

2023

Research and Idea Symposium

Newcomb-Tulane
College



Introduction

The 2023 Newcomb-Tulane College (NTC) Research & Idea Symposium represents the second joint poster session by the Office of Undergraduate Research and Center for Academic Equity. The symposium highlights the summer research and experiences of 75 NTC students. NTC provided more than \$150,000 in grant funding to support the unique and ambitious projects on display today.

Students from each of the five schools that make up NTC are included in the symposium. Projects include inquiries in hygiene to prevent zoonotic diseases, the political influence of China in Peru, the influence of far right extremism in American elections, and so much more.

Many of the research experiences occurred on the Tulane campus, but some students traveled as far as Philippines, Ecuador, and Greece to complete their projects. Finally, this work would not be possible without the time and resources NTC faculty members devote to mentoring our students.

To learn more about opportunities for undergraduate research and experiences at Tulane, please contact the Office of Undergraduate Research or the Center for Academic Equity.

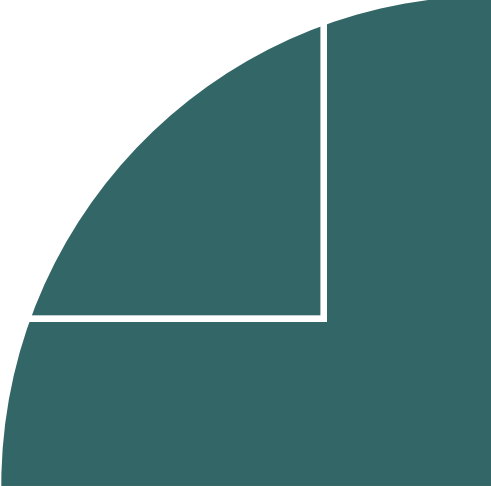


Table of Contents

5	Cece Acosta	31	Caitlin Fong
6	Jordyn Addison	32	Karson Franjeh
7	Thamidul Alam	33	Marneisha Gilmore
8	Abryana Alvarado	34	Ursula Girdwood
9	Yuanelis Baez	35	Morgan Gitlitz
10	Alejandro Bailey	36	Annabelle Harris
11	Bacilio Benelalija	37	Danna Hirshberg
12	Ayanna Boateng	38	Rin Hu
13	Averi Bogucki	39	Dalisia Hughes
14	Ysabelle Broderson	40	Camryn Jenkins
15	Owen Brown	41	Maggie Johnson
16	Allan Buezo	42	Kaitlyn Juneau
17	Madison Burnstein	43	Rhys Karasavidis
18	Catie Mae Carey	44	Jasmine Kiley
19	Sophie Casto	45	Autumn Kranz
20	Saul Chavez	46	Aaron Lever
21	Callie Rose Chenevert	47	Gabby Levine
22	Arianna Chisum	48	David Li
23	Eshan Damle	49	Stacey Li
24	Sedonia Davis	50	Mary Lorino
25	Alyse Diamond / Claire Callahan	51	Erin Lynskey
26	Rachel Elias	52	Madeline Magruder
27	Natalie Eng	53	Tiara McGuire
28	Megan Ezell	54	Hubert Mendez / Evelyn Howard
29	Annabelle Falconer	55	Kevin Miao
30	Arielle Flaks	56	Maggie Millar

Table of Contents

57	Skylar Morgan
58	Paige Mosley
59	Charlize Nguyen
60	Aim Niamnud
61	Jase North
62	Olulabomi Osikoya
63	JP Ott
64	Syna Pal
65	Layla Reese
66	Meredith Rosenberg / Michael Yang
67	Didi Ross
68	Maxwell Rubin
69	Molly Shields
70	Anna Sloan
71	Adhithi Sreenivasan
72	Paul Stolin
73	Siena Szeto
74	Laney Tellegen
75	Sarah Thomas
76	Maya Tilley
77	Emilia Wilke
78	Zoe Yates
79	Iker Rafael Yturralde
80	Irene Yu



CECE ACOSTA

she/they

ASSESSING CATERPILLAR PREDATION IN A REFORESTATION SITE

In this project I examine the role and scope of insectivory (predation on insects) within neotropical rainforest regeneration sites undergoing the early stages of applied nucleation, an experimental reforestation technique. I aim to understand the effects of applied nucleation on insectivory, as compared to natural forest regeneration, in a recently-established reforestation project in the Ecuadorian Chocó. My investigation provides a preliminary assessment of predation pressure on insects at the study site, so that future iterations of this study may use the data as a baseline in order to examine changes in insect predation over time. These comparisons' purpose is twofold: first, they will gauge the capacity of 8 different applied nucleation treatments, which are specific to the local context, to emulate natural forest regeneration in terms of species interactions; second, they will add to the broader understanding of the role that top-down ecosystem controls play in forest succession. By characterizing applied nucleation in terms of insectivory, we can better predict the impacts of this contemporary reforestation technique as it's implemented at a global scale.



JORDYN ADDISON

she/her

SAKS FIFTH AVENUE'S INTERNSHIP

This summer, I had the incredible opportunity to serve as an Imaging and Print Production Intern at Saks Fifth Avenue in the bustling heart of New York City. The primary objective of my internship was to immerse myself in both the creative and business facets of a leading luxury fashion corporation. Over the course of my internship journey, I collaborated closely with various teams in the creative department, including Art direction, Graphic design, Editorial fashion direction, while my role was specific to the Print production and Imaging teams. Among the exciting projects I had the privilege to contribute to was the development of SAM, Saks' cutting-edge data asset management AI software. SAM serves as the central hub for organizing and efficiently managing all creative assets, streamlining digital content and resources essential for our creative endeavors. This work was central to my gained overarching understanding of the expansive opportunities in the creative field that I was not exposed to prior.



THAMIDUL ALAM

he/him

FADOK LAB, TULANE

Traumatic experiences can have lasting effects on mental health, such as the development of post-traumatic stress disorder (PTSD). Those with PTSD exhibit a distinct inability to extinguish trauma-associated fear memories, resulting in maladaptive defensive responses. Using a Pavlovian fear conditioning paradigm employing a serial compound stimulus (SCS) consisting of tone and white noise (WN) segments, we have previously found roles for corticotropin-releasing factor (CRF) and somatostatin (SOM)-positive neuron populations within the central amygdala (CEA) in directing cue-specific fear response behaviors. We also found that defensive responses to both tone and WN change after fear extinction sessions. Through this project, we aim to explore and elucidate how the CEA mediates changes in defensive behaviors over extinction. We will use optogenetics to activate or inhibit CRF+ and SOM+ neuron populations within the CEA during fear extinction to explore how they affect complex fear extinction profiles. We will also explore the role of the pathway between the ventral hippocampus (vHPC) and the CEA in gating cue-dependent behavioral switching across extinction by using optogenetic stimulation and inhibition of vHPC terminals in the CEA during WN presentation within extinction. Through completing this project, we expect to identify and confirm cell- and pathway-specific control mechanisms that drive behavioral transitions within our SCS paradigm. We expect this research to give us greater insight into how defensive behavior is mediated by CEA-dependent neuronal dynamics. By understanding how fear memory and fear extinction can be modulated, new targets for disorders of fear learning can be identified.



ABRYANA ALVARADO

EDI SUMMER RESEARCH INSTITUTE, NTC

Youth incarceration rates have gone down in the last 5 years because of restorative justice efforts being offered to youth offenders. Unfortunately, these efforts of justice are not as regularly granted to Youths of Color in comparison to their White counterparts as a result of psychological and sociological biases in reference to those involved in youth of color's cases in the United States. The current Juvenile Justice System specifically targets youth of color through the upholding of the Youth Control Complex coined by Rios. We have seen this clearly in the state of Louisiana as in the last year there were children transported to be held at the Louisiana State Penitentiary's former death row. Majority of these children are Black males. These youth are still over-represented in the Juvenile Justice System, specifically in those incarcerated since they are less likely to be granted a restorative justice path due to racial inequities and prejudice within the Juvenile Justice System. In this project, I will highlight the sociological and psychological traits of both the adults working for the system, and the developmental psychology and sociological attributes of the Youths of color becoming part of the system from the lack of restorative justice purposefully being offered to Youths of color.



YUANELIS BAEZ

she/her

CHRISTIAN SAUCE LAW FIRM

It is important to me as a U.S. born child of immigrant parents to be able to better understand the struggles immigrants face when trying to get into the United States. To gain more experience on this topic, over the summer I worked with the Christian Sauce Law Firm under Lilian Maldonado to assist her in her role as an Immigration Paralegal in Gretna, Louisiana. I analyzed legal documents that specifically pertained to the different steps needed to gain citizenship and met with various clients to better understand their story. In my poster presentation. Through this experience, I was able to better understand the processes and lengths immigrants have to go through to gain U.S. citizenship. I also gained a better understanding of the harsh realities people face while going through the immigration process by working on their cases. I also was able to broaden my humanitarian approach towards different cultures, understand the impact that different events and moments have on others, and advocate social and legal justice for those in need. I would like to share the different ways that others can come into the United States, the success rate and common failures associated with the process, and extinguish common misconceptions about the immigration process that others may have.



ALEJANDRO BAILEY

he/him

OSA SUMMER IN PANAMA PROGRAM

As the son of a Panamanian, going to Panama was essential to understanding myself as a person and understanding why Panama means so much to my family. Through traversing a rainforest where I encountered a poisonous snake up-close and personal, the invaluable experience I gained in speaking Spanish, being exposed to the beautiful natural sights of Panama, going to visit family members, and learning about Panamanian culture, Panama changed my life. Before this trip, I struggled with my Spanish and never labeled myself as a Hispanic male because I wasn't brought up with traditional Hispanic culture or upbringing.. Instead of having Spanish dishes at home, I had New Orleanian cuisine. Instead of speaking Spanish at home, the only Spanish words I came to know were sit down. So although, by heritage, I am Hispanic, I felt I could never claim it due to my lack of immersion in my heritage. Through this program, however, I feel I am finally able to call myself Hispanic and thus, I gained a new identity.



BACILIO BENELALIJA

he/him

Public Health

IDENTIFYING EXPRESSION PATTERNS OF GENES MECP2 AND FOXG1 IN THE ZEBRA FINCH SONGBIRD NEURAL SONG NETWORK

Mutations to several genes, including methyl CpG binding protein 2 (MeCP2) and Forkhead box G1 (FOXG1), have been implicated in hindering the language or speech learning process in humans. In humans, FOXG1 acts as a transcription factor that regulates numerous downstream genes involved in early brain development. Mutations to this gene can lead to FOXG1 syndrome, characterized by physical and cognitive difficulties in addition to language or speech impairment. Likewise, the MeCP2 gene has been shown to have a role in transcription repression in response to epigenetic biomarkers, but was also implicated in impacting speech/language development due to its association with Rett (RTT) Syndrome. Approximately 90% of RTT syndrome patients have mutations to the gene MeCP2, and often present with impaired language and speech development. Although our understanding of how MeCP2 and FOXG1 directly impact vocal development is incomplete, both of these genes have been heavily connected to speech and language progression and are ideal targets for further inquisition.

We hypothesized that FOXG1 expression would be concentrated in the song nuclei regions of the brain. Similarly, given its connection to speech and language development, we expect MeCP2 will see similarly concentrated expression patterns in the sing circuit. Furthermore, it is expected that the expression of these genes will be developmentally regulated with notable fluctuations between the juvenile and adult life stages in Zebra Finches. To test this, we collected zebra finch brains at four different time points (30 days, 45 days, 60 days, and adulthood), and performed immunohistochemistry to visualize gene expression.



AYANNA BOATENG

she/her

OSA SUMMER IN PARIS PROGRAM

During the summer, I had the privilege of participating in Tulane University's study abroad program in Paris, France. This experience was dedicated to exploring the profound impacts of French colonialism on the political, social, and economic trajectories of the Francophone world. Throughout the program, I engaged in a series of courses and had the privilege of conversing with influential figures, including representatives from UNESCO and visits to migrant museums. These experiences improved my ability to understand the complex relationship between societal structures and disparities within criminal justice, education, and healthcare systems. The Paris, France Tulane study abroad program enriched my academic understanding and instilled in me the value of empathy, cultural sensitivity, and collaboration when pursuing my mission of prison reform on a global scale.



AVERI BOGUCKI

she/her

International Relations and Legal Studies in Business

HOW CHINA HAS INCREASED ITS SOFT POWER IN PERU

In recent years, there has been no doubt that China has been making bold strategical moves and power plays across Latin America. As China has grown in economic prowess, so has its influence in Latin America, especially in the country of Peru. Peru has become a beacon for Chinese growth, making it one of China's most important allies in Latin America.

Skillfully, China has managed to outmaneuver firmly established nation-states like the United States and gain more soft power in Peru. By using different investment strategies, heightening trade, and embracing its inherent cultural ties with Peru, China has been able to gain valuable influence in one of Latin America's biggest countries. Even though China has run into problems into its quest for influence, their three-pronged strategy has worked well in a 21st century Peru.



YSABELLE BRODERSON

she/her

Public Health and Cellular & Molecular Biology

THE ASSOCIATION BETWEEN TRYPANOSOMA CRUZI GENETIC INTERACTIONS AND CONGENITAL CHAGAS DISEASE

Chagas disease (CD), caused by the parasite *Trypanosoma cruzi* (*T. cruzi*), is a significant global health problem that has been dangerously overlooked and stigmatized. Effective vector controls appeared to impede the transmission of CD, but congenital cases of Chagas have posed a new threat to public health. Approximately one to ten percent of newborns of *T. cruzi* afflicted people are born with Chagas disease. Furthermore, studies have linked specific *T. cruzi* strains to an increased likelihood of congenital transmission of the parasite, which detrimentally affects maternal health and the quality of life of newborns. This project will detect any haplotypes found in paired cord blood and maternal blood samples and assess the similarity of their nucleotide sequences through next-generation sequence analysis in order to elucidate the associations between haplotypic interactions and congenital transmission of disease.



OWEN BROWN

he/him

FADOK LAB, TULANE

Post-traumatic stress disorder, or PTSD, affects around 5% of the U.S. population each year, and more than a third of these cases are considered severe. Previous research indicates that hyperarousal symptoms of PTSD may be caused by a dysregulation of noradrenergic signaling, but noradrenergic drugs have had limited therapeutic effects. We hypothesize that traumatized individuals experience increased neuronal activation and/or altered glial function in the Nucleus of the Solitary Tract (NTS), a major noradrenergic nucleus located in the brainstem. In this project, I used immunohistochemistry to quantify the expression of c-Fos, a protein that is expressed in highly active neurons, and IBA1, an indicator of morphological changes in microglia associated with stress-induced inflammation. I stained and imaged both control groups and groups of transgenic mice that underwent the Traumatic Experience with Reminders of Stress (TERS) behavioral paradigm. The data I collected suggests that the NTS increases noradrenaline production and microglia undergo morphological changes after reminders of traumatic experiences.



ALLAN BUEZO

he/him

CM MARKETING

This summer I had the privilege to work for Chris Mitchell and CM Marketing remotely to help further my experience in social media marketing as well as research and data analysis. CM Marketing specializes in social media management, data analysis and research, and providing creative services such as logo design and color palette selection for businesses in the surrounding area.

During the eleven weeks that I worked with Chris Mitchell, I first trained to use many creative programs as well as research-based programs that allowed me to further understand common trends and what content performs well on separate platforms. My training consisted of using different marketing model frameworks to create consumer pitches for a few of the existing clients. Through researching and analyzing different social media platforms' data, I was tasked with choosing platforms that would fit our client's plans and then implementing a plan to start the campaigns.

My largest project was creating social media posts for the Long Beach Young Professionals to raise awareness for events and inform the public. Through working with CM Marketing, I learned valuable real-life skills that pertain to the field I would one day want to enter.



MADISON BURNSTEIN

she/her

CHILD FAMILY HEALTH INTERNATIONAL, GLOBAL HEALTH

This summer I traveled to the Philippines for a month. For a week, I was guided by three local doctors and walked through different types of health facilities (Rural/Urban) in Manila, San Juan Il, and Ternate Cavite. Then, I job-shadowed a Rural Health Physician in Tingloy Batangas, for three weeks. My goal was to be introduced to rural/community medicine and to see if this is a field, I want to work in for my future career endeavors. Within these facilities, I interacted and conversed with the staff to learn about their opinions towards their healthcare system and asked how they think their system works. What changes are needed? Why is community medicine needed? What is community medicine's role? Furthermore, I would observe around me, journal based on what I saw, and then reflect on my goal. This experience has taught me how vital community health is for a beneficial healthcare system. This experience has solidified my desire to be a part of community medicine as I am currently a pre-medical student studying public health, and it demonstrates that I can take my two interests and mold them into a career that needs emphasis in both areas.



CATIE MAE CAREY

she/her

Latin American Studies and Management

UNVEILING THE PAST, UNDERSTANDING THE PRESENT: EXPLORING PORTUGUESE COLONIALISM AND CONTEMPORARY ANTI-RACIST MOVEMENTS IN PORTUGAL

This report summarizes a two-week research project conducted in mainland Portugal and the Azores in May 2023. It explores the history of Portuguese colonialism and the current anti-racist movements. The research reveals a contested narrative of Portuguese colonial history and ongoing racial disparities in the country.

The project started in Porto, where a tour unveiled how Portugal portrays its colonial history through art and monuments. The "benevolent colonizer" narrative was evident, strategically used to promote tourism. Coimbra and Lisbon provided the main research hubs. Meetings with experts, including Professor Pedro Cardim and SOS Racismo activists, highlighted efforts to challenge prevailing narratives and address racial discrimination.

The report concludes that Portugal's national pride often obscures its colonial history, but a more critical perspective is emerging. This project broadened my understanding of how former colonial powers perceive their history, differing from narratives in former colonies like Brazil. The report underscores the importance of ongoing engagement with individuals and organizations involved in the research.



SOPHIE CASTO

she/her

CIEE: VISUAL ALPHA

This past summer I completed an internship at Visual Alpha, a fintech startup in Tokyo, Japan with the goal of learning about global finance and Japanese culture. At Visual Alpha, I published a comparative research paper, constructed a database of emerging managers, and assisted in website development for Tokyo's Asset Management Forum. During my time off work, I traveled around Japan and East Asia where I interacted with locals, collaborated with schoolchildren, and explored Asia's ruins, beaches, caves, and trails.

The Japanese's kindness and tranquility shaped the way I think about culture. Being a minority in a homogeneous country like Japan gave me a newfound perspective on the world.

It made me realize that I, too, have an American identity attributed to me by others. After eight busy weeks, I returned home with a stronger understanding of collectivism, a greater appreciation for U.S. diversity, and gratitude for Earth's beauty. My experience abroad expanded my global perspective, allowed me to professionally develop, and helped me discover what it means to have an identity.



SAUL CHAVEZ

he/him

EDI SUMMER RESEARCH INSTITUTE, NTC

This Summer I participated in the EDI Research Institute organized by Dr. Ray Proctor. The goal of this experience was to explore the aspects of how racism impacts our modern world, what Equity, Diversity and Inclusion means and how it affects our respective professional fields. We shared discussions with professors and professionals such as Dr. Sonia Malhorta from the Louisiana Children’s Medical Center, who spoke to us about the hold race in the healthcare industry, and visited scenic locations such as the Whitney Plantation or the Studio B art gallery. I was able to figure out the topic I wanted to learn more about and conduct my research in. Since the inception of this country, minorities have suffered from the weight of discrimination and bias upon them. This is especially true when it comes to the healthcare system in the United States. As a result, the trust from minority communities towards healthcare institutions of this country has greatly diminished, which has led to underrepresentation in clinical trials and hinders health access to minorities in the country.



CALLIE ROSE CHENEVERT

she/her

Environmental Biology

HOW PALM TREE COMMUNITIES INFLUENCE FRUGIVORY

Seed dispersal is an important process that allows seedlings to grow away from their parental plant to avoid competition, disease, and predation (Griz & Machado 2001). However, it is not fully understood how fruiting communities influence the rate of seed removal. While a large area of fruiting trees may attract more frugivores, each specific tree has a lower likelihood of being selected as the food source. Conversely, one fruiting tree may not attract many animals, but the few frugivores that do pass by will only remove fruit from this tree, guaranteeing that the seeds disperse. Additionally, the nutrients that the fruit offer the frugivores will likely factor into their decision to eat fruit from a specific tree. Fruits dispersed primarily by birds are usually richer in lipids and have a high water and sugar content (Lei et al. 2021). There are visual cues such as color, smell, and size that can inform frugivores about a fruit's nutrition (Lei et al. 2021). The objective of this study is to compare how neighborhood fruiting density and individual fruit metrics, such as fruit size and water weight, influence frugivores' choices between two understory palm species in Ecuador. Preliminary results find no clear association between frugivore visit rates and seed removal rates per frugivore species and between palm species. Additionally, there seems to be a positive correlation between fruit size and water weight between the palm species.



ARIANNA CHISUM

she/her

HOW PALM TREE COMMUNITIES INFLUENCE FRUGIVORY

Dendrimers are a species of branched, highly ordered synthetic macromolecules. They are characterized by their high degree of functionality and their monodispersed nature. Previous work in the Grayson group has confirmed that bis-MPA based polyhydroxy dendrimers, hyperbranched polymers, and linear dendronized polymers have shown extremely high dielectric constants. However, the generation two dendrimer has the highest dielectric constants of a polymer. The synthesis of another polyhydroxy dendrimer can also be achieved through the synthesis of these polyhydroxy dendrimers can be achieved through dithiol-yne “click chemistry.” By employing a six-armed alkyne functionalized core and a trihydroxy-functional thiol monomer, the objective is to exponentially increase each generation by a factor of six, whereas traditional dendronizations are typically limited to a factor of 2 or 3, all while minimizing the hydrodynamic radius of the dendrimer by limiting the number of atoms between each generation. This iterative growth approach enables precise manipulation of the dendrimer’s size and functionality, rendering it a highly promising candidate for diverse applications in nanotechnology and drug delivery systems. The starting materials, synthesized monomers, and dendronized products were characterized by ^1H and ^{13}C nuclear magnetic resonance (NMR), gel permeation chromatography (GPC), and matrix-assisted laser desorption/ionization – time-of-flight mass spectrometry (MALDI-TOF MS).



ESHAN DAMLE

he/him

TULANE BRAIN INSTITUTE

The topic for this poster is the modulation of microglial activation in-vitro, with emphasis on attenuating the response of immortalized BV-2 microglia to SARS-CoV-2 spike protein insult. This investigation aims to evaluate whether microglial activation can be modulated and if such modulation can reduce the production of pro-inflammatory cytokines and other activation-associated markers. Exploring this link could establish microglia as a therapeutic target for the prevention of chronic symptoms believed to be the result of neuroinflammation as part of the post-acute sequelae of SARS-CoV-2 infection (PASC), otherwise known as “Long-COVID”. This poster will discuss the experimental methods that will comprise the basis for my forthcoming Honors Thesis.



SEDONIA DAVIS

she/her

TULANE BRAIN INSTITUTE

This paper explores mice lacking primary cilia in corticotropin-releasing hormone (CRH) neurons and the effect on the stress response to better understand molecular mechanisms between glucocorticoids and primary cilia. There is limited research on the influence of defective primary cilia and behavior despite clinical findings of disorders in humans called “ciliopathies” resulting from mutations in primary cilia across varied cell types. These mutations lead to deficits in vision, intellectual defects, and obesity. Understanding glucocorticoid mechanisms in primary cilia can be useful in clinical applications, especially chronic stress and feeding behaviors. To investigate this, the project aims to evaluate the hypothesis that primary cilia are necessary for rapid negative feedback of the hypothalamic-pituitary-adrenal axis and stress-induced feeding. This was done by performing a stress paradigm on CRH-Cre mice either having or lacking primary cilia in CRH neurons, with an added high-fat diet (HFD.) Blood samples containing corticotropin, a glucocorticoid, were collected, and post-fixation of brain tissue was analyzed to determine changes in cell activity using the marker C-fos. Current findings show increased CRH and decreased body weight amongst mice mutants lacking primary cilia compared to controls, indicating a potentially crucial role of primary cilia in the stress response. This project is ongoing as the results of C-fos expression are being quantized.

ALYSE DIAMOND / CLAIRE CALLAHAN

she/her | she/her

Cellular & Molecular Biology | Cellular & Molecular Biology and Design

USING PARENTERAL COMBINATION ADJUVANTS TO INDUCE MUCOSAL IMMUNITY AGAINST CHLAMYDIA MURIDARUM

Mucosal surfaces are the first point of entry for most pathogens, making them vulnerable barriers. Chlamydia is the most common non-viral sexually transmitted infection, with no current vaccine, and increasing antibiotic resistance there is an increasing need for a new vaccine. The most efficient way to induce protective immunity would be to immunize mucosally, e.g., intravaginally; however, vaccine hesitancy and other logistical issues make this route unlikely. Current vaccines are administered parenterally (mostly intramuscularly), but these vaccines struggle to elicit robust mucosal protection. One way to tailor responses is inclusion of an adjuvant, which can enhance the strength and durability of the immune response, and potentially induce mucosal homing. Prior work in our lab has shown that intradermal administration of the adjuvant double mutant heat labile toxin (dmLT) can target T and B cells to mucosal tissues. Additionally, we have shown that bacterial outer membrane vesicles (OMVs) can stimulate both cellular (CD4 and CD8) and humoral immune responses. With this knowledge, we tested whether intradermal administration of OMVs and dmLT combined could induce an increase in antigen specific T cells. We found that intradermally delivered dmLT induced a potent T cell response in the FRT. Additionally, while we observed that each adjuvant alone induced an antigen specific response, the combination was much more robust. Based on these results, we hypothesize that intradermal immunization with this adjuvant combination will drive antigen specific T cells to the FRT and protect against Chlamydia infection. Current work is testing this possibility.



RACHEL ELIAS

LUCIDITY SYSTEMS

I spent this summer interning as a Research & Development Engineer at Lucidity Systems just outside of Charlotte, NC. Over my eight weeks at Lucidity, I had the opportunity to experience the workflow of a start-up which provided me with exposure to every department at the company. Lucidity specializes in innovating chemical analysis equipment, and while I was learning more about their products, I helped produce fun and entertaining marketing videos and product tutorials. While my focus was working with the research and development team, I was also included in client interfacing, marketing, and manufacturing endeavors. From the research and development team, I learned about how to move through each step of the design process while keeping in mind the company's main objective of tailoring their products to be low-cost, to have a small carbon footprint, and be easily maintained by customers. With the help of my team, I honed my CAD skills using Fusion360, as well as dimension tolerancing, and using personal CNC mills for prototyping. Through my internship at Lucidity, I gained invaluable knowledge about product development in the industry setting and I intend to carry my experiences with me through my career journey after graduating.



NATALIE ENG

she/her

Neuroscience

THE USE OF RETINAL IMAGING (RI) AS A TOOL FOR IDENTIFYING BIOMARKERS OF VASCULAR HEALTH AND DISEASE IN A COMMUNITY EXPOSED TO EBOLA

Exposure to Ebola virus disease (EVD) prompted lasting health outcomes for communities exposed. These outcomes include cardiovascular disease, hypertension, and cognitive/ocular disorders to name a few. To assess outcomes of youth that were exposed to Ebola or youth that lost a parent to Ebola in Sierra Leone, retinal imaging (RI) was implemented to allow the capture of vessel diameters and quantify the ratio of arteries and veins present within the retina. To obtain these images, we separated participants into three groups – infected, affected, and control/comparison. 258 retinal images were taken in different districts (urban and rural) in Sierra Leone, 151 on a handheld camera and 107 on a camera that was on a tabletop. These devices photographed the back of the eye, showing the microvasculature going into the optic disk and the macula. In this ongoing study, these images are being analyzed using the MONA REVA analysis software, on which the vasculature can be mapped, the diameter of the vessels can be measured, and arteries and veins can be differentiated. We will be comparing the output data from the images to physical health data we collected and looking for significant differences between the three groups in the outputs from the images as well as in comparisons to the health data. Furthermore, we will be comparing the outputs from the handheld and tabletop images that were taken on the same participant. This will give us an idea of the reliability of handheld imaging devices as a tool in retinal imaging.



MEGAN EZELL

she/her

Art History

INTERNSHIP WITH THE REGISTRAR AT A LOUISIANA STATE MUSEUM COLLECTIONS FACILITY

In the spring of 2023, I began an internship at one of the Louisiana State Museum's collection facilities, the one that specifically hold's much of the museum's visual arts collection. My time with the LSM revolved around me gaining meaningful experience in the art world, most especially conservation, a field I want to make my career in. I worked mainly updating the museum's collection in the Smithsonian's Inventories of American Art, but also spent lots of time learning about conservation from people in the field in and around New Orleans.



ANNABELLE FALCONER

she/her

CENTER FOR PUBLIC SERVICE TULANE HIMALAYAN EXPERIENCE

Against the backdrop of the Himalayas in North India, local Indian and Tibetan communities aim to cultivate life by promoting non-violent activism and environmental preservation and embrace principles of compassion and wisdom as taught in Buddhist philosophy. Through the Center for Public Service’s summer in India program, I had the opportunity to work with local NGOs committed to these values.

Learning from a local organization working towards sustainable waste disposal in the region, I gained an enhanced understanding of what grassroots organizing and activism can look like. I also explored the concept of “learning service” while volunteering for a local institute developing a zero-waste system and an organic farm working to preserve biodiversity. In addition, having complex conversations with Tibetan refugees and Buddhist monks while serving as a language-learning partner provided me with important insight into how different religions, cultures, and politics can impact individual livelihoods and community organizing.

Finally, I further developed my understanding of Buddhist philosophy, and what I learned challenged me to think critically about the values held up in my own communities at home and how they differ from what I observed while abroad. The lessons learned during my time abroad deeply resonated with me as I returned home and back to Tulane. I hope to share these ideas and stories with others with an aim to expand perspectives and foster growth within our communities.



ARIELLE FLAKS

she/her

Cellular & Molecular Biology

BACTERIAL BIOFILM KINETICS

In nature, microorganisms will most often be found living in communities rather than as individual organisms. While bacteria can exist individually, they tend to associate together to form a biofilm, a community of microorganisms encased in an extracellular matrix and often attached to a surface. The formation of biofilms provides the microorganisms with various survival advantages including resistance to antimicrobial agents and immune defenses, promotion of cell communication and gene transfer, as well as accumulation of nutrients. While biofilms provide advantages to the microorganisms that live within, they can pose a threat to human health. Biofilm-related infections can be increasingly harmful as the protective matrix component promotes antibiotic resistance, making these microbial communities very difficult to treat.



CAITLIN FONG

she/her

BACTERIAL BIOFILM KINETICS

This past summer, I interned in the U.S. House of Representatives with the primary goals of developing my professional skills, expanding my professional network, and learning the ins and outs of navigating a workplace setting that Asian Americans have not historically had a place in. My experience was supported by the Asian Pacific American Institute of Congressional Studies, which is the non-profit branch of the Congressional Asian Pacific American Caucus. I was placed in Congressman Ami Bera's office, where I was tasked with leading constituent tours, responding to constituent letters, reviewing press clips, authoring memorandums, and attending briefings and hearings on behalf of legislative staff.

Congressman Bera is on the House Committee on Foreign Affairs and the Subcommittee on the Indo-Pacific, so a majority of my work focused on these topics. Outside of the office, I was able to participate in a vast array of networking opportunities with accomplished Asian Americans across the public service field.



KARSON FRANJIEH

he/him

OSA SUMMER IN STOCKHOLM PROGRAM

Throughout my summer experience in Stockholm, my goal was to immerse myself in Swedish culture while adapting to a new way of life. Through cultural experiences, technological advancements, trust within the government, and education from an early age, I began to understand why Sweden is one of the safest countries in the world. During my time in Stockholm, I participated in Midsummer, a Swedish tradition celebrating the longest day of the year. During this holiday, I danced around the maypole while learning local Swedish songs and dances. Additionally, I attended a Swedish culture talk to learn about the history and culture of Sweden, spoke with sexual health educators, went to the Abba Museum, and traveled to the Swedish countryside to spot Moose. All these experiences showed me why Swedes are so prideful in their country and its traditions. While this experience opened my eyes to a new way of living, it also allowed me to fully appreciate the vast cultural significances that are portrayed throughout the world.



MARNEISHA GILMORE

she/her

OSA DOMINICAN REPUBLIC SUMMER PROGRAM

This past summer, I had the opportunity to study abroad in the Dominican Republic thanks to the Africana studies department and the Center for Academic Equity for making this dream become reality for me. With my great grandmother being part Dominican and Haitian, this trip was very important for me to find out my family's history. I began getting immersed into my Dominican heritage by staying with a host family. While in the country we had both Dominican and Haitian speakers who talked about the worsening social climate of the two countries due to their identities. I was able to physically see some of the disparities in which the people of Haiti struggle with more than their Dominican counterparts. During my great grandmother's time, the social climate wasn't as bad but as years went on, being connected to Haiti became social suicide, the Dominican Republic makes this distinction clear by even saying, those of African decent aren't Black. The people on the Island of Hispaniola identify with their nationality as their race. There is no Black or White only Dominican and Haitian. I learned so much about how the world's view of Haiti has impacted the people and the country's reputation. This once powerful Black nation was brought down by being blackballed. Now when people think of Haiti, negative views of it are displayed as poverty, violence, and horrific natural disasters. Overall, this experience has helped me understand part of my identity, family's roots, and the struggles of which they've gone through to make this family's bloodline continue.



URSULA GIRDWOOD

she/her

LSU STUDENT UNDERGRADUATE NEUROSCIENCE PROGRAM

This project investigates very-long-chain polyunsaturated fatty acids (VLC-PUFAs) as potential neuroprotective agents for neurological diseases. It focuses on identifying the sources of VLC-PUFAs, essential for producing neuroprotective lipid mediators called elovanooids (ELVs). The research I conducted involves isolating organelles (mitochondria, nuclei, and synaptosomes) from rat brain tissue using specialized methods and verifying the success of isolation through western blot analysis. Lipid extraction, hydrolysis, and UPLC-MS/MS analysis were employed to quantify VLC-PUFAs, revealing higher levels of specific n-3 VLC-PUFAs in mitochondria and synaptosomes compared to the nuclear fraction. Further validation and analysis of synaptosomal fractions are ongoing. Future research plans involve extending these protocols to rats with middle cerebral artery occlusion (MCAo) to explore potential VLC-PUFA loss in organelles post-ischemic injury. This study promises insights into the role of VLC-PUFAs during cellular stress and may uncover the origins of VLC-PUFAs responsible for generating neuroprotective lipid mediators like ELVs.



MORGAN GITLITZ

she/her

Cellular & Molecular Biology

VASCULAR IMPLICATIONS OF EXOGENOUS ESTROGENS IN TRANSGENDER WOMEN UNDERGOING GENDER AFFIRMING HORMONE THERAPIES

There is a consistent relationship between the decrease of primary sex hormones and the development of cardiovascular complications like heart attack, cardiovascular disease, and stroke. Cardiovascular outcomes are also worse for patients undergoing gender-affirming hormone therapies, with a 3-fold increase in cardiovascular complications in transgender women when compared with transgender men or cisgender patients. This data was supported using a male-to-female mouse model in our laboratory, where we found that testosterone treatment increased arterial stiffness. Therefore, the current investigation seeks to understand the impact of testosterone loss in biological males, and whether administration of exogenous estrogens mitigate its vascular impact. We will use in vivo mouse models to simulate these hormonal changes and measure arterial stiffness as the primary outcome. We hope to provide information that can be used to optimize cardiovascular outcomes in patients undergoing gender transitioning, menopause/andropause, or other treatments that impact endogenous hormone levels.



ANNABELLE HARRIS

she/they

UNDERWATER ARCHAEOLOGY FIELD SCHOOL IN THE BLACK SEA AND NOMAD SCIENCE: TAGIA ARCHAEOLOGY

I spent this July in Mongolia doing salvage archaeology on Mongol-era burials. In a race against climate-change and looting, my team dug up 7 different burials which had been looted from their safe location in permafrost and thus exposed to erosion from global warming. We camped in the Darkhad depression just south of Siberia and set up a temporary campsite where we slept and did lab work on the artifacts and human remains from the dig. We used dental calculus, imaging, and made osteobiographies of the individuals discovered in order to analyze the remains despite the sites being looted and thus not qualified for traditional stratigraphic archaeological methods. Our overall goal was to study what artifacts and human bones remained from the looted site in order to draw inferences about the nomadic people who created the Mongol Empire a millennium ago.



DANNA HIRSHBERG

she/her

Public Health

THE EFFECT OF CLIMATE CHANGE ON PLANT-MICROBE INTERACTIONS IN AN ALPINE ENVIRONMENT

With a changing climate comes a change in plant-microbe interactions. Ecologists across the globe have been researching the differences in plants and their relationships with their environment as the planet warms up. A topic of particular interest is how plants might alter their interactions with microbial organisms because of a shift in abiotic factors. Microbial pathogens and mutualists found in plant roots are changing in numbers, composition, and carbon acquisition potential. We investigated the effects of climate change on plant-microbe interactions by quantifying the number and type of fungal structures found in plant roots sampled from inside experimental warming chambers across a moisture gradient in the alpine tundra. Although research is still in progress, our collected data indicate that variations in temperature and moisture levels impact microbe structure and response to climate change in plant roots. We also are seeing that pathogens are impacted by temperature and moisture in an alpine ecosystem through our preliminary results.



RIN HU

she/they

Design and Psychology

DESIGN AT THE DEMOCRATIC NATIONAL COMMITTEE

I served as a Design Intern at the Democratic National Committee (DNC) during the summer of 2023. During this time, I was able to learn and design within an established brand identity while collaborating with people across various departments in the organization. While at the DNC, I was tasked with creating graphics for multiple departments, including Advertisements, Emails, Finance, Marketing, Organizing, and Socials. The most requests received from any department were by far the Socials Team, which was involved with managing social media accounts for the DNC, President Biden, and Vice President Harris. Each project required thinking of visually attracting an audience and ensuring the design adhered to the color palettes, fonts, and branding guide of the DNC or Biden for President campaign.



DALISIA HUGHES

she/they

Design and Psychology

OSA SUMMER IN PARIS PROGRAM

This summer, I studied abroad in France with the intention of applying my knowledge of psychology internationally and gaining a first hand experience of Parisian culture. My classes were taught outdoors in various locations around Paris, thus allowing me to actively interact with our class material and naturally observe the Parisian lifestyle around us. For example, Parisians are stereotyped as cold and distant. However unknown to most, this persona is a self defense technique to avoid the persistent scamming and robbery that takes place in the city. When interacting with loved ones on the streets or in intimate environments like restaurants, Parisians showcase universal emotions and behaviors. Through my course material and analysis of the city of Paris, my understanding of the differentiation between human nature and culture grew profoundly. The academic insight I gained was valuable but my other motive for studying abroad was also to achieve personal growth. Living in France increased my confidence in my resilience and ability to adapt and thrive in a new environment. This self-assuredness strengthens my resolve to explore uncharted waters of my life such as academia and the working industry.



CAMRYN JENKINS

she/her

JP MORGAN CHASE & CO.

Over the summer, I interned at JP Morgan Chase in Westerville, Ohio. While interning in the Chase Leadership and Development Program, I was assigned to the Employee Journey Team for Consumer and Community Banking. My projects included welcome gifts, an animated video series and interview guides for call centers. I wanted to expose myself to a vibrant working environment and establish networking connections with professionals in my career field. During the summer, I learned professional networking, adobe premiere editing and negotiation tactics.



MAGGIE JOHNSON

she/her

TIERA FIELD COURSE

Water quality is not only an important measurement for assessing its safety for human consumption, but it is also used to determine the ecological health of an area. The purpose of this study, conducted through Tulane University's TIERA Program, was to determine the ecological health and extent of human impact on both the Zancudo and El Caucho rivers as an exemplification of human activities and their impact on tropical ecosystems around the globe. Macroinvertebrate classifications, measurements of *E. coli* coliform presence from different niches, various physicochemical factors, and structured interviews with local residents were used to establish a comprehensive analysis of water quality. Our findings indicate a strong ecological health in both rivers, as well as differing levels of anthropogenic pressures in each river. This study concluded that while both the Zancudo and El Caucho rivers experience differing levels of anthropogenic pressures, both rivers demonstrate a strong ecological health in their water qualities.



KAITLYN JUNEAU

she/her

HUSTLEHAWKS

In my sophomore year at Tulane, I began interning with the company HustleHawks because I wanted to further my skills in marketing and advertisement while also supporting my home state of Louisiana. Since their inception, they have been connecting locals in the community to college students with tasks from hurricane recovery to babysitting. I began interning with them at the ideal time because they were working on expanding their marketing and community outreach initiatives. While working with HustleHawks, I learned about the processes that went into marketing to specific audiences, cold approaches, and maintaining relationships with different companies and people. This internship turned out to be an amazing opportunity because I was able to further my marketing and outreach skills, foster connections with locals and see firsthand the impact of college students coming together to support the community.

RHYS KARSAVIDIS

they/them

Classical Studies

THE USE OF RETINAL IMAGING (RI) AS A TOOL FOR IDENTIFYING BIOMARKERS OF VASCULAR HEALTH AND DISEASE IN A COMMUNITY EXPOSED TO EBOLA

Exposure to Ebola virus disease (EVD) prompted lasting health outcomes for communities exposed. These outcomes include cardiovascular disease, hypertension, and cognitive/ocular disorders to name a few. To assess outcomes of youth that were exposed to Ebola or youth that lost a parent to Ebola in Sierra Leone, retinal imaging (RI) was implemented to allow the capture of vessel diameters and quantify the ratio of arteries and veins present within the retina. To obtain these images, we separated participants into three groups – infected, affected, and control/comparison. 258 retinal images were taken in different districts (urban and rural) in Sierra Leone, 151 on a handheld camera and 107 on a camera that was on a tabletop. These devices photographed the back of the eye, showing the microvasculature going into the optic disk and the macula. In this ongoing study, these images are being analyzed using the MONA REVA analysis software, on which the vasculature can be mapped, the diameter of the vessels can be measured, and arteries and veins can be differentiated. We will be comparing the output data from the images to physical health data we collected and looking for significant differences between the three groups in the outputs from the images as well as in comparisons to the health data. Furthermore, we will be comparing the outputs from the handheld and tabletop images that were taken on the same participant. This will give us an idea of the reliability of handheld imaging devices as a tool in retinal imaging.



JASMINE KILEY

she/her

Biological Chemistry

CHANGES IN DESMOSINE CONTENT OF THE ELASTIC FIBER DEFICIENT MURINE UTERUS

Elastic fibers in the extracellular matrix provide compliance and distensibility to uterine and vaginal tissue. The uterus experiences elastic fiber turnover during processes such as postpartum recovery and aging. Adenomyosis is a uterine disorder associated with enlarged uterus, increased menstrual bleeding, pain, and infertility, and dysregulation of the extracellular matrix in the endometrium may contribute to its pathogenesis. Desmosine crosslinks form between mature elastic fibers and can be used to infer mature fiber content. Fibulin-5 (Fbln5) is expressed in tissues abundant in elastic fibers, and mice deficient in Fbln5 develop pelvic floor disorders similar to females with genetic disorders that negatively impact elastic fiber formation. Prior work has quantified desmosine content to study elastic fiber turnover in the vagina of Fbln5 deficient mice. However, the presence of mature elastic fibers in uterine tissue with differing Fbln5 expression is unknown. Therefore, the objective of this study was to determine the role of Fbln5 insufficiency on desmosine content of the murine uterus. We hypothesize that Fbln5 haploinsufficient and deficient uterine tissue will have lower desmosine content than wildtype tissue.



AUTUMN KRANZ

she/her

Neuroscience and Psychology

LEKKING BEHAVIORS OF THE WHITE WHISKERED HERMIT

This summer, I traveled to the fragmented Chocó Rainforest in Northwest Ecuador and conducted a descriptive study of the White-Whiskered Hermit (*Phaethornis yaruqui*) with the Karubian Lab of Tulane University. The goal of the study was to describe the hermits' lekking behaviors and the structure of their leks. This study includes an ethogram of the white-whiskered hermit's behaviors, a time budget of their lekking behaviors, a map of the leks and pistas observed, a flower survey of the leks, and an attempt to describe the structure of the leks.



ISABELLA R. KULSTAD

she/her

Neuroscience and Mathematics

IDENTIFYING THE DOWNSTREAM EFFECTORS OF TLE4-MEDIATED REPROGRAMMING

Starting at early embryonic development, Cortical Progenitors in the ventricular zone differentiate to form the cerebral cortex, a six-layered dorsal structure involved in decision making, sensation, attention, and memory. Projection Neurons, or CPns, are a distinct class of neurons involved in communication electrical impulses between the cerebral cortex and distal regions of the Central Nervous System (CNS). The question of how corticospinal projection neurons are involved in motor function and represents a fundamental and clinically important question in neurodevelopment. A network of transcription factors, including the transcriptional co-repressor Tle4, are central to specifying cortical projection neuron fates and identity. However, genes that act downstream of these transcriptional regulators are poorly understood. In this study, we investigate the role of Tle4 during embryonic development and post-natal circuit maturation. In addition, we investigate changes molecular identity of Corticothalamic neurons in Layer 5 of the cerebral cortex.



AARON LEVER

he/him

Public Health

DEVELOPING HAND HYGIENE INTERVENTIONS TO REDUCE ZONOTIC SPILLOVER WHILE FIELD BUTCHERING IN SIERRA LEONE: A MULTIMETHOD STUDY

Zoonotic spillover, the transition of pathogens from animals to humans, is a significant health concern worldwide. Sierra Leone, due to its entrenched traditions of field butchering, faces increased risks of these transmissions. Notably, inadequate hand hygiene in such practices can facilitate the spread of pathogens, heightening the threat of zoonotic diseases (Jones et al., 2008). This multimethod research aims to enhance hand hygiene protocols to mitigate the incidence of zoonotic spillovers during field butchering in Sierra Leone. The methodology encompasses observations of individuals involved in field butchering and interviews with village healers and medicinal herbalists, seeking insights into natural remedies that might augment hand hygiene practices.



GABBY LEVINE

she/her

TIERA FIELD COURSE

In the FCAT Gaia of El Chocó Rainforest, a profound sense of gratitude prospered within me. With the initial goal of deepening relationships at FCAT and pursuing an independent research project related to my interests in the field of environmental psychology, I worked on FCAT's permaculture farm and simultaneously conducted interviews aimed at evaluating the TIERA program's goals and learning objectives. I gained a deeper appreciation of the importance of constant reflection and including community voices in program development and found an unexpected family who taught me the importance of reciprocity in relating to the land.



DAVID LI

DEPARTMENT OF ARCHAEOLOGY

I engaged in an archaeological excavation organized by the University of Arizona in early July. This experience was more educational than practical for four weeks, providing fundamental knowledge in archaeology and wilderness survival. We meticulously recorded local data during the excavation, including elevation, sunlight, and precise site location. Post-dig, I assisted my professor in data consolidation and presenting the findings using GIS technology. My thesis asserts that while solar radiation is not the primary factor deterring the Ancestral Pueblo from relocating to the Rockies, it remains a vital consideration. Extended exposure to excessive solar radiation in the Rockies could result in health issues such as skin cancer and photosensitivity reactions. While my hypothesis was substantiated, it doesn't fully unravel the reasons behind the Ancestral Pueblo's migration patterns. This project lays the groundwork for refining theories as more comprehensive data is unearthed.



STACEY LI

she/her

DEPARTMENT OF ARCHAEOLOGY

Among all age groups, young adults (YAs) have the highest prevalence of alcohol use disorder (AUD) (15.4%) (Department of Health and Human Services et al., 2022; Grant et al., 2015). Although YAs of color's AUD rates are lower compared to their white peers: e.g., Asian 9.5%, Black/African American (hereafter Black) 11.2%, Hispanic/Latino/Latina/Latinx (hereafter Latinx) 12.7%, and White 18.2% (Department of Health and Human Services et al., 2022), YAs of color are disproportionately burdened by alcohol-related consequences (Carrion et al., 2011; Flores et al., 2008; Schafer et al., 2004; Sabato, 2016 alcohol-related mortality (Younossi & Stepanova, 2010). Research has found the link between YAs' substance use and various sociocultural factors such as racial/ethnic discrimination, acculturation stress, and spirituality (Chartier et al., 2015; Desalu et al., 2019; D.K. et al., 2016; Hai, 2018; Lui & Zamboanga, 2018; Mays et al., 2017; Pittman et al., 2019; Zamboanga et al., 2016; Zemore, 2007). Yet, there is very little research exploring YAs of color's own beliefs about these links. The present study aims to address this research gap and investigate the beliefs of YAs of color's perspectives on sociocultural links to alcohol use. Findings from this study may inform the development of alcohol interventions and preventions for YAs of color. The proposed project is a qualitative study aiming to examine the beliefs about various sociocultural factors' links to substance use among YAs of color with AUD.



MARY LORINO

she/her

Neuroscience

LOSS OF ZMIZ1 LEADS TO IMPAIRED CORTICAL DEVELOPMENT AND AUTISTIC-LIKE BEHAVIORS

A recent case series screening human patients has linked a syndromic neurodevelopmental disorder similar to Autism Spectrum Disorder (ASD) to single nucleotide variants in the *Zmiz1* gene. Despite *Zmiz1*'s known function as a transcriptional coregulator, and its function in the differentiation and migration of cortical neurons, *Zmiz1*'s role in the development of the cerebral cortex is not completely understood. This project aims to discover if the *Zmiz1*-knockout (mutant) mice will exhibit a phenotype similar to clinical behaviors seen in ASD patients. Additionally, this research will determine the cellular changes caused by *Zmiz1*-knockout. Based on our results, we can conclude that in comparison to controls, *Zmiz1* mutants have exhibited alterations in anxiety states, a decreased startle response, and greater compulsive tendencies. Moreover, *Zmiz1* mutants have reduced cortical neurogenesis and axonal migration in the corpus callosum. This project is still in progress and these findings encourage future investigation and continued project growth.



ERIN LYNSKEY

she/her

ESSEX VICINAGE OF THE SUPERIOR COURT OF NEW JERSEY

The goal for my experience this summer as a judicial intern was to gain exposure to judicial and legal proceedings to better equip myself to make the decision to attend law school in the near future. My internship took place at the Civil Division of the Essex County Vicinage in Newark, New Jersey. The judge I interned for was the Presiding Judge of the Landlord-Tenant division and I was able to observe while he worked through many of the LT cases that had been backed up during COVID-19. I helped administratively support these proceedings by inputting court proceeding dates into the calendar, uploading legal documents to the state court system, filing incoming paperwork, and supervising virtual court appearances, among other supportive tasks. While doing so, I learned about how the standard for responsibility in these conflicts was determined and what documentation and facts were required to keep a tenant in their property. I was able to watch the judge deal with what he wanted to do morally and what he was able to do legally; many of the tenants who were not able to pay their rent had respectable reasons: a job was lost, a relative was sick, etc. Despite this, the judge had to act within the confines of the law, which led him to evict tenants when rent was not paid. This exposed me to the limitations of the law in achieving morally satisfying outcomes.



MADLINE MAGRUDER

she/her

THE BEHAVIORAL AND NEURODEVELOPMENTAL GENETICS LAB

During the course of summer research, my central focus related to investigating cohorts of Ebola virus disease (EVD) survivors and children affected by EVD in the center of the outbreak, Sierra Leone. The project's goal is to use Mona Reva software programming for retinal imaging to understand the impact of EVD on children and adolescents to inform the development of interventions that support EVD affected individuals. Retinal imaging is an efficient, non-invasive method that allows us to examine the microvasculature of the retina, which reflects the microvasculature in other areas of the body like the heart and brain. The use of retinal imaging via Mona Reva provides insight into characterizing post-Ebola eye complications and has uses in identifying biomarkers to detect systemic diseases like hypertension, cardiovascular disease, or cognitive function. This project is currently ongoing and I will continue to use retinal imaging to understand the ways children and adolescents are impacted by EVD and how the social environment operating in individuals, families, and communities mitigates or mechanizes risk in them over the next two years.



TIARA MCGUIRE

Throughout my Summer Research Institute experience, I focused on the anthropogenic effects that causes coastal erosion. The research reflects that the main causes are fossil fuel extraction, levee building, and natural disasters. Levee building in Louisiana started as early as 1682, with the arrival of the French. When Louisiana became a state, this way of managing flood control was inherited. Overtime, people came to realize that building levees drains the area of water, revealing fertile land ready to be exploited by the agricultural industry. The environmental violence, of the levees, became a trade-off for the proceeding economic boom in the agricultural industry. There are levees all along the southern border of the Mississippi River. This means that the Mississippi River basin is no longer being replenished with the sediments carried by the river. Overtime, sea-levels rise and the edges of the delta are being eroded away. This is catastrophic ecologically because of the delicate fresh water to salt water ratio. When exposed to high saline conditions, freshwater plants often die. Without the plants to hold the sediments in place, the land is eroded by the ocean. As sea levels rise, salt water overtakes the fresh water ecosystems in this exact fashion. Levee building and permits for fossil fuel extraction are all regulated by the federal government. Therefore, they bare responsibility for the destruction of these habitats and the unjust burden on marginalized communities. The dynamic between these different components is important to grasp as changes in one area affect another. The layered violence in wetland ecosystems must be addressed as it very well might change the course of history. Wetland ecosystems are huge carbon sinks, which if healthy, would alter some of the effects of global warming.

HUBERT MENDEZ / EVELYN HOWARD

they/them

Computer Science | Biomedical Engineering

TWO TYPES OF MALES? MORPHOLOGY AND DOMINANCE IN WILD CAPUCHIN MONKEYS

A small number of primates show rank-based differences in morphology such that alphas males are easily distinguished from subordinates based solely on physical appearance. Through our long-term studies of wild white-faced capuchins in the Santa Rosa Sector of the Área de Conservación Guanacaste (SSR), we discovered that upon reaching alpha status adult male capuchins undergo a physical transformation – their face widens, brows enlarge, hairline recedes, shoulders and biceps enlarge (Jack et al., 2014). These physical changes are preceded by a significant increase in testosterone levels (over 10x their testosterone levels as a subordinate). In 2022, with funds from the National Science Foundation, our team began to measure male morphology using non-invasive photogrammetry (Rothman et al. 2008). This technique uses parallel lasers mounted on a digital SLR camera to project two parallel beams of light, spaced 4 cm apart, onto subjects during photographing enabling us to measure various body parts directly from the photos.

This summer, our Tulane team will extend this technique to measure morphology in adult female capuchins. Female capuchins remain in their birth group for life and form linear dominance hierarchies based on maternal lineage. Given that females inherit their dominance rank from their mothers rather than fighting to attain it as males do, we do not anticipate finding rank-based differences in morphology. However, we cannot rule this out. Data on human aging and reproductive history (number of offspring) have found significant changes in adult morphology and thus we do expect the same processes to occur in female capuchins (Windhanger et al., 2019). The data we collect this summer will provide us with a cross-sectional dataset to investigate the link between female age, parity (# of offspring), rank, and morphology that will form the starting point of a longitudinal data set to which we will add new photographs of individual females each year.

KEVIN MIAO

he/him

Neuroscience and Economics

ROLE OF MIR-410-3P AD MIR-361-3P IN CARDIOMETABOLIC REGULATION

Cardiovascular diseases (CVD) are the number-one killer in the USA. Hypertension affects 55 percent of people over age 55 and it is associated with a number of diseases (e.g. type 2 diabetes, obesity) that contribute to its development. These coexisting conditions of insulin resistance, dyslipidemia, obesity, and elevated blood pressure (BP) are referred to as Cardiometabolic Diseases (CMD). The role of the brain renin-angiotensin system (RAS) in the regulation of BP and in the neuro-cardiovascular dysregulation leading to hypertension has been firmly established. MicroRNA (miRNA) modifications are among the most studied epigenetic mechanisms controlling gene expression at the post-transcriptional level. More than a thousand miRNA families have been identified to regulate RAS gene expression, where their dysregulation has been associated with hypertension, cardiac ischemia and aging. We aim to answer the question: Are miRNA targets differentially expressed in hypertension and diabetes? Expression of these miRNA will be assessed by quantitative real time PCR (qRT-PCR) in tissues obtained from hypertensive and diabetic mice. Our experimental results indicate upregulation of miR-361-3p in the hypothalamus and heart, and downregulation in the aorta. For miR-410-3p, we found upregulation in the hypothalamus in female CMD mice, but downregulation in the male CMD mice. Additionally, miR-410-3p was downregulated in both male and female CMD mice heart tissue, and downregulated in male mice in kidney tissue. Our conclusion is that both miR-361-3p and miR-410-3p play a role in cardiometabolic regulation, but are affected by their location, and in the case of miR-410-3p, affected by sex.



MAGGIE MILLAR

she/her

Environmental Biology

THE ROLE OF ECTOPARASITES IN THE NEOTROPICS

Ticks are a highly influential organism in the ecosystems they inhabit. As an ectoparasite that feeds off their host's blood, ticks have the capacity to be vectors for infectious disease. In addition to posing a risk for their host's health, ticks can also have an impact on their host's productivity (Jongejan et al., 2004). There have also been documented instances of ticks engaging in phoresy, a commensalism in which one organism uses another as a vehicle of transportation (Saloña-Bordas et al., 2014). Previous studies at FCAT have observed high tick and mite parasitism rates on birds, which can negatively impact their health and productivity (Jongejan et al., 2004). Mesostigmatid mites and Ixodes ticks have been documented engaging in phoresy with *Oxysternon conspicillatum* and other Coleoptera dung beetles (Quintero-Gutiérrez et al., 2020; Bugmyrin et al., 2010). How do these phenomena apply to FCAT's regenerating, neotropical cloud forest? This study aims to further our understanding of the relationship between ticks and their environment by investigating tick parasitism on birds and dung beetles. Do the genera/species represented vary across levels of deforestation? Does phoretic load differ significantly across plot types? Do phoresy on beetles and parasitism on birds occur at the same frequency? Samples have not yet been identified, but there seems to be a diversity of potential genera. Though I expected phoretic load to be significantly different, it was not ($p=0.547$). Initial test yielded highly significant results ($X^2 = 176.38$). Test should be redone to confirm.



SKYLAR MORGAN

she/they

POMPEII 1.14 PROJECT

Although $\frac{2}{3}$ of the ancient city of Pompeii is excavated to the 79 AD level, only about 5% of that excavated land is below that level. This summer, I had the opportunity to be an excavator for the Pompeii I.14 project, run by Tulane faculty Dr. Allison Emmerson in the Classical Studies Department. The project seeks to uncover what life was like for non-elites living in Pompeii. Due to this subject area, the project is crucial to diversifying the field of Classic Studies in terms of its participants and the subject matter. As an excavator, I actively engaged myself in the ancient city of Pompeii and the modern city where I lived in a hostel for five weeks. During these five weeks, we explored the modern Bay of Naples, engaging in Italian culture, practicing Italian, and reflecting on the paradox of living in the modern city of Pompeii while actively discovering its past. As a result of the project, we uncovered new ways of identifying the lasting impact of non-elites. While I learned loads about the ancient city of Pompeii, my biggest takeaway was that I want to pursue a career in academia and hopefully be involved in excavation for as many summers as possible.



PAIGE MOSLEY

DELOITTE: SHINE MARKETING

This summer, I had the opportunity to partake in Deloitte’s SHINE Marketing Rotational Internship program within its Client and Market Growth (CMG) organization. Deloitte’s Client & Market Growth team is dedicated to driving revenue, building relationships, and enhancing Deloitte’s reputation in the marketplace. The purpose of this internship was to gain experience in a variety of marketing realms. Since marketing is a broad field, it was important that I figured out both what I was interested in pursuing post-graduation and knocking off options I did not want to pursue. Furthermore, since I interned for a smaller firm last summer, I wanted to diversify my professional portfolio and expose myself to the culture of a larger corporation like Deloitte. From this experience, I gained a new network of professionals who provided me with insightful advice and mentorship to aid me as I finish my senior year of college and enter the workforce. This internship also solidified my interest in pursuing public relations and communications post-graduation.



CHARLIZE NGUYEN

she/her

VIETNAM NATIONAL CANCER HOSPITAL AND OXFORD UNIVERSITY CLINICAL RESEARCH UNIT

In recent years, Vietnam has made significant progress in its healthcare and research infrastructure. To gain a stronger understanding of public health and medical operations in this rapidly developing nation, I participated in an eight-week dual internship at the Vietnam National Cancer Hospital and Oxford University Clinical Research Unit (Hanoi Center). At the Oxford University Clinical Research Unit, I worked with a team of local and international researchers to investigate to what extent countries across the world, including Vietnam, have incorporated ideas of justice and equity into their plans to combat antimicrobial resistance (AMR). Our work on this project remains ongoing; however, through qualitative analysis of countries' national action plans, we found that few countries considered the needs of marginalized groups in their proposed AMR-related interventions. On the other hand, at the National Cancer Hospital, I observed how oncologists operated in the pathology, molecular biology, and inpatient departments. I learned about cancer from the microscopic to the macroscopic level— from genetic testing to diagnostic pathology to inpatient treatment. Through immersion with the doctors, I familiarized myself with the strengths and weaknesses of the public hospital system in a low-middle income country. Overall, these two unique yet complementary internships helped develop my skills in qualitative data analysis, wet lab techniques, clinical interaction, and cross-cultural collaboration.

AIM NIAMNUD

she/her

Neuroscience

INVESTIGATION ON THE CEREBRAL MICROVASCULAR BIOENERGETICS DYSREGULATION IN OBESITY- RELATED DEMENTIA OF FEMALES

Obese-related cognitive dysfunction in women is a severe health problem, and there is a fundamental knowledge gap in understanding the molecular mechanisms underlying cognitive decline in obese women. The long-term goal is to understand the pathogenic mechanisms and identify novel targets for the intervention and treatment of dementia in obese women. By using advanced LC-MS/MS-based metabolomics in a well-established high-fat diet (HFD)-induced obesity mice model, our preliminary data suggested that HFD induces a cognitive decline in 18-month-old (postmenopausal) female but not male mice and is associated with exacerbated aging-related cerebrovascular metabolic dysregulation only seen in female mice, including impairment of cellular glycolysis and mitochondrial TCA cycle metabolism. The central hypothesis is that obesity-induced metabolic dysregulation of cerebral microvascular endothelium may be the key pathogenic mechanism, contributes to microvascular dysfunction, thereby causing cognitive deficits in postmenopausal obese female mice. The rationale for the proposed research is that understanding the impact of cerebral microvascular bioenergetics metabolism on brain function will set the stage for the development of innovative approaches to mitigate obesity-associated cognitive decline. To test this hypothesis that cerebral microvascular metabolism dysregulation occurs earlier than other known mechanistic markers of vascular dysfunction, neurobehavior experiments as well as a battery of molecular techniques will be utilized to determine cerebral microvascular metabolic profiles and vascular dysfunction in obese female mice. This study may help in understanding of the mechanisms underlying obesity-related impairments and identifying novel therapeutic targets for the intervention and treatment of dementia in obese women.



JASE NORTH

he/him

Neuroscience and Philosophy

HOW DO FACTORS LIKE RACE, AGE, GEOGRAPHY, AND NATIVITY AFFECT INDIVIDUALS' ABILITY TO ACCESS HEALTHCARE?

Health disparities, a concern in public health and medicine, are significantly influenced by factors such as geographical region (urban vs. rural), insurance coverage, race, age, and nativity. These determinants dictate the accessibility and quality of healthcare available to people, especially those from marginalized communities. This study investigates the collective association of these social determinants on healthcare access among a national sample of Black adults in the United States. It is hypothesized that these determinants contribute to delays in seeking medical care, which can exacerbate health disparities. Logistic regression analysis was used to obtain the odds of Black adults delaying medical care because of cost due to region, geography, insurance, and nativity. Compared to the Northeast, Black adults in the Midwest and South are more likely to delay medical care because of cost. Location (city center, outskirts, smaller cities, rural areas) doesn't seem to influence the decision to delay care because of costs. Being uninsured greatly increases the likelihood of delaying medical care because of costs. Birthplace doesn't seem to play a role. The impact region and insurance status have on the health-seeking behaviors of Black adults serve as a starting point for creating interventions to help mitigate healthcare disparities.



OLULABOMI OSIKOYA

he/him

MORGAN STANLEY: FIXED INCOME SECTOR

During the Summer of 2023, I interned at Morgan Stanley in New York City. During my three months, I was a Fixed Income Sales and Trading Summer Analyst, who rotated through Foreign Exchange and Emerging Market Sales, Interest Rate Sales, and Commodities. During this experience, I learned a lot about these products' micro and macro aspects, wrote the beginning of the morning and end-of-the-day notes, shadowed individuals within the respective groups, and pitched a trade at the end of each rotation. Each rotation was about three weeks, followed by an end-of-internship feedback session. On the Foreign Exchange and Emerging Markets team, I learned about how to trade with different currencies, non-deliverable forwards for developing countries, and how headlines can affect deals within foreign countries. For interest-rate sales, I worked with the respective groups' sales and trading aspects and their REPO and futures teams. Lastly, for commodities, I worked with power, gas, oil, and the origination teams. I enjoyed interning in these groups and am looking forward to using these experiences to catapult my career into finance.

JP OTT

he/him

Neuroscience / Economics

MACHINE LEARNING DATA ANALYSIS VALIDATION AND THE EFFECT OF THREAT SALIENCY ON ACETYLCHOLINE RELEASE IN THE BLA

A major barrier to behavioral research is the presence of subjectivity in behavioral analysis scoring and the time required to complete this scoring. By the use of a machine learning model to automatically score these data sets an internal consistency can be achieved that is not seen between manual scorers. By using Deep Lab Cut (DLC) and Simple Behavioral Analysis (SimBA) points attached to areas on the subjects can be tracked and behaviors can be identified by comparison to samples of these behaviors given to the model. The results of the machine learning model scoring has been compared to manual scoring and shows variability similar to the levels between two different manual scorers. Further validations will occur with this model, however the implications of this model would allow for 100% internal consistency and faster data analysis which would greatly expedite behavioral research fields.

Anxiety disorders are characterized by a state of hypervigilance to threats and heightened autonomic arousal. Release of Acetylcholine in the basolateral amygdala (BLA) has been implicated in the formation of fear memories. Through the use of a fluorescent GRAB Acetylcholine receptor implanted into the BLA the amount of acetylcholine release can be measured and compared in response to threat stimuli with different saliency. With more salient fear stimuli eliciting more Acetylcholine release, and during additional days of testing the subjects learned the stimuli and showed increased activation of fear responses to stimuli closer to the threat.



SYNA PAL

EDI SUMMER RESEARCH INSTITUTE, NTC

Through an analysis of theoretical literature and comparative case studies this research recognizes that the current international system is a result of historical processes such as colonization and imperialism. These systems involved the domination and exploitation of certain nations and peoples by others, often driven by racial and economic motives. The legacies of colonization and imperialism have shaped the current global order, with power dynamics influenced by the historical subjugation and marginalization of certain groups both racially and through the patriarchy. In this view, the dominant social, economic, and political structures reinforce and perpetuate the power of certain racial and gender groups while marginalizing others. These hierarchies and inequalities based on race, gender, and sexuality create tensions and divisions that can lead to violence and hostility between nations and groups. Additionally, the pursuit of power and resources within this system often exacerbates these conflicts. Finally, the thesis statement emphasizes there is a need to dismantle these power structures and inequities because peace cannot be achieved within a system that perpetuates racial and gender-based hierarchies. By dismantling these hierarchies and addressing the root causes of inequality, it is argued that a more just and peaceful international system can be established.



LAYLA REESE

she/her

THE YATES LAW FIRM,LLC

This summer I worked with The Yates Law Firm, LLC, which was founded by entertainment lawyer, Wynton Yates. This firm focuses heavily on progressing careers of artists such as writers, musicians, etc. This firm also provides entrepreneurs with legal knowledge for further growth in their craft. I was able to take my passion for law and graphic design and gain first hand experience in curating digital content for The Yates Law Firm, LLC. This opportunity has granted me skills such as engaging in legal content and social media management.



MEREDITH ROSENBERG / MICHAEL YANG

she/her | he/him

Neuroscience

NEW ORLEANS ELEMENTARY SCHOOL COOKING CLASS INITIATIVE

Louisiana bears one of the nation's highest prevalence rates in childhood obesity, where childhood obesity rates have more than tripled since the 1970s. This is of particular concern since compared to children who are not obese, obese children are five times more likely to be obese as adults as well. However, early introduction to nutrition and physical wellness education within a health-promoting school environment has proven to effectively aid in lowering childhood obesity rates. What is missing from the solutions landscape are community programs designed specifically for elementary school students that provide engaging early-youth education addressing the multifaceted nature of obesity. Much more than solely increasing access to nutritional foods, one should promote a healthy relationship with foods and physical activity in order to empower youth students to utilize, share with one's family, and incorporate such skills into one's daily life.

The New Orleans Elementary School Cooking Class Initiative aims to serve as a catalyst for increasing equitable, early access to health and STEM education. By hosting four educational programs in the spring of 2023, NOESCCI reached 76 local New Orleans 8-12-year-old elementary schools students from 25 different schools and 21 unique zip codes. In collaboration with the Goldring Center for Culinary Medicine, NOESCCI endeavors to continue growing its program for years to come in an effort to promote equitable access to cooking, health, and STEM education.



DIDI ROSS

she/her

Cellular & Molecular Biology

DEVELOPING A BEHAVIORAL MEASURE OF LONG-TERM MEMORY FOR SOCIAL CONTENT IN NARRATIVES

Previous studies investigating how the cortical apex (MPFC, MPC, TPJ, STS, & SFG) processes information have taken a domain-general approach, so have argued that this neural pathway processes all types of information together into abstract representations, but recent fMRI work supports domain specificity in the network's processing – specifically in the domains of social information and spatial information. This study uses a behavioral task to take a domain-specific approach to studying long-term memory retention of social content as a novel way of studying human memory in the neuroscience literature. The social stimuli used were the pilot episodes of Friday Night Lights and Gossip Girl and the behavioral task involved taking a 25-question multiple-choice test immediately after viewing the episode and then taking a different 25-question multiple-choice test after a 3-week delay period. Both tests required participants to recall social information relating to a specific event or moment in the episode via “Event-Based” questions and information that is not directly tied to one event such as relationships or personalities via “Abstract” questions. The results of the study concluded a relative consensus on correct answers among the tests as many questions are subjective in nature and showed a meaningful drop in social memory performance that can be studied when comparing performance before and after the 3-week delay. Furthermore, the Friday Night Lights data showed a main effect for delay and an interaction between delay and category (“Abstract” vs “Event-Based”).

MAXWELL RUBIN

he/him

Neuroscience and Mathematics

EXPLORING PIPECOLIC ACID AS A METABOLIC ETIOLOGY FOR CEREBRAL MALARIA

Cerebral malaria (CM) is a complication of severe *Plasmodium falciparum* infection which manifests with coma. Mechanisms underlying coma in CM is unknown. Pipecolic acid (PA), a metabolite generated by human and malaria lysine degradation pathways has neuromodulatory properties and is a putative etiology of CM coma. It was previously demonstrated that children with CM have abnormally elevated PA blood concentrations compared to levels in children with mild malaria and PA is elevated in brains of ECM animals compared to controls. Here we will present data that PA is also elevated in CM CSF compared to control CSF. To determine if PA induces neuromodulation, we administered PA at 2.5 g/kg and 500 mg/kg intraperitoneal (i.p.) into C57BL/6 mice. We used the Rapid Murine Coma and Behavior Scale (RMCBS), a scale from 20-normal to zero-abnormal, that assesses 10 behaviors. Previous CM studies have demonstrated increased blood-brain barrier (BBB) permeability, and BBB permeability is a hallmark of ECM. To recapitulate this physiology, we also pretreated mice with VEGF (vascular endothelial growth factor) and DCA (deoxycholate acid, a bile salt), both which induce reversible BBB permeability. Mice demonstrated a decline in neurological function over two hours, after administration with 2.5 g/kg of PA ($p = 0.097$) and 500 mg/kg of PA ($p = 0.029$) using one-way ANOVA. Likewise, mice pretreated with DCA or VEGF also demonstrated a decline in coma score, (2.5 g/kg PA pretreated with DCA, $p = 0.137$; 500 mg/kg pretreated with VEGF, $p = 0.144$) with a longer duration of neurologic impairment. Animals pre-treated with VEGF also had larger decrease in RMCBS at 60 minutes (pretx RMCBS mean: 11.6 vs no pretreatment :17.7, $p = 0.003$). We will present RMCBS data under experimental conditions that prolong the blood level of PA, using probenecid or an infusion pump, and mimic blood levels found in CM (50-100uM). Our data demonstrates that systemic administration of PA causes a decline in neurologic behavior in mice, providing evidence of PA's potential role as the etiology of coma in CM.



MOLLY SHIELDS

she/her

Political Science

THE FIGHT FOR 2024: AMERICA'S FAR RIGHT

The American far right is gaining strength, evidenced by Trump's presidency and current attempt to re-enter office, the events of January 6, the overturning of Roe v. Wade, and many other current American political debates. My time at a far-right political conference revealed conservatives' priorities include universal abortion restrictions, parental choice, school vouchers, and substituting 'big' bureaucratic government with strong family units. The conservative right's celebration of the nuclear family means while women may occupy visible political roles in the far right, they never stray far from their role as mothers.



ANNA SLOAN

she/her

HEALTHY GULF

During my internship with Healthy Gulf, I learned extensively about liquid natural gas (LNG) permit applications, how companies apply for these permits, and what private agencies can do with this knowledge. Healthy Gulf is an organization that wants our society to transition from a consumption and oppressive model to an equitable and regenerative model. To do that, they use their knowledge of state and federal laws and of the oil industry to monitor and research the impact of LNGs on our land, to influence government decisions, and to support local community movements and organizations to fight against environmental inequality. While working under Scott Eustis, I was able to diversify my GIS skills while also focusing on how GIS is being used to combat environmental issues in Louisiana. I will be able to bring the lessons and skills I have learned through this internship to all of my future endeavors, both academically and professionally.



ADHITHI SREENIVASAN

she/her

Neuroscience

PRECLINICAL EVALUATION OF COMMON CAR TARGETS IN MEDULLOBLASTOMA

Common CAR targets in medulloblastoma were analyzed, including GPC2, GD2, and B7H3 CAR, for their anti-tumor efficacy in both in vivo and in vitro models. Potential targets for CAR T-cell therapy were evaluated based on mechanistic and efficacy studies.



PAUL STOLIN

he/him

FADOK LAB, TULANE

In my experiment, I will use a viral vector to express a Cre-dependent caspase 3 selectively in corticotropin-releasing hormone (CRH) neurons in the central amygdala (CeA) of CRH-Cre mice. CeA CRH neurons are involved in the control of heart rate as well as control of the response to startling stimuli. These neurons are thought to receive interoceptive information from the nucleus of the solitary tract (NTS), a brainstem region that relays interoceptive signals coming from the organs via the vagus nerve. CRH neurons were chosen targets for this study because it has been shown that CRH neurons influence the startle response, a symptom of hyperarousal, and potentiate the startle response over long periods of time⁴. By selectively ablating CeA CRH neurons using caspase 3, this project aims to investigate the contribution of these neurons to hyperarousal symptoms in PTSD. We hypothesize that the ablation of NTS-CeA will decrease hyperarousal symptoms in a mouse model.



SIENA SZETO

she/her

Public Health

NETWORK MEDICINE IN POST-ACUTE SEQUELAE SARS-COV-2 INFECTION

This project is dedicated to uncover the disease mechanisms of Post-Acute Sequelae SARS-CoV-2 Infection (PASC or Long-COVID) and Myalgic Encephalomyelitis (ME/CFS) through network medicine analyses, e.g., to define disease gene modules and to compare with other diseases (Figure 1). Our research will predict candidate drugs for repurposing and subclassify the disease based on phenotypes and mechanisms for precision medicine. My primary role involved extensive research, patient interviews, and meticulous curation of survey data to ensure seamless integration across various components. Through this curation process, each data point became readily mappable to its corresponding column within the raw data matrix, enhancing the comprehensiveness of our findings. My work involved computational biology, artificial intelligence, and population genetics. While substantial strides have been achieved, our official results and publication are anticipated within two months, contingent upon approvals from the Institutional Review Board (IRB) and the Food and Drug Administration (FDA).



LANEY TELLEGEN

she/her

Environmental Biology

THE EFFECT OF ENDOPHYTES ON SPARTINA ALTERNIFLORA EXPOSED TO STRESSORS

Coastal landscapes, such as Louisiana, are facing increased sea level rise and land loss each year. These stressors have negative impacts on plants; however most plants associate with microbial taxa (so-called “endophytes”) that can help to ameliorate environmental stressors and promote plant growth in spite of them. Endophytes are microbes that colonize plant tissue. They do not harm plant growth, but can facilitate uptake of nutrients or bolster plant defenses. I conducted research over the summer months of 2023 to investigate the effects of fungal endophytes on germination and seedling growth in environments with increased stressors, as a way to begin to understand how microbial communities may aid in preserving coastal landscapes facing these changes. I chose four isolates from an endophyte culture collection in the Farrer lab at Tulane University that demonstrated beneficial traits in vitro (petri dish), two that exhibited salinity resistance, and two with pathogen-inhibition. I then inoculated *Spartina alterniflora* seeds with these isolates alone or in groups, and exposed them to high salinity or pathogen-infected environments for 14 days, recording growth. I found that the addition of endophytes either did not affect plant growth or harmed growth of *S. alterniflora*. Overall, in vitro endophyte traits did not transfer to host plants in planta.



SARAH THOMAS

she/her

Economics

THE ECONOMIC BURDEN OF CHAGAS DISEASE: A CLOSER LOOK AT DIAGNOSIS AND SCREENING IN THE GREATER NEW ORLEANS AREA

With over 300,000 individuals infected in the United States, Chagas disease is a neglected disease that needs increased awareness among physicians and those susceptible to infection. There currently isn't an extensive guideline for the state of Louisiana about the process of screening, diagnosis, treatment, and follow-up, leaving many infected individuals unaware to receive early diagnosis and, therefore, treatment. With early treatment being both more inexpensive and effective than treating in later stages, giving physicians the information needed to treat before the progression of infected individuals into the chronic phase can prevent many from getting symptoms of chronic illness, such as heart failure, and the costs associated with treating those symptoms. The prevalence rate in the U.S. is high because of barriers such as low physician awareness, lack of access to healthcare, limited testing options and treatment, and lack of adherence to treatment due to side effects. However, the true prevalence rate is unclear due to a lack of national surveillance. Focusing on large hospitals in New Orleans, I aim to create a flowchart to analyze how the testing process is done. From ordering the test to receiving the diagnosis from the confirmatory test, I will mark the flow of the sample. I aim to assess the barriers preventing patients from receiving screening and diagnosis in large hospitals in the city. By making treatment protocols clear and encouraging patient follow-up, patients can have higher adherence to treatment.



MAYA TILLEY

she/her

TIERA FIELD COURSE

I studied abroad in Ecuador this past summer, where I learned about the local people, culture, and ecosystem. Also while there, I participated in a group study on the water quality of two Andean-Choco rivers on the Mache-Chindul reserve. The Andean-Choco is a biodiversity hotspot, and protection of its natural species and ecosystem has become imperative as anthropogenic activities are beginning to threaten this unique environment. As a group, we researched the impact of anthropogenic activities on the rivers' water quality, and individually, I studied how social awareness of the impact of these anthropogenic activities would affect the water quality. We analyzed water quality and anthropogenic impact through sampling and classifying macroinvertebrates, physicochemical data collection, and the completion of various river quality index surveys. Outside of my research, I found myself immersed in a culture and environment completely different from my own. I was able to not only learn about the local ecosystems but the food, people, and culture as well. In order to further my interests in the field of sustainable development, I am currently interning at a New Orleans nonprofit working with water quality/drainage.



EMILIA WILKE

she/her

Public Health and Psychology

SOCIAL NETWORK SUPPORT: THE IMPACT OF HOMOGENEITY IN SOCIAL NETWORKS ON INTERGROUP RELATIONS

The importance of exploring and enhancing the effectiveness of intergroup interventions targeting our social networks cannot be overstated, as quality cross-group friendships have profound prejudice reduction effects (Halim et al., 2021). It is important to explore the impact of both the demographic and ideological make-up of social networks and their impact on intergroup relations. In the present study, we explored the impact of social network factors such as race, political affiliation, and color-blind ideology, as well as engagement in and quality of conversations about social issues on an individual's approach, avoidance, and initiation attitudes toward outgroup members. We hypothesized that ideological heterophily (political affiliation and color blindness) will be associated with more avoidant attitudes and that demographic heterophily (racial group membership) will be associated with more approach attitudes toward racial outgroups and conversations about social issues related to race. We additionally hypothesized that engagement in and quality of conversations about social issues would be associated with more approach attitudes toward racial outgroups and conversations about social issues related to race.

Our findings suggest that some aspects of an individual's social network makeup have influences on intergroup approach, avoidance, and conversation initiation behaviors. Surprisingly, our findings did not consistently support the hypothesis that demographic race homophily would influence approach and avoidance behaviors as it has in past research conducted with student samples (Bagci, Turnuklu, & Tercan, 2020). Our findings also suggest that both quality of and engagement in conversations regarding race relations are important predictors of approach and initiation behaviors. This research will continue to be crucial in the current climate of the United States, as understanding and speaking about race-related issues will improve our intergroup interactions and understanding of one another.



ZOE YATES

she/her

TIERA FIELD COURSE

Access to water for households in northwestern rural Ecuador directly relates to water contamination and their wet and dry seasons. The wet and dry seasons in and around the Mache Chindul Reserve impact local residents' coping strategies for water insecurity and their perceptions of what they consider to be water secure. Coping strategies in the wet season allow for a lesser need for locals to purchase water but put them at a higher risk of being exposed to E.coli contaminated water. During the dry season, coping strategies lead to locals drinking cleaner water due to them having to purchase water but this also leaves many locals water insecure because of the high dollar cost of water and these locals not being able to afford it. This project aimed to study this water security predicament by conducting qualitative and quantitative surveys of women head of households on water security, as well as focus groups of women's experience with food energy and water insecurity, samples of water from each household and examining their E.coli count, and collecting geospatial data locating access points to water in correlation to water contamination. We hope to use this research to portray the deficiencies in empirical surveys that would consider areas like these water secure, but that is due to how well people execute their coping strategies because they are water insecure.



IKER RAFAEL YTURRALDE

he/they

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

Thalassia Testudinum, or turtlegrass, is the most common species of seagrass throughout the Caribbean. It is extremely important in shaping and maintaining the ecosystem because of its ability to stabilize seabeds, prevent coastal degradation, maintain water quality, and provide nursing and shelter space for marine organisms. Invertebrate grazers, like snails, that rely on these seagrass meadows may be facilitating microbial infection in seagrass tissue, which could impact seagrass health and productivity. Our team studied the potential grazer-fungal-plant interactions and examined the density-dependent effects of grazing snails (i.e., *Tegula fasciata* - smooth tegula) on seagrass fungal infection and the potential cascading effect on turtlegrass health and growth in Bocas del Toro, Panama. Previously, this type of cryptic top-down control had only been shown in terrestrial and some marine systems but never in seagrasses. Accordingly, this research could inform the development of novel techniques for seagrass restoration, health conservation, and predictive degradation modelling.

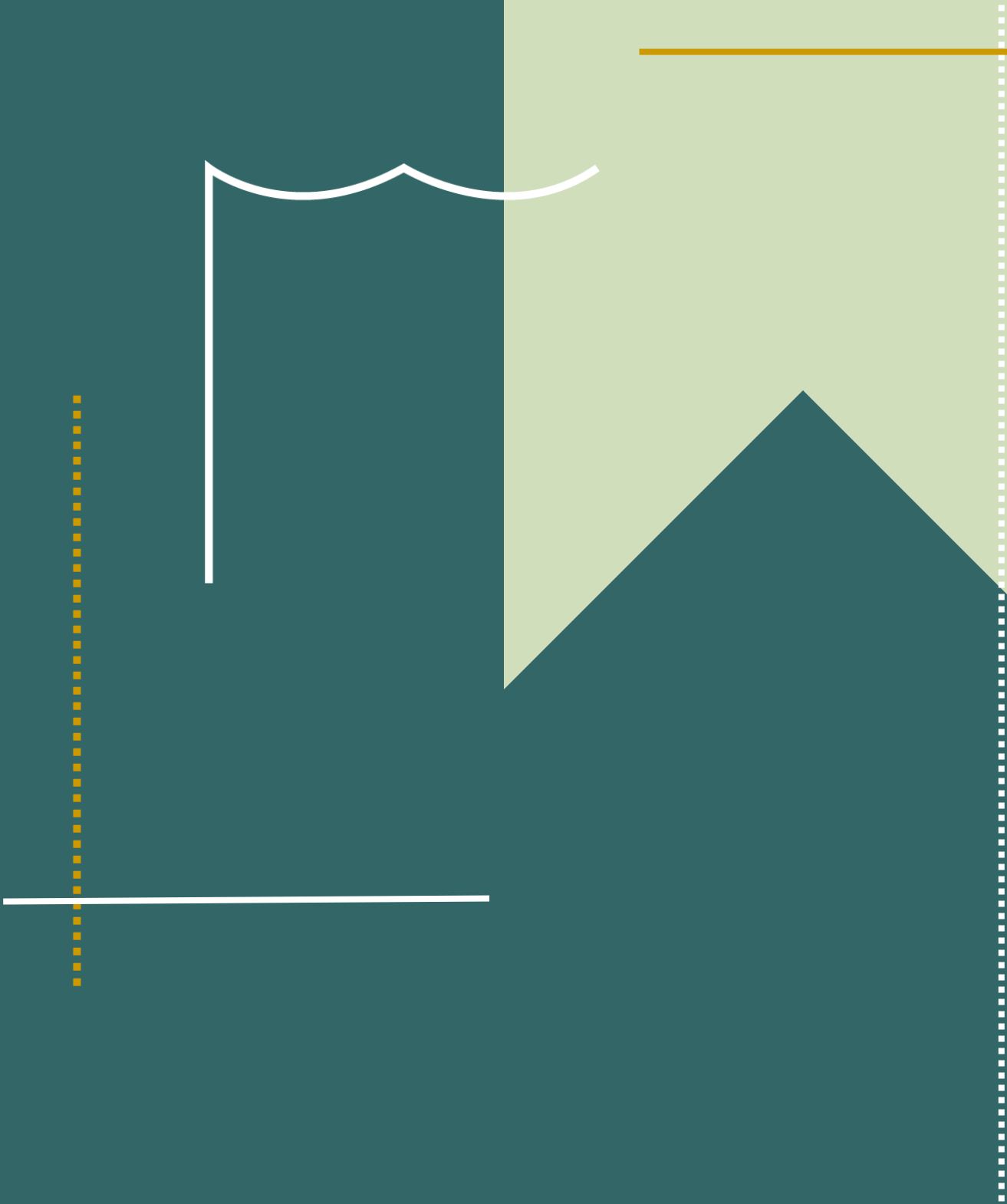


IRENE YU

she/her

DEPARTMENT OF NEUROLOGY

The objective of this research project is to identify baseline sex-dependent differences in gut microbial diversity and composition as well as how they influence sex differences seen in cognitive function. My central hypothesis for this project is that there are sex differences in both gut microbiota and cognitive function. The first aim of this project is to determine the extent to which sex hormones impact gut microbial diversity and cognitive behavior in female and male rats. In addition, this project aims to elucidate how short-term diet intervention of either the Mediterranean diet or Western diet may further exacerbate the aforementioned sex differences. Through these observations, the project sheds light on the sex-specific mechanisms of the gut-brain axis, providing greater understanding for the sex-differences seen in mild cognitive impairment, Alzheimer's disease, and other related dementias while also investigating the potential for diet modulation as an intervention for cognitive decline.



Newcomb-Tulane College
Undergraduate Research

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