstract 85: College Students’ Beliefs about Etiology and Dangerousness of Mental Illness

Authors: Kate Sheehan

Mentor: Rachel Annunziato

College: Fordham College at Rose Hill

Previous research indicates that 30-50% of college students have some type of mental health concerns, often including depression, self-harm, OCD, eating disorders, anxiety, and psychotic disorders (Blanco et al., 2008; Cheng et al., 2018; Ganon et al., 2017; Storrie et al., 2010). Unfortunately, many students do not seek help, which may lead to worsened prognoses and more distress; this hesitance to seek help may be due to stigma (Cheng et al., 2018; Rafal et al., 2018). Considering the relationship between stigma and knowledge, the current study aimed to explore these themes more in-depth as they pertain to college students. Participants (N = 160) responded to questionnaires about mental health knowledge and beliefs, and scales for dangerousness, literacy, overall attitudes, and etiology with good reliability were created from the questions. It was hypothesized that biological beliefs about etiology would be associated with more negative attitudes towards mental health. This hypothesis was not supported, $r(158) = -.03$, $p = .75$, perhaps because etiology may encourage understanding mental illnesses similarly to physical illnesses, which are less stigmatized. Secondly, it was hypothesized that judgements of dangerousness associated with mental health would be correlated with mental health knowledge and literacy. This was supported because perceived knowledge ($r(160) = .42$, $p < .001$) and the mental health literacy scales of sympathy, ($r(152) = -.5$, $p < .001$), help-seeking, ($r(151) = -.28$, $p = .001$), and perceptions of distress associated with mental illness, ($r(151) = -.2$, $p = .012$), were significantly associated with perceptions of danger. These findings may have implications for university administrators as developing interventions that deliver accurate, effective mental health education to students may be beneficial.

Abstract 86: Emotion Knowledge and Emotion Regulation among Preschool Students: Effects of the Jumpstart Curriculum Revisions Pilot and Differences by Child Gender

Authors: Ashley Evans and Richmond Carlton

Mentor: Joshua Brown

College: Fordham College at Rose Hill

This study assessed whether there was an effect of the Jumpstart preschool intervention program on children's emotion knowledge and emotion regulation when compared to children in a control group, and if the effects of the program were moderated by child gender. Secondary data analysis was used to examine these hypotheses in a diverse sample of children (n =122) who attended preschools in the Bronx, NY and Philadelphia, PA. Children were on average 49.53 months (4.12 years) old, 31.1 % Black, and 23 % Hispanic/Latino. Children's social-emotional skills from two sequential annual cohorts were directly assessed at baseline during the fall of 2017 and 2018, and again at post-test during the spring of 2018 and 2019. Linear regression models were used to assess whether there was an effect of the intervention, gender, or an intervention by gender interaction when controlling for baseline scores and child age. The results showed a positive main effect of Jumpstart on emotion knowledge, and a negative main effect of Jumpstart on emotion regulation. Gender did not significantly moderate the association between the intervention and either outcome. Findings suggest that Jumpstart positively impacts children's emotion knowledge, but not their emotion regulation. This study adds to the research about preschool early intervention programs that focus on social-emotional learning and literacy.

Abstract 87: Technology Use and Early Social-Emotional and Academic Development

Authors: Thomas Dang

Mentor: Joshua Brown

College: Fordham College at Rose Hill

Technology usage in early childhood has been found to have both positive and negative relationships with children's social emotional and academic development (Linebarger & Walker, 2005; Domingues, 2017). This study examined the effects of early technology use on the emotional knowledge, social skills, and academic skills of 122 preschool children (Mean age = 4.12 years, 31.1% Black, 23% Hispanic/Latino). Children's social-emotional skills from two sequential annual cohorts were directly assessed at baseline during the fall of 2017 and 2018, and again at post-test during the spring of 2018 and 2019. Linear regression models were used to assess the relationship between time spent using technology and academic skills, executive functions, and emotional knowledge at the end of once year of preschool after controlling for baseline scores on the outcome and child age. The results showed there was no significant association between the amount of time children use technology and change in social-emotional and academic outcomes over one year of preschool. Results from this suggest levels of technology usage (as measured by amount of time) are not linked at least in negative ways to children's social emotional and academic development during a single school year.

Abstract 88: The Association between Food Insecurity and Anxiety and Depression Symptoms in Children and Adolescents

Authors: Erinne Benedict

Mentor: Natasha Burke

College: Fordham College at Rose Hill

Food insecurity and its association with mental health have limited research in children and adolescents. This current study examines the associations between a) food insecurity and anxiety symptoms, and b) food insecurity and depression symptoms among children and adolescents 8-18 years old from the greater New York City area. Additionally, parental anxiety and parental depressive symptoms are examined as

putative moderators of these associations in exploratory analyses. Thirty participant-parent dyads from the community were included in the analysis. Measures included demographic, food insecurity, anxiety, and depression questionnaires by child and parent self-report. Parent-reported demographics and food insecurity variables were utilized in analyses. Zero-order correlations and linear regressions were used to examine study hypotheses. Results indicated no significant correlations between household food insecurity and anxiety or depression symptoms for children and adolescents. No significant correlations between parent and child anxiety symptoms or parent and child depression symptoms were found. Further research with a larger sample size is warranted to better understand the associations between food insecurity and anxiety and depression symptoms in children and adolescents in the Bronx.

Abstract 89: Mediators and Moderators of Treatment Outcome for Anxiety and Depression: A Meta Analysis

Authors: Kate Sheehan

Mentor: Lauryn Garner

College: Fordham College at Rose Hill

While extensive research has analyzed the efficacy of various types of treatments for anxiety and depression and designated certain treatments as “evidence-based” therapies (EBTs), there is still a deficit in the understanding of how and why EBTs (i.e., Cognitive Behavioral Therapy) work. The current study explores the literature on mechanisms that impact treatment outcomes (mediators and moderators). Mediators explain why a treatment leads to better outcomes while moderators explain the strength of a treatment effect on outcomes (McKay & Tobin, 2017). The current study is a meta-analysis with the aim of summarizing previous findings and calculating effect sizes of various mediators and moderators of CBT outcomes. The meta-analytic process began with searching databases for related literature, and after exclusion criteria screening, 40 studies were included in the final meta-analysis. Analyzing effect sizes in the previous research, cognitive mediators of anxiety outcomes had a weighted mean effect size of almost 0, interpersonal moderators of anxiety outcomes had a small weighted mean effect size ($d = .27$), followed by duration of symptoms/ age of onset ($d = .38$), and comorbidity ($d = 0.48$). The largest weighted mean effect size was 0.67 for anxiety sensitivity as a moderator, suggesting this is especially important to consider in anxiety treatment. For depression, moderators of outcomes were maladaptive personality traits ($d = -.24$), comorbidity ($d = .43$), and therapeutic factors ($d = -.15$). Cognitive mediators of depression had a medium effect size ($d = .49$), suggesting cognitive aspects of depression treatment are important.

Abstract 90: Putting Yourself Out There: Examining Positive Risk-Taking in Emerging Adults

Authors: Simona Biundo, Natasha Chaku, and Kelly Barry

Mentor: Lindsay Hoyt

College: Fordham College at Rose Hill

In past research, risk-taking has focused extensively on negative and health-compromising behaviors. The current study will focus on the concept of positive risk-taking; a fairly new concept in the world of psychology. This study will be utilizing a newly created “Putting Yourself Out There” (PYOT) scale to measure positive risk. It will then evaluate how positive risk-taking relates to other factors such as negative risk-taking, mental health, urbanicity, gender and parental structure. It was predicted that PYOT would have a positive correlation with negative risk and with mental health. It was also predicted that those that grew up in single-parent households would have lower PYOT than those that grew up in a two-parent household and that those in rural/ suburban neighborhoods would have higher PYOT than those in urban neighborhoods. Lastly, it was predicted that gender would not be related to engagement in PYOT behaviors. Ultimately, it was found that PYOT was positively associated with negative risk-taking and positive well-being. Implications can provide new insight into how to approach negative risk-takers in the

world of mental health. They also can help to change society's view of "risk-takers", who have been previously viewed as failures to society.

Abstract 91: South Asian Mental Health Service Use: Risk and Protective Factors for Young Adults

Authors: Shubarna Akhter, Dr. Tiffany Yip, Li Niu, and Kelly Barry

Mentor: Lindsay Hoyt

College: Fordham College at Rose Hill

Asian Americans are 51% less likely to utilize mental health services compared to White Americans and 40% less likely than Latinx and Black Americans (Smith & Trimble, 2016). While researchers typically combine all Asian sub-groups into a single homogenous "Asian" category, significant cultural differences exist between groups (Rahman & Rollock, 2004). Twenty young adults (65% female; Mage = 19.7) were recruited through South Asian organizations across New York City, including university organizations, local organizations, and nonprofits representing all eight South Asian countries. All participants were between 18 to 24 years of age, self-identified as South Asian, and had experience with mental health symptoms (even in the absence of a diagnosis). This study examines psychosocial predictors of mental health service utilization among South Asian young adults using mixed methods analysis of quantitative survey data and qualitative focus groups discussions. Both risk (i.e. stigma and internalization of the model minority myth) and protective (i.e. parental acculturation and social support) factors were identified for mental health seeking behaviors in accordance with previous literature. Stigma in the form of gender stereotype, online sources of social support, and the importance of representation were elucidated as novel findings. The findings of this study can help inform culturally sensitive training for mental health professionals to better understand the experiences of South Asian young adults. This research also sheds light on the complexities of the barriers this population faces when seeking mental health treatment, which may be areas that can be targeted by future interventions.

Abstract 92: Parental Education and Its Implications for Executive Functioning in Adolescence

Authors: Tereze Nika, Kelly Barry, and Natasha Chaku

Mentor: Lindsay Hoyt

College: Fordham College at Rose Hill

Adolescence is a period during which executive functioning (EF) skills greatly improve. Prior research suggests that parents have a significant impact on their children's cognitive development, including their EF skills, and that parental support can promote positive EF development in children (Conway, Waldfogel, & Wang, 2018; Bernier, Carlson, Whipple, 2010). An important component of supportive parenting is the parent's ability to recognize the emotional needs of a child, which is also known as emotional intelligence (EI). However, little research has examined how parental EI affects adolescent's EF skills. This study aimed to examine associations between parental EI and adolescent EF skills, and investigate whether this association was moderated by SES. A sample of 72 New York City adolescents (ages 9-15) and their caregivers were recruited to participate in this study. The Stroop Color-Word task was used to assess EF in adolescents, and the Trait Meta-Mood Scale was used to assess EI in caregivers (Golden & Freshman, 1978; Salovey et al., 1995). Multiple regression analyses controlling for age, gender, race/ethnicity and SES found that parent EI significantly predicted better scores on the Stroop. For participants from high-SES backgrounds, performance on the Stroop was consistently high across all levels of parent EI. However, for participants from low-SES backgrounds, higher parent EI was associated with better performance on the Stroop task. The findings suggest that a parent's ability to comprehend and manage their emotions (EI) can act as a protective factor for those from low-SES backgrounds.

Abstract 93: Personality Predictors of Well-Being in Young Adulthood: The Role of Social Media Usage

Authors: Bryce Allen and Brandon Dull

Mentor: Lindsay Hoyt

College: Fordham College at Rose Hill

Personality traits and social connections are important predictors of mental health; however, little is known about how social media usage may influence the relationship between personality characteristics and psychological well-being. Some researchers have found that social media use has a positive impact on well-being (Ellison, Steinfield, & Lampe, 2007), while other researchers have found the opposite (Woods & Scott, 2016). Due to the contradictory nature of these findings, other factors, such as personality traits, may work together and play a role in the impact social media has on people's well-being. The current study looked to fill this important research gap by investigating how social media use and personality traits together impact young adults' psychological well-being. Young adult participants (n = 254) were recruited for the study (50.4% female, ages 18-27) through Amazon's Mechanical Turk to complete a survey measuring the big-five personality traits, social media usage, and psychological well-being (i.e., anxiety, depression, self-esteem). Results supported the relationship between personality characteristics and well-being. In addition, it was found that more time spent on social media was associated with higher levels of anxiety and depressive symptoms, but time spent on social media was not correlated with self-esteem. Lastly, time spent on social media did not moderate the association between personality factors and poor well-being. As the social media landscape continues to grow and evolve, it is vital to understand the implications for development.

Abstract 94: Identity Formation for Youth of Color: Individual and Macro-Level Influences

Authors: Roscoe Garner IV and Natasha Chaku

Mentor: Lindsay Hoyt

College: Fordham College at Rose Hill

Adolescence is a period of substantial biological, psychosocial, and cognitive development, inspiring adolescents to think about who they are and who they want to become (LeMoult et al., 2018). Recent research suggests that identity formation is the focal achievement of adolescence (Klimstra et al., 2010), however, previous work on identity does not reflect the racial/ethnic diversity of youth living in the United States today. The current, mixed-methods study examined sociopolitical influences on identity processes among racial/ethnic minority youth (aged 14-15) as part of a larger Youth Participatory Action Research summer class on civic engagement. Students completed surveys at the beginning and end of the class which included an identity questionnaire. Students also generated research questions through a series of small group exercises to guide peer interviews on students' identity, the 2016 presidential election, and ways for peers to get involved in politics. Survey data suggested that students found youths' similarity to others, individuality, and sense of belonging to their racial group as most central to their sense of self. Peer interviews highlighted that specific sociopolitical stressors such as immigration anxiety, family separation, and heightened racist culture further influenced how youth felt about themselves and how their place in society. Overall, these findings suggest that adolescents pay attention to political events, and both political policies and associated media coverage have profound effects on how they think about themselves and their communities. Having a positive racial/ethnic identity may be important for adolescent development during this polarizing time for racial/ethnic minority youth.

Abstract 95: Pathways to Resilience in People with Cancer: Qualitative Analyses

Authors: Tomas Gonzalez

Mentor: Mary Procidano

College: Fordham College at Rose Hill

Cancer is a widely prevalent and life-threatening disease, yet little is known about the nature of resilient versus non resilient psychological adjustment in people coping with cancer. Available literature documents the potential importance of appraisal and coping and social support (e.g., Lent, 2004), as well as other experiential factors including spirituality and personal goals. Most available research has been conducted in the US or other individualistic societies. Participants in this study included 18 individuals (8 women, 10 men) between middle- and old age and from a range of socioeconomic backgrounds, in inpatient treatment at Astorga Oncology Clinic in Medellin, Colombia (where they were interviewed in Spanish by the first author), using a semistructured interview constructed for this study. A grounded-theory approach was utilized to identify themes within the study's domains, and relationships among these themes. Results confirm the salience of the constructs studied: many participants described complex, ongoing intergenerational family relationships through the cancer experience; patterns of emotional coping (expression versus self-calming); and particular patterns of religious/spiritual experience (especially identification with Catholicism, and enhanced closeness to God, during cancer). Many of the narratives showed particular coherence, in which experiences of close and caring family relationships, spirituality, and emotional experience (either emotional expression or composure) were integrated, and tied to personal goals (which often reflected living meaningfully day by day, given most participants' advanced ages). Results are discussed in terms of suggestions for future--particularly cross-cultural--research, and for integrating spirituality into culturally-sensitive psychotherapy for individuals coping with cancer.

Abstract 96: Alterations in Brain Structure in Children with Severe Temper Outbursts

Authors: Andres Salgado

Mentor: Amy Roy

College: Fordham College at Rose Hill

Prior research indicates that children struggling with severe temper outbursts (STO) have difficulties regulating emotions and general functional impairment. Recent functional neuroimaging studies implicate alterations in the functional connectivity of brain regions involved in generating and controlling emotion such as the anterior midcingulate (Roy et al., 2018). The present study examined whether children with STO exhibit structural differences in this region as well. Data was obtained from a study of 142 children (ages 5-9) who completed structural Magnetic Resonance Imaging (MRI) scans. These children fall into three groups: 62 STO, 39 healthy controls, and 41 ADHD without STO. Freesurfer software was used to delineate cortical thickness values across the entire cortex. Due to the wide age range, we decided to group participants according to the median age of 7.3 years. One-Way ANCOVAs, controlling for total intracranial volume (eTiV) failed to find any group differences for either left or right anterior midcingulate volume. We then conducted dimensional analyses examining scores on the Anger subscale from the Child Behavioral Questionnaire (CBQ) in relation to anterior midcingulate volumes. Partial correlations found a small-moderate negative correlation between CBQ Anger scores on the CBQ and the left midanterior cingulate volume in the younger group but not the older group. In children younger than seven, those with greater expression of anger, exhibited smaller left midanterior cingulate volumes. Future work is needed to further hone such neurobiological models of emotional dysregulation in children.

Abstract 97: The Impact of Satisfaction with Social Support and Environmental Demands on Subjective Cognition Across Adulthood

Authors: Annalee Mueller and Jillian Minahan

Mentor: Karen Siedlecki

College: Fordham College at Rose Hill

Dementia and declines in objective cognition (OC) are associated with increased age (JAMA, 2020). Research on subjective cognition (SC), which is an individual's self-appraisal of their OC, has shown a significant correlation between high levels of stress, low OC, and poor SC (Nicol et al., 2019). Stress, as explained in Person – Environment fit theory, is caused by a misfit between a person's environmental demands (ED) and their personal resources. Social support (SS) has been shown to have a positive relationship with OC across adulthood, and to buffer against and reduce experienced stress (La Fleur & Salthouse, 2017; Kuiper et al., 2017). Limited past research has considered the relationship between SS, SC, and ED. Participants (N = 1,873; age range 18-99) from the Virginia Cognitive Aging Project completed assessments of multiple domains of SC, OC, SS, and ED. Results from the current study demonstrated a significant interaction effect between satisfaction with social support and SS on participants' self-ratings of general memory functioning ($B = .046, p < .05$). Further, we found a consistent, significant association between increased ED and poorer SC (Bs ranged from $-.051$ to $.149, p < .05$), and a significant interaction effect between anticipated support and ED on SC ($B = .049, p < .05$), beyond the influence of sociodemographic, well-being, and health factors. Our findings suggest that an individual's appraisals of their overall cognitive functioning may be notably impacted by levels of satisfaction with the support they receive and by how many ED they maintain in relation to that support.

Abstract 98: The Social Effects of an Intergenerational Email Pal Program

Authors: Kristi Lise and Jillian Minahan

Mentor: Karen Siedlecki

College: Fordham College at Rose Hill

Ageist attitudes and loneliness are associated with detrimental effects on younger and older adults. This study utilized a randomized waitlist-control design to investigate the effects of a six-week intergenerational e-mail pen pal program on loneliness in younger and older adults and ageism in younger adults. Thirty-three younger adults (18-30 years) and 29 older adults (over age 60) completed an online survey assessing ageism, loneliness, measures of well-being, and several other individual difference characteristics. Participants completed the baseline survey, and then one week later, 11 pen pal pairs began the six-week e-mail intervention. All participants repeated the survey one week and then one month after the intervention was completed. Analyses revealed that at baseline, young adult participants scored higher on measures of loneliness, depression, anxiety about aging, and negative affect, and had lower levels of mastery, life satisfaction, and positive affect than older adult participants. There was no effect of the intervention on levels of ageism or loneliness in either young or older adults as indicated by repeated measures ANOVAs. However, the effect size of the intervention on older adults was small to moderate. Inspection of the descriptive statistics indicated that older adults in both the intervention and control group experienced increase loneliness during the post-test. However, the older adults in the intervention group experienced less of an increase compared to those in the control group. This suggests that participation in the intervention may have acted as a buffer to the loneliness that older adults experience during the winter months.

Abstract 99: The Influence of Language on Time Perspective and the Selection of Socially Oriented Goals

Authors: Devin D'Agostino

Mentor: Karen Siedlecki

College: Fordham College at Rose Hill

Does the language we speak determine how we perceive time? Recent studies have shown that how a language marks the future (grammatically distinct from the present in strong-future time reference (FTR) languages and grammatically equivalent to the present in weak-FTR languages) impacts a speaker's likelihood of engaging in future-oriented behaviors. According to Socioemotional Selectivity Theory, an individual's selection and pursuit of social goals varies with their perception of the expansiveness of the future – as an individual's perception of the future becomes more limited, goals shift from future-oriented information gathering goals to present-oriented emotional regulatory goals. Although both models are well supported, research has yet to investigate the impact of language on the selection of temporally oriented social goals. The present study examined whether the time perspective associated with a language's type of FTR (present-orientation in strong-FTR, future-orientation in weak-FTR) is correlated with quantitatively measured orientation towards and perception of time. Participants consisted of English-German bilinguals (N = 16) between the ages of 18-85. Type of FTR was found to be a significant predictor of temporal orientation and perceived expansiveness of the future, providing the first evidence of a language's type of FTR predicting quantitatively measured time orientation and perception. Implications of the influence of language on a speaker's orientation in and perception of time are discussed.

Abstract 100: The Associations Between LGBT Vicarious Discrimination, Perceived Stress, Sexual Orientation, and Sexual Identity Exploration and Commitment in College-aged Students

Authors: David Rosen

Mentor: Tiffany Tip

College: Fordham College at Rose Hill

Understanding the factors associated with sexual identity development and mental health outcomes in sexual minorities is becoming increasingly more important to addressing mental health disparities in LGBT individuals. Multiple models of sexual identity development identify young adulthood as an important period in which to study these factors. The Minority Stress Model has shown discrimination to be an important factor that affects ethnic racial minorities and sexual minorities alike. Previous literature on ethnic racial minorities illustrates the effects of ethnic racial identity exploration and commitment on mental health outcomes in the face of discrimination. To determine if sexual minority individuals fared in similar ways, the current study examined the associations between sexual identity exploration and commitment, sexual orientation, LGBT vicarious discrimination, and perceived stress in a sample of 64 college-age students. Participants were surveyed using the Measure of Sexual Identity Exploration and Commitment (MOSIEC), the LGBT Vicarious Discrimination Scale, and the Perceived Stress Scale. Results showed that sexual identity exploration exacerbated stress while commitment served a protective function, mirroring previous findings for ethnic racial identity. Results also echoed previous literature showing significantly more stress was experienced by sexual minority individuals than heterosexual participants. This research has implications for promoting healthy sexual identity development in young adults in order to prevent stress linked to sexual minority discrimination.

Abstract 101: A Phenomenological Evaluation of the Transition into College

Authors: Jason Dufour

Mentor: Tiffany Yip

College: Fordham College at Rose Hill

Many young adults make the transition into the college environment every year. However, the particular aspects that create strain on this already difficult transition is unclear. The current study utilizes the scaffolding of past work on this important transition to form a theoretical framework within the context of qualitative inquiry. By utilizing a phenomenological approach to examining the college transition, this study explores particular factors that may be salient to inducing stress in college students during their transition. It was determined that various social aspects relevant to this transition amongst two qualitatively different groups—commuters, residents—are involved in creating a more stressful, and thus more difficult, transition of freshmen in college. A third group, students of color, face unique challenges that have the potential to be a part of either of the two aforementioned groups. Future research should look to replicate the methodology of the current research, as well as use the rich qualitative context that this study provides as a theoretical framework to base future investigations off of.

Abstract 102: The Role of Dispositional Mindfulness: Effects of Mindfulness on Mental Health Outcomes

Authors: Isabella Tomei and Teresa Travnicek

Mentor: Tiffany Yip

College: Fordham College at Rose Hill

Mindfulness is an ancient Buddhist strategy that has become rapidly more popular in modern times, especially concerning its positive effects on mental health. Mindfulness can be defined as a present, gentle awareness of one's thoughts, emotions, feelings, bodily sensations, and nearby environment (Greater Good Science Center, 2017). Many studies suggest that mindfulness is associated with greater psychological wellbeing and can be utilized as a tool that can combat mental health distress such as rumination, depression, and anxiety (Hayes & Feldman, 2004). Additionally, mindfulness has been attributed to positive psychological effects such as increased subject wellbeing, emotional reactivity, and behavioral regulation (Keng, Smoski, & Robins, 2011). This present study will investigate whether dispositional mindfulness is a predictor of mental health outcomes for college freshmen, utilizing subjective scores from several mental health scales. 65 first-year undergraduates, in their first two weeks at college, completed the Mindful Attention Awareness Scale (Brown & Ryan, 2003), in addition to measures of Trait Anxiety (Spielberger, Gorsuch, & Lushene, 1970), Self-Esteem (Rosenberg, 1965), Perceived Stress Scale (Cohen et al., 1983), Center for Epidemiologic Studies Depression Scale (Eaton, Smith, Ybarra, & Muntaner, 2004), Ruminative Responses (Treyner, Gonzalez, & Nolen-Hoeksema, 2003), and Engagement and Disaffection with Learning (Furrer & Skinner, 2003). These scales were completed as a part of the Fordham University Sleep Study led by Dr. Yip. A linear regression will be conducted in order to statistically analyze the results to investigate whether dispositional mindfulness is a predictor of mental health outcomes.

Abstract 103: Using Neuropsychology and Neuroimaging to Investigate the Deterioration of the Serial Position Effect with Aging

Authors: Madison Shyer

Mentor: Molly Zimmerman

College: Fordham College at Rose Hill

Memory difficulties are commonly one of the first impairments in normal aging. This study investigates how established processes of memory are impacted by aging- specifically, how the Serial Position Effect

(SPE) is affected in healthy controls (HC), patients with Subjective Memory Complaints (SMC), Mild Cognitive Impairment (MCI) individuals, and Alzheimer's Disease (AD) patients. It was hypothesized that the SPE will be increasingly less prominent in individuals diagnosed with SMC, MCI, and will be significantly different between HC and MCI/AD in scores of the first and last trials of recall, relating to cortical thickness differences in regions of the brain corresponding to long-term memory. 175 participants divided into four diagnostic groups underwent neuropsychological examination and neuroimaging. Statistical analyses were included to depict the effect of cortical atrophy on delayed recall with SPE. Cortical thickness was measured and found statistically significant regions of cortical atrophy maps matched typical regions associated with AD, specifically in the precuneus. Results have been corrected for multiple comparison with false discovery rate (FDR). Neuropsych results were analyzed with the Kruskal-Wallis test and corrected with post-hoc pairwise comparisons. These tests found significant differences in cortical thickness and SPE between MCI and AD patients from HC in delayed recall with p-values of <0.05 , respectively. These combined methods could potentially play a future role in how memory processes are studied from a neurological and neuropsychological perspective as well as earlier, distinguishable diagnoses for various stages of dementia.

Abstract 104: The Relationship Between Sleep and Anxiety & Depressive Symptoms

Authors: Mira Bhattacharya

Mentor: Molly Zimmerman

College: Fordham College at Rose Hill

There is strong evidence that adults experience sleep-related issues that may be associated with elevated levels of anxiety and depression. This study seeks to examine the relationships between sleep, anxiety, and depression in primarily young adult college students ($N=178$). It was hypothesized that poorer sleep quality would be associated with elevated levels of anxiety and depressive symptoms. The Pittsburgh Sleep Quality Index (PSQI) was used to assess quality of sleep. The Beck Anxiety Inventory (BAI) was used to assess anxiety symptoms and the Beck Depression Inventory (BDI) was used to assess depressive symptoms. All of the variables of interest were normally distributed, thus parametric statistical methods were used to examine these relationships. Pearson's correlations were used to examine the relationship between the demographic variables and primary variables of interest to check for potential confounders. Linear regression revealed that both depression and anxiety symptoms were independent predictors of sleep quality. Depressive symptoms were a stronger predictor than anxiety for sleep quality, although both were strong predictors ($p<.05$). Results indicated that the BAI total scores and the BAI total scores accounted for 23.5% of the variance of PSQI global scores. BAI total scores were a positive and significant predictor of PSQI global scores ($r[172]=4.292, p<.05$). For every one-unit increase in the BAI total score, PSQI global scores were expected to increase by 0.163. BDI total scores were also a positive and significant predictor of PSQI global scores ($r[172]=2.382, p<.05$). For every one-unit increase in the BDI total score, PSQI global scores were expected to increase by 0.074. Results from this study will improve our knowledge of the complex relationships among sleep, depressive symptoms, and anxiety symptoms.

Abstract 105: The Effects of Alcohol on Verbal Episodic Memory in College Students

Authors: Julia Marsden

Mentor: Molly Zimmerman

College: Fordham College at Rose Hill

The consumption of alcohol among college students is not uncommon, and binge drinking is a prevalent issue among this population. According to the National Institute of Alcohol Abuse, at least 55% of college students ages 18-22 consume alcohol, with about a third of them engaging in binge drinking; the consumption of excessive amounts of alcohol in a short time period. High alcohol consumption in young

adults has been linked to neuropsychological effects, specifically in memory functioning. Past research has demonstrated some reduced left hippocampal volume and impaired hippocampal functioning in adolescents with binge drinking habits. Verbal episodic memory has been shown to be associated with the left hippocampus as well. Informed by these findings, the current study investigated the effects of alcohol consumption on verbal episodic memory in college students. To study this effect, a Modified Rey Auditory Verbal Learning Test (ModRey) was administered to participants during an initial lab visit, and alcohol consumption data was collected for each participant via survey. The ModRey involves a verbal list-learning task where participants are read a word list, and are asked to recall the words later after varying time delays. This ModRey was adapted to include an extended recall task two weeks later. The results of a Spearman's rho showed a significant negative correlation between weekend alcohol consumption levels and extended recall savings on the adapted ModRey ($r_s = -.254, p = .024$). These results suggest that higher alcohol consumption rates among college students may have detrimental effects on verbal episodic memory consolidation.

Sociology

Abstract 106: Investigating the Impact of Parasocial Relationships with Animals and Zookeepers on Learning Zoo and Conservation Messaging Found on "THE ZOO", a television docu-series

Authors: Lindsay Thomas

Mentor: Emily Rosenbaum

College: Fordham College at Rose Hill

Parasocial relationships form between a person and a media character – celebrities, newscasters, cartoon characters – without bidirectional reciprocation or direct communication. In the realm of conservation education, parasocial relationships can drastically influence how a wider audience interprets conservation messaging beyond zoos and aquariums by forging emotional connections with endangered species, which, in turn, can positively impact support for their preservation. Using "THE ZOO," a television docu-series featuring stories about the wildlife living at the Bronx Zoo, this research will investigate the impact of parasocial relationships developed between viewers and the docu-series' characters – animals and zookeepers. This research will use data gathered from a Qualtrics survey and data analysis using SPSS to evaluate the correlation between viewers' level of parasocial relationship and (1) pro-conservationist behavior, (2) connection to wildlife, and (3) ecological practices. Preliminary findings suggest that there is a strong link between parasocial behavior and pro-conservationist behavior, connection to wildlife, and ecological practices. However, future research should examine the behavioral differences contributing to viewers developing parasocial relationships with specific characters.

External Projects

Abstract 107: Control of Reward-Processing Behaviors in Mice: Role of Projection from Basolateral Amygdala to Nucleus Accumbens

Authors: Joseph Floeder

Mentor: Benjamin Samuels, Rutgers-New Brunswick, Psychology Department

College: Fordham College at Rose Hill

Reward-related deficits are a characteristic symptom of mood disorders, but they can be difficult to model in rodents. Common methods of investigating mood disorders rely heavily on negative valence behavioral tests that assess anxiety. Positive valence behavioral tests that evaluate reward processing, however, can provide stronger translational validity for mood disorders. The neural projection from the basolateral amygdala (BLA) to the nucleus accumbens (NAc) is involved in reward-related behaviors, but little is

known about how sustained stimulation of this pathway impacts reward processing. Here we used DREADD technology to constantly activate or inhibit the BLA-to-NAc pathway in mice during positive and negative valence behavioral testing. In the positive valence behavioral tests, activation of NAc-projecting BLA neurons had no significant effect while inactivation of those neurons impaired performance in the progressive ratio and sucrose preference tests. For the negative valence behavioral tests, which included novelty-suppressed feeding and open field, neither activation nor inhibition of the BLA-to-NAc pathway had a significant effect on performance. These results confirm that the neural pathway from the BLA to NAc plays a role in reward processing but not in anxiety response. Furthermore, the robust impairment in reward processing brought about by inactivating the BLA-to-NAc pathway may prove to be a useful experimental system in studying behaviors indicative of mood disorders.

Abstract 108: Elucidating the Role of Chaperone-Mediated Autophagy on Adult Neurogenesis in the Dentate Gyrus of Mice

Authors: Elizabeth Wood

Mentor: Tiago Goncalves, Albert Einstein College of Medicine, Neuroscience Department

College: Fordham College at Rose Hill

The present study identifies a novel role for chaperone-mediated autophagy (CMA) in the regulation of adult neurogenesis. Adult neurogenesis is a complex process in which neural stem cells proliferate, differentiate, mature, and integrate into the existing neural circuitry of the hippocampus. Adult born neurons are thought to facilitate memory encoding and context discrimination. The decline of neurogenesis, due to stress and age, is associated with cognitive impairment and neurodegeneration. Recently, the lysosomal autophagy pathway of protein degradation has been implicated in the regulation of adult neurogenesis. However, no one has previously assessed the specific role of chaperone-mediated autophagy. Chaperone mediated autophagy (CMA) is a selective cytosolic protein degradation mechanism that is important for cellular stress response and has a gradual decline with age. I provide evidence that CMA incompetence reduces the adult hippocampal neural stem cell (NSC) pool. Furthermore, CMA has a variable effect on adult-born neuron differentiation and dendrite morphology. These results elucidate a functional relationship between CMA and adult neurogenesis.

Abstract 109: NRF2 Activation by Aspirin Analogs of Various Structures

Authors: Eliot Kazakov

Mentor: Irina Gazaryan, New York Medical College, Department of Cell Biology and Anatomy

College: Fordham College at Rose Hill

Nuclear factor erythroid2-related factor 2 (Nrf2) is a leucine zipper transcription factor whose activation restores redox homeostasis and thus minimizes the harmful effects of oxidative stress. Activators of Nrf2 are shown to slow down aging and to reduce neurodegeneration. Since aspirin is also known to minimize neurodegenerative symptoms, the identification of aspirin analogs with the ability to activate Nrf2 would be of particular interest. In a collaborative effort with the Dept of Pharmacology, UIC, we tested their collection of 40 newly synthesized aspirin analogs in a cell-based Neh2-luc reporter system designed to screen for Nrf2 activators working via the stabilization of the Nrf2 protein. The majority of the active aspirin analogs had a pro-alkylating or a pro-oxidant motif in their structures and therefore showed toxicity at high concentrations. However, among the active compounds, we identified three with a structure resembling a known Nrf2 “displacement” activator whose mechanism of action had been proven by its crystallization into the Kelch domain of Keap1, an inhibitory partner of Nrf2 in the ubiquitin ligase complex. We compared the activation properties of the compounds and their docking into the Kelch domain, and based on docking scores, speculated that one of the mild activators, the newly identified Compound 9, is a likely Nrf2 “displacement” activator. Compound 9 can be used for future structural

optimization aimed at the development of new drug candidates for the treatment of neurodegenerative disorders.

Abstract 110: A Comparative Study of the Social Organization of Wild and Captive Golden Lion Tamarins

Authors: Kaitlin Schmoyer

Mentor: Erica Murrell, Philadelphia Zoo

College: Fordham College at Rose Hill

Zoos globally must take the social organization of all species into consideration when creating successful species-specific exhibitions. Research has shown that in the wild, the social structure of Golden Lion Tamarins consists of a breeding pair and their offspring until sexual maturity is reached. This study aims to determine the social interactions of two unrelated and nonbreeding Golden Lion Tamarins living in captivity at the Philadelphia Zoo. Because the individuals are neither related nor breeding, the nature of their partnership deviates from what is expected of Golden Lion Tamarins in the wild. The behaviors of these two individuals were observed for ten different general categories of behaviors to determine how the two individuals interact given the nature of their relationship as companions. Analysis of the results indicates that compared with the literature, these 2 companion individuals interacted less than has been observed in the wild. This suggests that animals that are not related or breeding can be expected to display a lower level of social interactivity in the captive setting. Further research is needed to identify if this lack of social interaction between unrelated and nonbreeding Golden Lion Tamarins in captivity has significant consequences for their well-being, given that in the wild they are gregarious and depend on the cooperativity of social living.