

Volume XXVI

# INQUIRY

A Journal of Undergraduate Research



**NYU  
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SOCIAL SCIENCES **HUMANITIES STEM**  
STUDENT RESEARCH ABSTRACTS

# INQUIRY:

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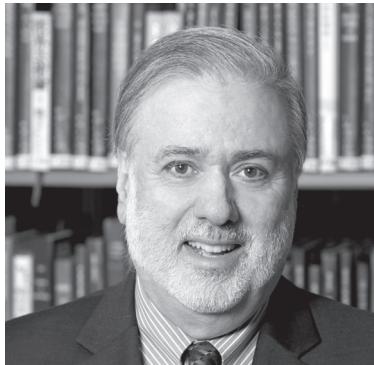
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# INTRODUCTION



Located at the center of a premier research institution, the College of Arts and Science at New York University has the opportunity—and the responsibility—to involve undergraduates whenever possible in the production of knowledge. We do this by putting students in direct contact with the distinguished scholars on our faculty, active researchers who routinely teach undergraduate courses. We do this also by empowering our students to conduct their own inquiries, for a liberal arts education is not only about transmitting knowledge but also about teaching our students how to learn for themselves throughout their lives, and how to use that knowledge to have a positive impact on society.

NYU's College of Arts and Science has long been at the forefront of promoting undergraduate research. All of our majors, for instance, offer Honors tracks in which original inquiry is central. The College's annual Undergraduate Research Conference was established over 40 years ago and now encompasses projects in all of the humanities, natural sciences, and social sciences, as well as in creative writing. In addition, the Dean's Undergraduate Research Fund, created through the generosity of alumni, parents, and friends, provides students in the College with the material support necessary to carry out their inquiries. (A list of the research scholarships that have been endowed in the Fund appears on page 2 of this journal.) Finally, student funding is also available, particularly in the sciences, from departmental resources as well as through external grants that the institution and individual faculty members have received to promote undergraduate research experiences.

The annual journal *Inquiry* showcases abstracts of selected student research. This issue contains abstracts of projects presented at the College's Undergraduate Research Conference held in spring 2022. Research takes many shapes. The students featured in this publication spent time working in a lab with a team of scientists in order to understand brain development; they measured the dimensions of ancient human remains to understand cultural practices surrounding beauty; they picked through boxes in an archive, finding textual evidence to support a literary analysis; or interviewed living eyewitnesses to a major historical event in a foreign country. The majority of these projects were supported by the Dean's Undergraduate Research Fund. But these abstracts represent only a fraction of the research undertaken by CAS students, both as individuals and in groups, under the close mentorship of faculty.

Taken all together, the contents of this issue attest to the crucial importance of independent inquiry as a paradigm for a liberal arts education for the twenty-first century. We are very grateful to the students, their faculty mentors, and the generous funders who have made this sort of educational experience, and this journal, possible.

Matthew S. Santirocco  
*Interim Dean, College of Arts and Science*  
*Professor of Classics*  
*Angelo J. Ranieri Director of Ancient Studies*  
*Faculty Director, NYU Washington DC*



# HUMANITIES

## A Writer Who Translates: Federico Falco as Co-Author in His Translation of Deborah Eisenberg's

*Your Duck Is My Duck*

Marguerite Alley, Spanish

Sponsor: Professor María José Zubieta, Spanish and Portuguese

In my project, I explore the confluence of creative writing and literary translation through the work of US short-story writer Deborah Eisenberg, as translated into Spanish by Argentine short-story writer Federico Falco. By examining, via close reading, the stories in Falco's 2015 collection *222 patitos y otros cuentos* alongside his 2020 translation of Eisenberg's story collection *Your Duck Is My Duck*, I identify key syntactical and thematic differences that indicate moments where the translator asserts his visibility as a writer in the text, thus providing evidence for the subjectivity and creativity intrinsic to the act of translation. How does Falco's own experience as a writer influence his interpretation and adaptation of Eisenberg's work? Using a theoretical framework provided by scholars like Lawrence Venuti, Jeremy Munday and Chantal Wright, I investigate the degree to which a writer's creative voice and subjective experience influence their interpretation and adaptation of a source text, while also noting the ways in which changes in the publishing industry have brought the theory and practice of translation to the fore. Translated literature has recently gained more of a foothold in the English-speaking market through the work of independent and academic presses disrupting the hegemonic control of the major publishing houses. Translation theory, in turn, has also progressed to a point where the translator has become more of an acknowledged presence than ever before, as the line sep-

arating translation from creative writing grows ever thinner. Based on these factors, I conclude that modern translators, especially those with creative writing backgrounds like Falco, become something closer akin to co-authors, contributing to the construction of a hybrid work.

## Dirges in the Dark: Political Music in 1960s Greenwich Village

Julia Baxley, History, Journalism

Sponsor: Professor Susan Linfield, Journalism

When considering decades of divisive and tumultuous large-scale cultural change, the 1960s are unrivaled. In a decade rife with political assassinations, international conflict and revolution, music made its way to the forefront of social commentary. As the counterculture movement grew, so did topical music. This type of music directly commented on political affairs or movements as they were happening. The situation was unique due to the large number of political and social movements that were simultaneously occurring—the anti-war movement in response to the Vietnam War, the Civil Rights movement and second-wave feminism, as well as a general shift in the values of the younger generations. The East Coast epicenter for the counterculture movement was Greenwich Village, and thus this is where many musicians made their residence and found their fame. Greenwich Village was long considered a bohemian haven and already had a diverse demographic. These factors, combined with new publications and performance venues which allowed for the spread of topical music, created the perfect atmosphere for topical music to grow in popularity and prominence in the 60s counterculture movement.

### **The Poetics of Detention and Belonging: Spatializing Angel Island Immigration Station**

*Angela Cai, English and American Literature, Social & Cultural Analysis*

*Sponsor: Professor Sonya Posmentier, English and American Literature*

Angel Island Immigration Station was a detention center that operated from 1910 to 1940 in San Francisco Bay and detained primarily Chinese immigrants traveling to the United States. While they awaited entry or deportation, immigrants painted and carved classical Chinese poetry into the walls of their detention barracks, resisting immigration authorities' repeated attempts to erase their writing by continuously adding to their writing. Translated by Him Mark Lai, Genny Lim and Judy Yung in *Island: Poetry and History of Chinese Immigrants on Angel Island* (2014), these poems articulate the immigrants' dreams of freedom, longings for home and frustrations with confinement. In my thesis, I organize the poems into three primary categories: legal liminalities, spatial imaginaries and cross-temporal exchanges. My research explores the central question: how did Chinese immigrants on Angel Island use poetry to produce, engage with and transform the liminal space of detention? To answer this critical inquiry, I deploy legal, literary and spatial analytics to explore how Angel Island and its poetry embody the marginal sites of the detention center and the racialized body. I draw on my visit to Angel Island to analyze how the natural and built environment structure the entangled spaces of detainment, law and race. I argue that Angel Island poets appealed to different scales of the body, space and time to construct an open, intertextual dialogue of survival and resistance spanning continents and generations. My thesis enters into dialogue with Angel Island's anonymous poets, as well as the longer genealogy of Chinese American immigrant writing, to historicize the critical immigrant themes of space, place and identity.

### **Merciful Anger: The Esoteric Cult of “Five Wisdom Kings” and State-Protection Buddhist Rituals in Eighth- to Ninth-Century China and Japan**

*Catherine Cao, Applied Psychology, East Asian Studies*  
*Sponsor: Professor Benjamin Fleming, Religious Studies*

This study considers the emergence of the cult of “Five Wisdom Kings” in eighth- to ninth-century China and Japan, with a focus on the role played by the Buddhist Mijiao School (“Esoteric teachings”; Japanese: Mikkyō). Unlike traditional Buddhist divinities that are benevolent and peaceful, the “Wisdom King” deities in the esoteric pantheon are wrathful: terrifying facial expressions (fangs, etc.), dynamic body language and weaponry. What might have inspired this unusual portrayal of anger? How does that anger speak to the larger context of religion and polity in medieval East Asia during which the cult was

promulgated cross-culturally? My research examines the Wisdom-King sculptures from two monasteries in East Asia: the Anguo Temple in Chang'an (present-day Xi'an), the capital of Tang-Dynasty China and the “East Temple” in Heiankyō (present-day Kyōto), the capital of Heian-Period Japan. It also analyzes key contemporaneous Buddhist scriptures (sūtras) where the iconography of the Wisdom Kings is prescribed. One of the most important of these is the Benevolent Kings Sūtra. These deities are described in detail as part of the special esoteric ritual called the “state-protection” ceremony, which evokes the power of the “Five Wisdom Kings”. This ritual harnesses their power in order to protect a given empire (Tang or Heian) from invasions, illnesses and disasters. These real-world, political efficacies helped esoteric Buddhism earn continuous patronage from the imperial families of both China and Japan. Herein, the very capacity of esoteric Buddhism to offer magical solutions to worldly crises was the main reason why the Mijiao school was able to thrive in the Chinese and Japanese medieval landscapes.

### **Disturbance and Delight: The Startling Grotesques of Quinten Massys**

*Emma Carrig, Art History*

*Sponsor: Professor Carol Krinsky, Art History*

Working in sixteenth-century Antwerp, a commercial and intellectual center, Quentin Massys painted images with a wide range of subjects. His grotesques pose many questions for art historians, as few documents exist to record his and his patrons' intentions. The grotesques—some based on drawings by Leonardo da Vinci—reveal the inward characteristics of subjects through their physiognomy. Massys created inventive images with which viewers could engage actively, but the specific patrons and audience remain unknown. The simultaneously didactic and entertaining grotesques suggest that the viewers were learned humanists, likely in the circle of Desiderius Erasmus. Participants in images of folly and greed, Massys' figures warn viewers to lead lives of virtue, to avoid the inevitable fate of those whom he depicted. However, the actual effect of these messages was left up to the beholder. Massys' grotesques are featured less prominently than his religious works in art historical scholarship; however, the depiction of grotesque individuals in isolation, often in a portrait-like format, reflects his artistic ingenuity.

### **Entrapment, Agency and Inertia in Korean Narratives of Urban Experience**

*Jenny Choi, Comparative Literature, French*

*Sponsors: Professor Yoon Jeong Oh, East Asian Studies; Professor Emanuela Bianchi, Comparative Literature*

The emotionscape embodies an urban dweller's agency within a narrative of urban experience and incorporates organic elements, such as one's interpersonal re-

lationships and collective emotional experience, as they re-enact and adapt their urban routines while navigating urban spaces. Feeding into the network of the cityscape are specialized urban microcosms where urban dwellers operate on assumed rules that facilitate their extreme self-regulation. Kim Ae-ran's 2003 short story, *The Place Where No One Knocks*, depicts the shared Korean apartment unit as a designated private space that operates in reality as an unavoidably public one. The apartment microcosm overpowers the emotionscape by eliciting one's paranoid anxiety for an unfulfilled desire for privacy. As a hostile living force, the cityscape strips the urban dweller of their agency and regulates the emotionscape by imposing limitations that require the urban dweller to adapt their urban routines to the dynamics of the imagined space. In contrast, the emotion-driven narrative of Park Sang Young's 2019 novel, *Love in the Big City*, demonstrates how the emotionscape dominates the cityscape, thereby sustaining the urban dweller's agency. They are held captive by their indifference and resignation to the urban dynamic of constant change. Their unfulfilled desire for a stable grounding in routine results in the emotionscape's reconstruction of the cityscape, entrapping the urban dweller in a state of inertia. By navigating the tensions between the city and the urbanite via the cityscape and emotionscape, one can explore the root of the urban isolation which has since been exacerbated by the COVID pandemic.

#### **The Hero's Journey: An Analysis of Pierre Bezukhov**

*Cristina Coppa, English and American Literature*

*Sponsor: Professor Anne Lounsherry, Russian and Slavic Studies*

One way in which Leo Tolstoy's *War and Peace* can be dissected is by looking at this novel through the lens of the Hero's Journey, a common narrative template for stories, involving a hero who goes on an adventure, commences a major crisis and undergoes a spiritual transformation. The story of a main character in *War and Peace*, Pierre Bezukhov, adheres to the Hero's Journey: having lacked a legitimate father to provide him with a self-image, Pierre's journey is a quest for self-definition. Pierre himself provides the key to this journey when he values Napoleon Bonaparte. The latter's ideas of freeing man from the constraints of class life indicate the nature of Pierre's search and its resolution. Yet, Pierre's quest fails so long as he seeks an answer within Russian high society. On the other hand, when he is an identity-lacking prisoner of Napoleon's army and is all but executed for his namelessness, he begins to tap into his own nature. The very qualities that were deemed weaknesses of character in high society become his strengths through the isolation of suffering and imprisonment. Morally cleansed through the near experience of death, Pierre is reborn into a sense of freedom of self. My analysis offers a renewed way of

utilizing the Hero's Journey as a framework to understand the sensibilities of a set of circumstances different from our own. My research also gives insight into what is gained and lost in viewing a story with a single pair of lenses.

#### **Aesthetics of an Ideological Novel: Alienation through Sensory Imagery in Tolstoy's Resurrection**

*Taisia Crowley, Religious Studies, Russian*

*Sponsor: Professor Anne Lounsherry, Russian and Slavic Studies*

In my paper *Aesthetics of an Ideological Novel: Sensory Imagery in Tolstoy's Resurrection* I approach Leo Tolstoy's final novel, *Resurrection*, through the lens of the aesthetic theory described in his 1897 text *What is Art?* I attempt to provide a different reading than that of Mikhail Bakhtin, one of the Soviet Union's greatest literary critics, who described *Resurrection* as chiefly "socio-ideological". Though elements of the novel are certainly deeply rooted in Tolstoy's ideological convictions, the same could be said for *Anna Karenina* and *War and Peace*. I firmly believe that such a description limits the scope of the text and hope that through an analysis of the sensory imagery invoked across the novel, overarching qualities that distinguish the narrative techniques of *Resurrection* from Tolstoy's earlier work could be better understood. My primary argument relies on the application of Tolstoy's aesthetic theories from *What is Art?*, which claims that art must center God to qualify as "good". According to the text, the established standard of beauty cannot fall under the categories of what Tolstoy described as universal or Christian art without creating some semblance of social hierarchy. Therefore, I maintain *Resurrection* rejects the narrative style of, for instance, *War and Peace*, in order to replace it with an aesthetic tone that reflects Tolstoy's radically evolving Christian morality. My analysis demonstrates how such a shift in storytelling by Tolstoy sheds light on imperative questions within philosophy and theology, sex and power and nineteenth-century critical realism.

#### **Examining the Personal and the Political in the Works of Elena Ferrante**

*Sharanya Das, Economics, English and American Literature*

*Sponsor: Professor Gianna Albaum, Italian*

I will evaluate Lenu and Lila's journeys as political beings throughout *Those Who Leave and Those Who Stay* within the depiction of the relationship between the personal and political in the novel and its adaptation—the third season of HBO's *My Brilliant Friend*—by Saverio Costanzo. I will examine the stylistic choices employed in Saverio Costanzo's series *My Brilliant Friend*, the adaptation of Ferrante's novels, to emphasize Lenu and Li-

la's political self-realization. In doing so, I will consider how the relationship between subject and creator and the previously mentioned parallel is affected by the act of adaptation by a new creator, particularly how the frantumaglia and smarginatura of Ferrante's original writing are lost in adaptation. I ask: How does Costanzo's series get rid of the frantumaglia/"hidden depths"—"the mysterious churn of consciousness, the lawlessness of a person's doubts or desires"—which drive Lila and Lenu's political realizations in the novel? In other words, how does his series externalize moments of human irrationality, confusion and ambiguity—particularly moments of Lila and Lenu's political realizations—by attributing them exclusively or largely to narrative events? How does Costanzo's inability to properly express the frantumaglia within imply in or ascribe to Ferrante's original a special quality which is viscerally personal or specific to the creator and which cannot be properly replicated? How is Lenu's gap between theoretical understanding of abstract political concepts and practical understanding of her role in the communicative systems in which she participates through interpersonal interactions indicative of Felski's following claim: the political value of works of literature as feminist can be determined only by an investigation of their social functions and effects in relation to the interests of women in a particular historical context?

#### **Remembrance, Honor and Condemnation: A New Memorial Form in Germany and the United States**

*Sarah Fruehauf, Art History*

*Sponsor: Professor Ann Roth, Art History*

My project focuses on the way modern memorials erected in the United States and Germany in the past 50 years have developed a new visual language combining honor, remembrance and condemnation. More precisely, I seek to reveal why these new kinds of monuments, which balance honoring the individual with addressing and often criticizing a larger cause, are well equipped to confront complex tragedies and explore uncomfortable subjects. In my research, I look specifically at Maya Lin's Vietnam Veterans Memorial in Washington, D.C., Käthe Kollwitz's addition to the Neue Wache in Berlin, Peter Eisenmann's Memorial to the Murdered Jews of Europe in Berlin and Bryan Stevenson's National Memorial to Peace and Justice in Alabama. I will contextualize these memorials within the greater history of monumentality in the United States and Germany, in order to best show how these monuments have begun a new tradition. By comparing these four sites, I argue that this simultaneous acknowledgement of the individual and personal as well as the collective or larger ideology is an essential characteristic of this new monument.

#### **Sound in Sound: An Interdisciplinary Look into How We Perceive and Recall the Urban Soundscape**

*Emily Glass, Journalism, Music*

*Sponsor: Professor Martin Daughtry, Music*

What does the city sound like? What do the city's sounds tell us about urban life? What do people's opinions and recollections of these sounds mean? Do they matter? This research project utilizes an eclectic set of methods to explore the role sound plays on our understanding of spaces within New York City. It explores the relationship between urban geography, auditory perception and memory while drawing attention to ambient sound. I employ three interlocking methods—ethnographic investigation of peoples' attitudes toward urban soundscapes, analysis of ambient audio recordings and a composition building these recordings into an exploratory *sound work*—that will provide rich material for interpretation. In the sound work, environmental sound will take the lead, while the human voice will serve as a transitional and supplemental track, thus inverting the expectations of audio journalism. This inversion also becomes apparent in the research project as a whole, as the sound work will be the central component, with the extensive written text being provided as an important supplement. Following anthropologist Steven Feld's contention that "until the sound recorder is presented and taught as a technology of creative and analytic mediation, which requires craft and editing and articulation just like writing, little will happen of an interesting sort in the anthropology of sound", this project aims to present the sound work as a manifestation of scholarly argument, rather than an adjunct to it (Feld and Brenneis, 2004). This open-ended, eclectic format thus embodies an argument 'about' sound 'in' sound.

#### **How Social Mobilizations Impact Writing: Contemporary Mexican Feminism and the *Tsunami* Anthologies**

*Samantha Golden, Psychology, Spanish*

*Sponsor: Professor Laura Torres-Rodriguez, Spanish*

My thesis is focused on answering this question: How have the feminist protests in Mexico within the last few years impacted Mexican feminist writing? I am focusing on two anthologies of women writers: *Tsunami* (2018) and *Tsunami II* (2020). Gabriela Jáuregui is the editor of both and also wrote the prologues for both collections. Between their publication dates, Mexico has seen an unprecedented intensification of women's mass protests, collective actions and strikes that have captivated the public debate and the collective imagination. In analyzing them, I have found the feminist writing to mirror these changes, especially in the form of a transformation from an individual notion of authorship and ownership to a collective subject and voice. The increasing feminist mobilizations have created a more expansive and



experiential understanding of what “writing” can include: performance, songs, visual objects, gesture, graffiti and more. These are all things that can be incorporated into protests, and many have been used creatively in protests in different parts of Latin America, especially in recent years. I am using the concept of one of the writers to guide my analysis and construct an original theoretical framework: the concept of “gestural testimony”, or “testimonio gestual”. Using the ideas of philosopher Carrie Noland in *Agency and Gesture*, I am arguing that the second anthology gives more emphasis to other gestural, experiential and collective forms of inscription like performance, songs, collective gestures, graffiti, etc.

#### ***Garrote vil: Ramón Casas and History Painting in 1890’s Barcelona***

Rachael Griswold, Art History

Sponsor: Professor Miriam Basilio, Art History

This thesis will focus primarily on the Catalan artist Ramón Casas i Carbó and his painting *Garrote vil* (1894), which represents the public execution of nineteen-year-old Aniceto Peinador. Casas was part of a circle of *Modernista* artists with notoriously paradoxical and often inarticulate political views; their work expressed an affinity for the working class, but they were inherently elite and had more in common with the oppressive bourgeoisie than they did the radical revolutionaries they ostensibly championed. *Garrote vil* may reflect Casas’ search to capitalize on a grave moment in Catalan history rather than advocate for genuine social reform, but perhaps the work is more politically motivated and historically resonant than Casas’ intellectual milieu might suggest. In pursuit of an answer to the question of whether Casas could have represented the scene differently, I examine the ways in

which *Garrote vil* may have failed to send a clear message to a disparate, heterogeneous audience while also elucidating the aspects of the piece that were radically successful. This thesis will evaluate the effectiveness of *Garrote vil* both within its immediate context and also in dialogue with earlier representations of imminent death during the moments leading up to an execution, namely Francisco de Goya’s *The Third of May 1808* (1814). I will argue that *Garrote vil* functions as a modern history painting, memorializing a fractured public witnessing a horrific moment emblematic of the tumultuous 1890s in Barcelona.

#### **Incremental Housing: An Investigation into the Latin-American Self-Build Method and Its Applicability as an Affordable Housing Solution for British Columbia**

Eric Heidinger, Urban Design & Architecture Studies  
Sponsor: Professor Mosette Broderick, Urban Design & Architecture Studies

The lower Mainland region of British Columbia (BC) is facing an unprecedented housing crisis. Increasing housing costs and consistently low vacancy rates are creating an environment where finding and maintaining adequate shelter is difficult. BCHousing, the crown corporation responsible for the province’s affordable housing solutions, has been implementing the same strategies for over a decade with little to no impact, signaling the need for a shift in methodology. There are two purposes to this paper; to act as a synopsis of the current housing landscape within the Lower Mainland, as well as an analysis of self-build housing commonly found in developing nations. The duality of this paper provides the opportunity to understand the method not commonly found in North America and to investigate its possible applicability as a novel affordable housing strategy in BC. Overall, this pa-

per aims to determine whether self-build housing could be implemented by BCHousing to assist in creating more opportunities for affordable housing.

### **The Legality of Molière's *Tartuffe* from Louis XIV to the French Revolution**

*Abaigeal Heneghan, French, Politics*

*Sponsor: Professor Benoît Bolduc, French*

Perhaps the most recognizable work by famous French playwright Molière, *Tartuffe* (1664) is an infamously controversial play about religion and law. Despite being two of the most important pillars of French history, their roles in society and our understanding of them are not consistent across time. My thesis seeks to analyze two distinct time periods where the relationship between law and religion was increasingly dynamic—the reign of Louis XIV in the seventeenth century and the French Revolution in the eighteenth century. Under the absolute rule of Louis XIV, *Tartuffe* was first performed and then immediately censored for its perceived negative depiction of religion. While the ban was eventually lifted in 1669, over a century later, during the French Revolution, *Tartuffe* experienced renewed relevancy as revolutionaries striving for democracy sought to reclaim various pieces of French art by erasing the influence of the Old Regime. Through my project, I intend to analyze the disparate legal and religious contexts of these two time periods and the largely varied views and interpretations of *Tartuffe* to which they lent themselves, in an effort to contribute to studies of the play's reception and enduring allure.

### **War of Words under Conservative Regimes: An Examination of 1980s War Rhetoric in Britain and the United States**

*Nia Hope, History*

*Sponsor: Professor Michele Mitchell, History*

This thesis will examine the use of war language during the rise of transatlantic neoliberalism in the United Kingdom under Prime Minister Margaret Thatcher and the United States under President Ronald Reagan in the 1980s. In the U.K., Thatcher and the press implemented war language through her “war on soccer hooligans”, which encompasses her anti-hooligan agenda (Jones, 1985). Within the context of the U.K., the term “hooligan” is a charged label to describe the stereotypical rowdy working-class British football fan. Thatcher’s war on those deemed hooligans presents as an attack on the working-class football fans. My thesis argues that war rhetoric under Thatcher was evoked to reverse British decline in socio-political ways during the 1982 Falklands War, 1984 war on striking miners and the overall war on working-class football fans in the 1980s. The other part of my thesis examines Reagan’s “War on Drugs”. This part outlines Reagan’s and the media’s uses of racially coded

language that was directed towards those who the war was against, which statistically speaking, were overwhelmingly Black people. The thesis examines how the use of war rhetoric in the US was part of Reagan’s conservative regime aimed at restoring the declining countries. The last section examines the criminalization of urban Black men through the term “thug” and its associated terms. An analysis of the war rhetoric used during the conservative Thatcher and Reagan administrations as they worked to reverse the economic, political and social decline in their respective countries reveals how charged terms became weapons in a political war of words.

### **Whose Promised Land? Health Inequality, Segregation and the Potential for Unity across Jerusalem’s Divided Border**

*Raisy Jrada, Urban Design & Architecture Studies*

*Sponsor: Professor Jonathan Ritter, Urban Design & Architecture Studies*

This project investigates historical and contemporary cases of health inequity through the study of architecture and urbanism. Case studies of the divided and conflicted society of contemporary Jerusalem focus on the physical factors influencing epidemiological infection. While architectural design and urban planning can help reduce the spread of disease, examples in Jerusalem’s history demonstrate connections between unequal access to healthy environments and persistent social injustice. After the War of Independence in 1948 and the Six Day War of 1967, Jerusalem continuously transformed its border, known as the Green Line, leading to an ongoing dynamic of displacement over seventy years. This project focuses on a key site of this displacement, the Palestinian neighborhood of Sheikh Jarrah, in order to assess health impacts under home demolition, mass expulsion and land confiscation by Israel. Up to today, the Palestinian refugee crisis continues to intensify, creating mental and physical health crises in neighborhoods like Sheikh Jarrah. Today the conditions of vulnerable citizens continue to deteriorate through an unsafe water supply, increasingly dense environments, limited housing and a shortage in vaccine accessibility. In response to the Covid-19 pandemic, however, new health reforms promise to initiate peace among the two parties, as many now recognize that unified cooperation is the only cure for persistent public health crises. To assess the historic patterns of land occupation and the impacts of the built environment upon public health, the project relies upon primary documents, including maps showing shifts in land possession, archival newspapers and photographs, architectural drawings and urban planning documents. Secondary, interpretive literature from the fields of architecture and urban history, planning theory and healthcare policy furnish frameworks to ana-

lyze and understand the systems and structures described through primary documentation.

### **The Barnes Legacy: Afterlives of Primitivism in the Display of African Arts**

*Alyssa Kim, Art History, Psychology*

*Sponsor: Professor Prita Meier, Art History*

Amassing an impressive private collection, Albert Barnes was known for his unique curatorial approach. Utilizing his “Barnes Method”, the collection consisted of wall ensembles that juxtaposed furniture, cutlery, paintings and sculptures from various time periods and cultures. As artists like Picasso and Matisse began to find inspiration from African art (most notably African masks), Barnes was among the first to display African objects alongside the works of European artists—redefining African art as fine art rather than as artifacts. Unfortunately, using African works to support stories of European Modernism, though it may have been well-intentioned by Barnes, has led to a colonialist depiction of African objects in the form of “primitivism”. As the Barnes collection remains untouched since his death in 1951, my research performs a case study on the Barnes Foundation as a historical space reflecting a reductive representation of African art. This thesis traces the lineage of “primitivism” and offers a more nuanced viewing of the Barnes Foundation’s African collection and the exhibition as a whole. I explore the Barnes Method and how it influenced an understanding of African art as art rather than artifact. Focusing on the wall ensembles that directly compare African statues and masks with works by Modigliani, Picasso and Matisse, my research highlights the long-lasting impact of “primitivism” on African artworks. More specifically, I explore the “primitive’s” legacy—the tradition of exhibiting African works as contextualization of western art that continues in museums, galleries and private collections today.

### **Alleviating Writing Anxiety and Mapping Approaches in Research Writing across the Disciplines**

*Henry Kim, Biology; Crystal Li, English and American Literature; Yara Kyrychenko, Mathematics, Psychology; Melissa Olivari-Villanueva, Neural Science*

*Sponsors: Professor David Ellis, Expository Writing Program; Professor Jonathan Mischkot, Expository Writing Program*

For many students, both undergraduate and graduate, the process of research writing and reading is a major challenge. In fact, research writing- and reading-related anxieties have led to roughly 50% of graduate students in the US and Canada dropping out of their programs while trying to write research proposals or dissertations (Council of Graduate Schools, 2008). To address these concerns, we aim to provide students with helpful tools to discern what’s important when reading articles and to confident-

ly tackle writing them. To this end, we surveyed students in the Fall 2021 Research, Writing, and Speaking in the Disciplines class to measure research and writing anxiety. We asked how anxious and intimidated students felt about reading and writing different sections of a research article and found high levels for both. Our preliminary results indicate that undergraduate students experience significant levels of anxiety around writing, with problem areas being abstracts, discussions and methods. Likewise, these trends seem to persist into graduate studies as well (Council of Graduate Schools, 2008). Then, to improve upon writing anxiety, we are currently employing a meta-disciplinary analysis of primary research articles from the humanities, natural sciences and social sciences to clearly elucidate underlying rhetorical patterns and structures of research articles. Since these tools are not traditionally taught in schools, we hope our study can inform ways to improve students’ research writing and reading anxiety.

### **Vikramshila Mahavira: Rebuilding a History in Ruins**

*Anand Kumar, Politics, Public Policy*

*Sponsor: Professor Karen Karbiener, Global Liberal Studies*

“The art of a people is a true mirror to their minds”. This statement of India’s first prime minister, Pandit Jawaharlal Nehru, might help answer the question: why is Bihar, a state holding approximately 1.25% of the world’s population, still plagued with poverty and illiteracy? Bihar’s nostalgia for living in the past without valuing its artistic legacies has kept this region as well as the rest of the world from experiencing several medieval historic sites of significance and beauty. Vikramshila Mahavira (either Hindi for “best knowledge” or named after the king “Vikram”), the place of origin of Lamaism and once home to one of the three epicenters of learning in India, now stands dilapidated. This project takes viewers on a multimedia tour of this forgotten cultural treasure with the intention of drawing global attention to a worthy site and also of reminding Bihar of the history that could change its future. My visual and narrative documentation of this site is intended to bring economic and cultural revivalism of the area, thereby depicting the need for conservation and investment required to foster scientific inquiry and excavation. It is my intention to show Bihar and the world that it is only when a civilization looks back, preserves and learns that it can move forward.

### **Glory, Fate and Immortality through Art:**

#### **Reimagining Homer’s *Iliad* across Generations**

*Mae Liu, English and American Literature, Journalism*

*Sponsor: Professor Karen Karbiener, Global Liberal Studies*

How do you win a war waged against fate? It seems like a predicament for mythical heroes long past—

those like the wretched Achilles, entangled in a web of double-edged prophecies since birth. The *Iliad*—an epic no stranger to critical acclaim and artistic recreations—certainly confronts this question through tales of glory equal parts exhilarating and heart-wrenching. Yet interwoven between the threads of Homer’s tale are more timeless voices cautioning against the cost of ambition, exposing pressures that force youth to prematurely fill the shoes of imposed roles and challenging notions of masculinity through ambiguously intimate male relationships, such as that of Achilles and Patroclus. Hence, the *Iliad*’s study becomes a question of art’s preservation, innovation and communication. What makes a piece so powerful that its resonance remains pertinent amidst the changing backdrops of each successive generation? To investigate the art behind the *Iliad* and its significance, I not only analyze Homer’s craft, but compose my own portrayal of its themes through an original digital painting entitled *Hero Without a Cause*. By re-envisioning ancient narratives in modern mediums and comparing them with past renditions—such as Peter Paul Rubens’ *The Death of Hector*, c.1630–1635—we illuminate parallels between the original text, stylistic choices and contemporary art trends of each period that keep “old art” alive. Is there a point to struggle against forces that feel so out of our control—be it a hero’s destiny, or the uncertain fate of classic texts against the tides of time? This project, then, aims to tell.

#### **Nature as His Guide: The Botanical Studies of Leonardo da Vinci**

*Niall Lowrie, Art History*

*Sponsor: Professor Dennis Geronimus, Art History*

Leonardo da Vinci’s scientific interests and their related drawings, especially engineering and anatomy, have long been studied. His botanical drawings—the delicate and highly detailed depictions of plants which comprise

a large segment of his extant oeuvre and helped make his name early in his career—have had far less attention, with the last complete study of his botanical interests coming from the early 1970s. This study seeks to shine a fresh light on Leonardo’s botanical works by combining the earlier research with the wealth of new findings generated in the last 50 years of Leonardo studies. These decades have been especially important in filling gaps in Leonardo knowledge, with the discovery of the *Salvator Mundi* and a mass of biographical research for the 500th anniversary of the master’s death occurring in the last decade alone. Yet even the most recent monographs neglect a full coverage of the botanical works; this study aims to correct that. From a survey of research past and present, as well as renaissance herbal manuscripts, and Leonardo’s own notes, it is apparent that botany and gardening are as deeply woven into the master’s thought process as any of his fields of study. Leonardo planned formal gardens, farming programs and studied medicinal plants; it is also likely that he planned to compile a manuscript solely on the subject of botany. Highlighting these plans give a fuller view of Leonardo’s oeuvre as well as offering a fresh approach to a hegemonic body of work.

#### **The Search for a Jewish Homeland: An American Perspective on Birobidzhan 1928–1950**

*Nikkie Lyubarsky, History, International Relations*

*Sponsor: Professor Brandon Schechter, Columbia University, History*

In the mid to late 1920s, the Soviet Union claimed to have solved the problem of the “Jewish Question” with the creation of Birobidzhan—the first Jewish autonomous state in existence. Not long after its inception, Birobidzhan became quite notorious among American socialist or communist Jews who looked at the Jewish Autonomous Region (JAR) as the solution for all the problems facing



modern Jewry. They formed organizations like the ICOR and Ambijan to fundraise and promote the JAR; and to possibly encourage American settlement within the region. Narratives on the motivation behind the creation of the ICOR and Ambijan are somewhat obscured by the historical accounts of these organizations' life and death. However, through close examination of this documentation, as well as journals published by these organizations and other Jewish contemporaries, the reason behind the fascination with Birobidzhan comes to light. The factors that often drew American Jews to the Communist Party can also explain why Birobidzhan, in particular, and no other proposed Jewish mandates like Palestine or Madagascar, was so enticing. Understanding these factors—a fear of Nazism (and subsequent rise of antisemitism), the effects of the Great Depression on the Jewish middle and working class, a burgeoning “back to the soil movement” that emphasized the importance of Jewish agriculture, an overwhelming Anti-Zionist movement and a growing need to keep Yiddish culture alive—can answer the central question behind the peculiar relationship between American-Jewish Communists and Birobidzhan.

### **Exclusionary Urban Development Priorities in Karachi, Pakistan**

*Anushka Maqbool, Urban Design & Architecture Studies*  
*Sponsor: Professor Jonathan Ritter, Urban Design & Architecture Studies*

The city of Karachi is the economic, industrial and political center of Pakistan. Many factors, including Karachi's complete demographic shift post-partition, unstable democracy, complex land ownership and financially and politically involved military have contributed to exclusionary patterns of urban development in the city. This thesis traces the historical and contemporary urbanism of Karachi and the effects of wide-scale privatization and introduction of neoliberal policies and discourse in the early 2000s. This neoliberal era was pushed for by political, financial and military elites and has led to the private sector growing extremely powerful and dominating Karachi's urban development. The market-based, neoliberal approach to development and urbanism creates exclusion in Karachi, inspired by lifestyles offered in cities abroad. This thesis explores the city's patterns of development through the case study of Bahria Town Karachi (BTK), a 16,896-acre gated city developed illegally on public land inhabited by indigenous farmers and villagers. BTK encompasses key features of the exclusionary urban landscape of Karachi such as the neoliberal insistence on short-term profit, which manifests as a complete disregard for the environment; a lack of planning for ecological systems; car-centric development; and a notable appropriation of commodified and decontextualized spectacles of global tourist urbanism. In order for Karachi's urban

development to shift away from exclusionary neoliberal trends, there need to be strong restrictions over the private sector, established and enforced by an educated democratic government, and increased participation and information made accessible to the people of Karachi.

### **Social Hygiene, the Ecophobic Unconscious and Memory in the Reserva Ecológica Costanera Sur and Freshkills Park**

*Rachel Moorman-Minton, Global Liberal Studies, Spanish*

*Sponsors: Professor Jens Andermann, Spanish and Portuguese; Professor Mitra Rastegar, Global Liberal Studies*

This thesis examines and compares the beliefs underpinning the formation of dump sites and the subsequent creation of park spaces at what is now the Reserva Ecológica Costanera Sur in Buenos Aires, Argentina and Freshkills Park on Staten Island in New York City. I focus first on the use of the spaces as dump sites, analyzing the discourse established by the respective governments about these sites. I then discuss the so-called “parquización” or “parkification” of the spaces that has taken place more recently, analyzing this transformation in light of broader urban park histories in both cities. I particularly focus on the view of the human-nature relationship expressed in the waste-dumping and park-making actions, making use of the works of scholars such as Simon Estok, Susan Signe Morrison and Andrés Barreda. I also discuss the surprising agency of the matter and how that impacted both government language and broader cultural beliefs about the sites. My thesis also touches on the way that memory of the spaces is inscribed and interpreted in their current forms, specifically regarding the intrinsic connection between the Reserva and the last Argentine dictatorship. Using the critical framework provided by Estok and other authors, I argue that at the root of all these spatial reconfigurations within the Freshkills and Reserva sites is the desire for control—over the material, the environment, the people of the city and the very perception and memory of the sites—as well as the fear of losing it.

### **Perpetuating Colonialism in Puerto Rico: Luis Muñoz Marín and the Politics of Puerto Rican Independence, 1932–1952**

*Claudia Olmo Agrait, History, Politics*  
*Sponsor: Professor Sibylle Fischer, Spanish and Portuguese*

Puerto Rico's unique status as an unincorporated territory of the US has naturally made politics a basic and central topic in everyday popular discourse amongst Puerto Ricans. While growing up, I was fascinated by how everyone around me incorporated the island's politics as a key source of knowledge to navigate everyday life. Nev-

ertheless, I realized most discourse around Puerto Rican politics lacked a true and comprehensive understanding of the island's history. Most of us complain of how the island suffers from a crippling economy and an inefficient and corrupt government without considering the history that got us here. For this reason, I decided to write a thesis about Puerto Rico's state as a colony, and most specifically, how the island's first popularly elected governor made Puerto Rico's status question one almost impossible to solve. I study Governor Luis Muñoz Marín's (LMM) ideological transformation from an independence supporter towards a status quo champion. By analyzing LMM's desires to hold on to local power I discuss all of the political decisions he had to make, all at the detriment of Puerto Rican independence.

**British and Irish Marriage Bars during the 1920s–1930s: A Comparative Study on the Decline in Rights for Women in the United Kingdom and the Irish Free State**

*Elizabeth Rickert, History*

*Sponsor: Professor Guy Ortolano, History*

Despite making substantial progress towards women's suffrage in the late 1910s and early 1920s, women's rights in both the United Kingdom and in Ireland declined in the 1920s and 1930s. Previous scholars have asserted that the Irish Parliament passed anti-suffrage legislation during this time because of an increase in traditional Catholic values under the Irish Free State. However, this assertion overlooks the fact that the same issue was happening in Britain, a non-religious nation. When faced with the question of why the British government placed restrictions on women during this time as well, historians claimed that the Great Depression in the United Kingdom led British officials to focus on ways to keep men employed, which resulted in marriage bars preventing women from "taking men's jobs". These interpretations of the British and Irish governments' attitudes towards women fail to look at why the same phenomenon occurred in both the United Kingdom and the Irish Free State during the 1920s–1930s. In this thesis, I examine Parliamentary debates from both Britain and Ireland and compare government officials' views and ideologies about women. Through this research, I determine that members of both the Irish and British Parliament shared a strong belief in the "homemaker-breadwinner" gender roles and that this was reflected by their respective populations. Therefore, I conclude that the "homemaker-breadwinner" roles were much more widespread than previously thought, leading government officials to create anti-suffrage laws and that a nation's religiosity did not entirely determine its views towards women.

**On the Dance Floor: Liberation, Christianity and Masculinity in 1970s America**

*Oliver Ruiz-Gomez, History*

*Sponsor: Professor Irvin Ibarguen, History*

On July 12, 1979, the Chicago White Socks held Disco Demolition Night at their stadium, Comiskey Field. Led by radio disc jockey Steve Dahl, fans of the rock genre, particularly straight, white men burned disco records on the field while chanting "disco sucks". This event was not a random occurrence, as hatred of the genre had been building up for a few years. Repulsed by disco based on its perceived "plastic" and elitist nature, this movement, later coined "discophobia", would largely be responsible for disco's shift from culturally hip to outmoded. Since about the turn of the twenty-first century, scholars have begun to reevaluate disco music as an object of cultural importance. Many academics have tried to discern the motivation behind "discophobia". In general, most have contended that this anger was homophobic and racist in nature. At the same time as "disco fever" spread, religious groups across the country began to coalesce into what has become called the Christian right. These people worked towards returning the United States to its "traditional" state of being. Although scholars have discussed disco in relation to conservative politics during the 1970s, there has not been research into how religion and discophobia interacted. This project aimed to point out the similarities in rhetoric between the rock fans and the Christian right concerning disco and argues that the former appropriated the homophobic language utilized by the latter to further their hate campaign. Additionally, this paper contends that the central issue to both was not the music itself, but the connections that it provided.

**Regresar: Private Lives and the Shining Path Conflict in Perú, a film**

*Deborah Shonack, Film and Television, Spanish*

*Sponsors: Professor Lourdes Dávila, Spanish and Portuguese; Professor Enrique A Del Risco, Spanish and Portuguese; Professor Janet Grillo, Tisch School of the Arts, Film and TV*

Starting in 1987, the domestic terrorist group the Shining Path in Peru shifted their focus from the countryside to the capital, Lima, a shift that those living in Lima didn't really feel until 1989. When hearing stories about this time period from my family, what stuck with me the most is how much life my family was able to experience despite living in a country with ongoing conflict and violence. The Peruvian government's Truth and Reconciliation Committee has done extensive research on the start of the Shining Path, their activities and what they did in each region and the impact the violence has on different regions in Peru. What's missing from this research is what people's lives were like outside of the conflict, both in

Lima and in Puno where the Shining Path had a greater impact. As a filmmaker, the intersection of the horrors of the conflict and the oral history I've heard from my family greatly interests me, and I've chosen to dive into this intersection through the exploration of friendship in a feature film script that I've written. I combined months of research on the conflict and time period of 1986–1987 in Chosica, Lima and Juli with interviews with family members and family friends who have shared their experience about living through this time period in the construction of the script. With this script, I take a humanistic look at what life was like during domestic terrorism in Peru.

**Narratives of Immigrant Violence in the American West, 1850–1920**

*Doug Simons, Economics, History*

*Sponsor: Professor Stefan Aune, History*

The American West in the late nineteenth and early twentieth century was the most ethnically and racially diverse region of the United States, as immigrants arrived in the region to work in the construction of infrastructure like the transcontinental railroads and in emerging industries like mining. Newspapers were prominent expressions of American political opinion during the late nineteenth and early twentieth century and can still allow perceived whiteness of various immigrant groups in the West to be analyzed. This research project analyzes language in

newspapers describing violent events from strikes to gunfights among different immigrant groups in the West on railroads and in mines from a variety of newspaper sources from the 1850s to the 1920s. The project seeks to analyze a shift in the language around violence from how stereotypes of violence among groups like the Irish were easily transferred to other early groups of immigrants to the West like Chinese immigrants earlier in the nineteenth century to the language of newspapers in early twentieth century, where the language describing violent events depicts groups like Italian and Greek immigrants as white at the expense of Japanese and Mexican immigrants. The project also seeks to analyze how this shift reflected and interacted with changing national and regional definitions of whiteness.

**Existentialist Constructivism: Interpreting Simone de Beauvoir as a Metaethical Constructivist in *The Ethics of Ambiguity***

*Ben Steel, Philosophy*

*Sponsor: Professor John Richardson, Philosophy*

In my research, I investigate the ethical view found in Simone de Beauvoir's *The Ethics of Ambiguity*. I use the contemporary philosophical framework of "constructivism" in metaethics to conduct my investigation. More specifically, I draw upon the work of Sharon Street to characterize constructivism generally, and I draw upon



Christine Korsgaard's (1996) presentation of "Kantian Constructivism" in *The Sources of Normativity* to give a specific view for comparison. These views develop a picture of ethics where a person's view of what is a good or right reason for doing something depends on the ethical judgements that they already accept. We construct our judgements on top of what we have already built. This allows constructivism to posit an objectivity in valuing given by the criteria of a person's distinctive viewpoint. After presenting this picture, I turn to interpreting Beauvoir's text to demonstrate the shared affinities of her view and Kantian Constructivism. In drawing out how her view remains distinct from Kantian Constructivism, while still proving to be some form of constructivism, I propose a novel interpretive variety of constructivism, derived from *The Ethics of Ambiguity*: existentialist constructivism. In particular, I draw out a distinction in its view of personal relationships. Existentialist constructivism posits freedom as a universal value, emanating from our agency, which presents obligations towards the freedom of others. Such a position, while given a formal characterization, still requires further defense. This research hopes to lead to further investigative inquiry surrounding the merits of such a view in contemporary ethics.

#### **Diversity, Perspective and Propaganda: Evaluating Rhetoric and Narrative in Feature-Length Eco Documentaries (2005–2021)**

*Priya Subberwal, Environmental Studies*

*Sponsor: Professor Kimberly Carlson, Environmental Studies*

Environmental media seeks to communicate crises of unprecedented scope and scale, mobilize a global community of diverse perspectives and cultural values and comprehensively and engagingly advocate on behalf of the other-than-human world. At the same time, it is entangled with the larger forces of corporate capitalism and western cultural imperialism. This study assesses current environmental documentaries for their reinforcement of specific perspectives, values and ideologies. The 30 documentaries examined were selected due to their recurrence in the top media search engines and streaming platforms in the United States. Mainstream print and news media covering environmental topics has been shown to reinforce corporate capitalism and neoliberalism; however, with the rise of streaming platforms, the increasing accessibility of production technology and the global span of the internet, documentary filmmakers are poised to bring diverse narratives for ecological stewardship to the forefront of public consciousness. The mere quantity of environmental coverage in the media is not enough; the ways in which the stories are told and framed, and by whom, matters. By evaluating the ideological diversity of popular environmental documentaries, I present an understanding

of popular media framings of environmental problems and the degree to which the documentary film industry emphasizes certain environmental solutions or cultural norms.

#### **Virginia Woolf's *Orlando*, A Biography: Mediating Queer Identity through Configurations of Blackness**

*Kayla Thompson, English and American Literature*

*Sponsor: Professor Patricia Crain, English and American Literature*

Published in 1928, Virginia Woolf's *Orlando* has often been heralded as one of the most preliminary examples of outrightly and unapologetically queer literature. In this thesis, I argue that *Orlando* not only challenges early-twentieth-century literary canon through its pell-mell representation of queer/transgender identity but also as it presents a kind of corrective to the history of queer identity through Woolf's treatment and presentation of the site of the body. Chapter One argues that *Orlando* offers up the titular character's body as a kind of queer chronotope that preserves and stores queerness across time. Chapter Two examines the presence of Blackness, Black characters and Black figures in *Orlando*. Chapter Three ultimately connects observations about configurations of Blackness to Orlando's identity and the process of white (queer) identity formation and imagination. Chapter Four briefly comments on the current state of Black queer studies and how the arguments made in this thesis' first three chapters might inform future work. In the subsequent pages, I uncover new ways for understanding and situating the queer body in, as well as throughout, time. I challenge our preconceived notions about the boundaries of the (queer) body and argue that the body operates in these texts as a site of recovery, a recuperative space that stores and transports the queer self/body/identity and the memory of queer selves/bodies/identities, through a time that would prefer to forget it. Furthermore, I argue that the potentialities of the queer body are only made possible through the presence of the Black body in the text, as the articulation of Orlando's identity hinges on Orlando's ability to think through their own self via the Black self, and argue that the Black queer body is itself a source of power both within and without the text.

#### **Drunk Poets and Divine Politicians: Bacchus in Horace *Odes* 1.18, 2.19 and 3.25**

*Rafael Torre de Silva, Classics*

*Sponsor: Professor Matthew Santirocco, Classics*

Bacchus is one of the richest and most multifaceted images in Horace's *Odes*. He represents both the ecstasy of orgiastic dance and the peacefulness of drinking wine in moderation: he is violence and forgiveness, war and peace, pain and pleasure. Thus, Bacchus becomes a powerful symbol, albeit paradoxical, for both poetic in-

spiration and political ethics. On the one hand, he plays a crucial role in Horace's poetics insofar it is understood as a science, because Bacchus represents a certain school of writing, traditionally opposed to the Apollonian. Furthermore, Bacchus is also a key player in Horace's poetics insofar as it is understood as a subjective experience, because the god is the active agent in the divine possession that the poet experiences, whereby Horace is identified with Bacchus in a single individuality and nature. On the other hand, due to the political connotations of the symbol, there is also a purposefully ambiguous identification between Bacchus and Augustus. Indeed, as Horace transitions towards a more political writing, the emperor becomes then his true source of inspiration. In both spheres of poetics and politics, the figure of Augustus becomes central to Horace's evolving attitude, and so does Bacchus too become the key evidence to trace the progression in the author's political and poetic journeys. Through a contextual analysis and by applying the dualisms of poetics-politics and content-form, this paper examines how the symbol evolves and portrays the triangular relationship—and identification—of Augustus-Bacchus, Bacchus-Horace and Augustus-Bacchus.

**Raising Resistance: Women's Histories of Abortion, Infanticide and Sexual Violence in Late Colonial Mexico (1690–1821)**

*Ingrid Trost, Latin American Studies*

*Sponsors: Professor Zeb Tortorici, Spanish and Portuguese; Professor Rebecca Goetz, History*

This thesis analyzes four criminal cases of alleged abortion, infanticide and gender-based violence in approximately the final century of Spanish colonialism in Mexico, 1690–1821. I argue that state and community desire to support and strengthen established social hierarchy guided the process and outcome of criminal trials relating to the young female body and to reproduction. I trace the politics and enforcement of family and gender norms, intersections between the law and the young female body and the impact of class and race on perceived criminality or culpability. My work intersects with critical historical

scholarship on women, gender, abortion and infanticide in colonial Mexico. Research by scholars such as Asunción Lavarín, Nora Jaffary, Richard Boyer, Kathryn Burns, Marisa Fuentes and Tina Campt have proven to be indispensable. By presenting historical analysis in the context of close-reading case analysis, I demonstrate the practical impact of ephemeral and socially developed concepts like socially perceived honor, morality and acceptable family structure. For example, in the case of Maria Thomasa Muro, I trace how existing racial and gendered hierarchies in the early nineteenth century informed court procedure through invasive physical and emotional examinations conducted by court officials. Feminist and decolonial principles of narrative history-telling, the value of fiction and varied methods of resistance guide my case analysis, thesis construction and presentation.

**Megaprojects in New York City: A Reliable Approach to Improving Affordable Housing?**

*Sam Woodward, Urban Design & Architecture Studies*

*Sponsor: Professor Jonathan Ritter, Urban Design & Architecture Studies*

It was Josef Stalin, no champion of capitalist land development, who said “quantity has a quality all its own”, and, indeed, it seems that urban renewal projects today are lost under the colossal size and epic price tag of their ambitions. Therefore, through the lens of affordable housing, this project analyzes the effect that megaprojects are having on cities, an essential task given the current urban affordability crisis that grips many cities. As a result, the project concerns the contemporary conception of the “megaproject” and assesses whether they are failing the cities they purport to serve. Through the examination of a number of contemporary examples, this comprehensive narrative deciphers whether the megaproject is the future of architectural and urban design or whether this current enthusiasm for mass scale is to be short lived. Perhaps designers and investors are simply enamored with the idea of making monumental changes to cities and the notion of helping communities in need, but fail to actually do so.



# SOCIAL SCIENCES

## **Sex Education for Dommes: Is Safe Sex Work Possible?**

*Aashna Agarwal, International Relations, Journalism*  
*Sponsor: Professor Robert Boynton, Journalism*

What does it mean for a dominatrix when she starts dating her client? Sex education curriculums were designed before porn became universally accessible—are they too outdated to be effective? Is the violence depicted in porn going to result in dangerous conceptions of intimacy for coming generations? When clients come to sex workers with inspirations found online, can a lack of preparation and experience be dangerous? Though illegal, sex work has and will always continue to exist. While sex workers are people of all genders, races, classes and sexualities, they work in the industry where most marginalization's intersect. And, it is at that crux that we see the real danger. I sat down with Helena, a dominatrix and her client-turned-fling to better understand the grey areas in the sex work industry—and how that confusion can be harmful. As our conceptions and understandings of sex change, sex education lags behind. To not account for a modern world is not only irresponsible but dangerous. Absent from the debate around legalizing sex work is a call for resources and support—to ensure the safety, not exploitation of both sex workers and their clients, and that their rights are protected not just in law, but in practice. I talk to therapists, sex educators and dominatrixes about what they imagine effective change looks like.

## **The Makings of Under-Represented Cultural Arts Education Organizations**

*Najah Aldridge, Global Public Health/Sociology*  
*Sponsor: Professor Ruth Horowitz, Sociology*

I plan to research the ways in which underrepresented cultural arts educational organizations define their culture through art education with a particular emphasis on who they are, how they educate and what they present to their audiences. What are the influences that led them to choose certain aspects of a culture? Have these values changed over time? If so, what led to this change? My research question will be: How do cultural arts educational centers construct race and how do they educate their audience of cultural traditions in the construction of who they are and their relationships with communities of color?

## **Impeachment by Tweet: Predicting Roll Call Votes Using Congressional Twitter Data**

*Kenan Anderson, Data Science*  
*Sponsor: Professor Andrea Jones-Rooy, Data Science*

Twitter has increasingly become a focal point for American politics, finding engagement from political activists, journalists and politicians alike. In this paper, I explore whether the increased adoption of Twitter by members of Congress has the potential to allow for prediction of roll-call votes based on Twitter data from before the vote. Using the events of January 6th, 2021 as a case study (along with the following impeachment of then President Donald Trump) I developed a model that can predict how members of Congress voted in the im-

peachment proceedings. Using Twitter data from the day of January 6, this model is able to successfully generate predictions, matching the performance of other ideology estimations methods.

### **Analyzing Attitudes towards Uyghur Muslims among Chinese Nationals Living Abroad**

*Tzivia Appleman, Politics*

*Sponsor: Professor Chris Dawes, Politics*

According to sociologist Hedvig Ekerwald (2011), Islamophobia is “an ideology that radiates negative meanings to Muslims and Islam, thereby giving rise to negative attitudes and discriminatory practices against Muslims and Islam”. Currently, Uyghurs, an ethnically Muslim population in the Xinjiang region of China, are experiencing torture and prejudice as well as being placed into re-education and labor camps by the Chinese Communist Party (CCP). Many members of the international community have gone as far as to call this a genocide. Why does Islamophobia particularly persist in China? Even more broadly, what fuels this type of vile hatred that has led to genocide? Experts of this region have concluded that the main causes of discrimination among Han-Chinese towards Uyghurs include media, propaganda, Han-Centrism and ethnic homogeneity. Since propaganda is disseminated by the CCP to the general public in China, can we assume that Chinese nationals have received false information and have become negatively biased towards Uyghurs? In order to understand these anti-Muslim attitudes more closely, I will be conducting a survey experiment to see if exposure to positive content about Uyghurs can influence Chinese nationals’ attitudes towards the Uyghur population. Essentially, I will be testing the impact of information flow on the attitudes of an in-group towards an out-group. I hypothesize that positive content exposure about Muslims reduces bias among Chinese nationals living abroad. My survey experiment will expose participants to either positive or neutral content and will then evaluate their attitudes towards Uyghurs by using a Likert scale based on the RIVEC (Rejection, Intimacy, Values, Emotions and Culture) Prejudice Scale.

### **Profit over Planet? The Effect of *Citizens United* on Environmental Legislation**

*Leah Bahramipour, Environmental Studies, Politics*

*Sponsors: Professor Chris Dawes, Politics;*

*Professor Amy Catalinac, Politics*

In *Citizens United v. FEC*, the US Supreme Court ruled that restricting independent campaign expenditures is unconstitutional—a violation of the First Amendment’s free speech clause. Although researchers have analyzed the effect of *Citizens United* on the composition of state legislatures and the types of bills passed, its effect on environmental legislation has not been explored. Yet, the

energy, natural resources and agribusiness industries are consistently some of the largest donors in US politics; environmental legislation often threatens corporations’ bottom line, incentivizing them to donate money to block these bills. In this paper, I test whether *Citizens United* reduced support for three categories of environmental legislation. I begin by assessing its impact on environmental legislation in general, then narrow my focus to polarized environmental legislation and, finally, climate change legislation. To do so, I collect the number of bills introduced in each state legislature from 2009 to 2015. Then, I employ the difference-in-differences design to assess whether eliminating bans on independent expenditures had a discernible impact on environmental legislation. I found that *Citizens United* did not affect environmental legislation, in general. However, it drastically decreased the number of polarized and climate change bills introduced. Together, these results illustrate that *Citizens United* threatens the democratic norm that we all have an equal voice, allowing corporations to disproportionately influence environmental legislation and thus continue current rates of environmental degradation.

### **Demographic Upheaval and Democratic Decline: A Study of Emigration and Populism in Hungary and Poland**

*Julia Bails, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;*

*Maria Ignacia Curiel, Politics*

Right-wing populism is an enigmatic and convoluted phenomenon. In Europe, the term has been used to describe political parties, groups and leaders who reject both elitism and neoliberalism, oppose “the Establishment” and defend nativist and hyper-nationalist sentiments. This multifaceted ideology has gained a conspicuous foothold in Hungary and Poland within the past decade. The European Union, which welcomed these two states in 2004, has considered imposing sanctions against them both as their governments continue to backslide on democratic values. From a demographic standpoint, both Hungary and Poland have also experienced new migration patterns in recent years. The two nations have seen more pronounced trends of outward movement, specifically the emigration of younger individuals who decide to find permanent residence abroad, most likely for better work or educational opportunities. Emigration surges in any geographic area can induce astounding social, political and economic changes in the emigrants’ home countries. In this paper, I aim to identify a causal relationship between emigration and far-right populist electoral success in Hungary and Poland. Using a two-way Fixed Effects Model and Ordinary Least Squares regressions with particular emphasis on Poland, I find that an increase in the emigration of working-age citizens, regardless of the emigrants’

educational attainment, evidently decreases electoral support for far-right populist leaders in this context.

### Racial Socialization and Spatial Awareness in Black Students

*Chris-Ann Allison Barnett, Politics, Sociology*

*Sponsor: Professor Ruth Horowitz, Sociology*

Race in the United States has a substantial impact on how you experience the world. Black people have been historically disenfranchised by systemic and institutional racism, impacting their daily lives. In conjunction with race, class and community impact an individual's daily experiences. While community demographics may not impact how an individual is perceived, it impacts how Black individuals navigate social relationships and the physical spaces they occupy due to racial socialization and spatial awareness. For Black students who were raised in predominantly Black areas, racial expression and navigating social relationships are approached differently than those who were raised on white areas. When the element of ethnicity is explored, social relationships are approached slightly differently than when taking race into account. However, regardless of community upbringing, Black students seem to all find navigating social relationships problematic in certain aspects. Racism and micro-aggressions both impacts how Black students socialize in different settings, with shared trauma being a connection point for building relationships with each other. As we navigate our own daily lives within higher education institutions, we must ensure that we create and are intentional with inclusive and accountable environments that enable Black students to experience higher education without compromising their identity.

### Experts of Self-Administrable Forms of CAM

*Saralika Barua, Sociology*

*Sponsor: Professor Ruth Horowitz, Sociology*

My project focused on analyzing the relationship people have with complementary/alternative medicine (CAM), how people found their way to it and their thought process behind it. It also looked at who people consult and trust when making decisions relating to use of self-administrable forms of CAM. It is important to understand these experiences people have that leads them to seek out a self-administrable form of CAM and how they decide whether or not to share that decision with a healthcare provider so that the healthcare community can make appropriate changes going forward to improve communication and healthcare outcomes. While conducting interviews, I saw many people are influenced by the relationship their family and community has with self-administrable forms of CAM. Most were positively influenced while one person made the conscious decision to turn away from CAM once they moved out and went off to

college. There were countless stories relating to the failure of traditional medicine or primary care providers (PCP) not living up to the expectations of my participants. As a result, participants end up taking matters into their own hands to solve the problem. That can be in the form of turning to Google or hearing about a remedy from family members. I realized how quickly PCPs are judged by their patients. Sometimes, it will be the "smallest" things a PCP does or says, implicitly or explicitly, that have a great impact on the relationship between the PCP and their patient.

### Uprooting the Family Tree: With a Past Tangled in Slavery, Americans Are Looking for Reconciliation Everywhere from Plantations to DNA Sequences

*Kenna Beban, Environmental Studies, Journalism*

*Sponsor: Professor Robert Boynton, Journalism*

American families descended from enslaved people and slaveholders are trying to reconcile with that history. Some are reconnecting to other descendants through social media, DNA tests and family reunions to try to confront their shared troubled history, and some are using historical plantation sites as an avenue to tell long-ignored stories of enslaved people. I want to explore this impulse to reconcile with the past, and how familial relationships evolve against the backdrop of racial and political tensions. My goals for this project are to provide an overview on how individuals and organizations are interpreting their predecessors' roles in enslavement. I want to provide an in-depth personal understanding of several people's journeys, contextualized with analysis of how historical narratives are presented, and my own family's history. The questions I'll be asking are: how are American families approaching reconciliation with their histories in slavery? What motivates them to do so? How do these attempts affect people on an individual level? How are impulses to maintain family connections balanced with political disagreement and racial tensions? How do these attempts address societal inequalities on a larger scale?

### Thinking Outside the Box: Restorative Justice as an Alternative to Incarceration in Ideology and Practice

*Rachel Bell, Sociology*

*Sponsors: Professor Ruth Horowitz, Sociology;*

*Dr. Karen Miner-Romanoff, Sociology*

My research seeks to address the question of alternatives to incarceration, with a focus on restorative justice. The data that I've collected has illuminated the interesting pattern of a discrepancy between people's stated ideologies and their beliefs in practice. I have found that the majority of participants had overwhelmingly positive associations with restorative justice and overwhelmingly negative associations with incarceration and the current practices of the criminal justice system. However, when given specific crime scenarios and asked how they believe

the crimes should be responded to, the majority of participants responded that incarceration, either on its own or in conjunction with restorative justice, was their desired response. My research analyzes the factors that contribute to the apparent cognitive dissonance between ideology and practice and examines the difficulties people have with envisioning a society different from our own.

### **The Voices of Personalized Medicine**

*Isa Buitron, History, Journalism*

*Sponsor: Professor Robert Boynton, Journalism*

Personalized medicine is a promising medical approach for diagnosing and treating patients who have rare diseases, complex illnesses or ailments that don't respond to typical treatment modalities. It is a spectrum that has the ability to reach different populations. It can span from targeting a racial group, a gender, a specific type of cancer and an individual with a rare disease. This approach has proven possible through technological developments, genetic testing and evaluating the reaction of an individual to a drug. Herceptin, a drug developed to target a type of breast cancer resistant towards pre-existing cancer treatments, is an example of this. BiDil, while controversial, is another example of this. It is a heart medication used to treat a single racial group. However, drug development is not always a possible treatment option and even getting to diagnosis can prove to be a long journey. There are initiatives like "Genomic Answers for Kids", which seeks to diagnose pediatric genetic conditions. Other instances like that of a family whose children took eight years to diagnose through a genetics and neurologist team at New York University and Columbia University show the diversity of people's medical courses. While nobody questions the value of this approach, there are of course moral and ethical concerns. Questions about whether there are better ways of using scarce resources to benefit more people, if this will further health disparities, confidentiality and stem cell research all arise. But, the hope this field's progression has brought is evident in the development of specialized foundations, rare disease ally groups and research initiatives.

### **Tweet Topics and Tactical Behavior: A Topic Modelling Approach to Assessing the 117th US Congress**

*Christian Caballero, Politics, Sociology*

*Sponsors: Professor Amy Catalinac, Politics; Professor Chris Dawes, Politics*

Social Networking Sites have become the dominant form of communication for politicians to reach their constituents and beyond. Due to this explosion in popularity, strategic politicians are now motivated to employ communication strategies around this new medium that exploits this information environment. A fundamental un-

derstanding of the strategies these politicians employ on sites like Twitter is now essential to evaluating the motivations of politicians and the implications of such on policy and voter preference. The year 2020 provides an important contextual framework surrounding online communication strategies, both because of its proximity to a general election as well as the prevalence of social, economic and public health issues for politicians to react to. Using a novel machine learning technique—the Structural Topic Model—as well as high performance computing clusters, we are able to find the topics discussed in 2020 by members of the 117th US Congress on Twitter as well as covariate effects such as being up for re-election or ideology on what topics politicians choose to discuss. From this, we argue that the topics politicians choose to discuss on Twitter are an important, one-dimensional signal of the topic's politicians seek attachment to. These descriptive findings serve as a basis by which future research can begin to establish causal links between covariates and communication strategies.

### **They Don't Care about Us: The Challenges Black Students Face at Predominantly White Institutions**

*Tyler Centeio, Sociology*

*Sponsor: Professor Bart Bonikowski, Sociology*

Black students who attend Predominantly White Institutions live, work and learn in an environment where they are the minority. This status causes them to face specific challenges that negatively impact their mental well-being and their ability to thrive in a colligate setting. Predominantly White Institutions such as New York University are responsible for serving their Black students and ensuring that they are supported and safe during their tenure. However, through my research, I found that many Black students attending New York University faced many issues from both their non-Black peers and professors and the larger institution itself. Through interviewing these Black students, it became clear that issues of discrimination and racism as well as institutional failings and lack of resources are quite common. It is also clear that these Black students have many ideas regarding how their experience at New York University can be improved, and these changes were compiled within my research as well. All of this research serves as a way to bring the issues of Black students forward in hopes of creating demonstrable change within New York University and other institutions like it.

**Silent Dreaming and Underground Culture: The News Media Representation of Fracking in Australia's Northern Territory (2018–2022)**

*Jessica Chapel, Environmental Studies, Journalism*  
*Sponsor: Professor Colin Jerolmack, Environmental Studies*

Australian-based news media platforms have published a series of articles that can be examined for recurring narratives. To examine the nation's subject representation of Aboriginal Australians, the most vulnerable community to the impacts of hydraulic fracturing (fracking) in Australia's Northern Territory (NT), I analyzed coverage patterns by subject counts of keyword associations and journalistic narrative threads subsequent to the 2018 lift of the fracking moratorium in the region. Utilizing research database ProQuest Central, this research presents results yielded from both a quantitative and media content analysis of 81 articles in four Australian newspapers covering fracking and the Northern Territory between February 2018 and February 2022. The majority of articles covered topics with two recurring narratives: the economic incentive of fracking in the NT and the NT fracking exploration's prospective contribution to national greenhouse gas emissions. Within the ~21% of the articles that included the subject of Aboriginal Australians, the majority framed a call for the Aboriginal community's involvement and support in the oil and gas industry for optimal economic growth. Only 1 article out of the sample size included a quote from an Aboriginal voice. The quote was an unnamed voice and local to Sydney, not the NT.

**Cancelling and Clout Chasing: A Study of Online Shaming Practices and Their Consequences**

*Diya Chatterjee, Anthropology and Linguistics*  
*Sponsor: Professor Sonia Das, Anthropology*

Blocklist. Reylo. Sheith. These words have little to no meaning to those less technologically inclined but hold vast implications for those participating in fandoms online. Setting ethical standards in a community, or even any idea of proper social behavior, comes with an implied consequence of shame if someone fails to reach those norms. In the real world, shaming comes in the form of bullying for physical features, or for practicing ideals others don't agree with. However, since the online forum is so different from the real world, these practiced ideals are found in their own specialized forms, relative to each fandom. When everyone in a community begins with something in common (in this case, the media the fandom is about), segregation occurs in a more specialized setting, basing real world ideals within the context of the fandom. This research explores the shaming practices of online communities, and questions the connection of these practices to real world beliefs. While studying the *Star Wars*, *Dream SMP* and *Voltron: Legendary Defender* fandoms on Twitter and Tumblr reveals many different linguistic markers for shaming, such as "antis", "DNI lists" and "blocklists", it is also clear that bringing important topics such as racism and pedophilia to a fandom space with this vocabulary, or discussing it in the context of fictional characters tends to trivialize the issue and keep it at the same level as more petty discourse. This calls into question how media



is created and interacted with and how these online shaming practices bridge the gap between the real world and fictional works.

**Monitoring the Effect of BRI Membership:  
Differential Interdependencies on Trade, Sectoral  
Economies and Diplomatic Relationships**

*Catherine Chen, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;  
Maria Ignacia Curiel, Politics*

Amid the complex global economic environment, the vast market potential and development space of the Belt and Road initiative illustrated its strong vitality and creativity. This research aims to examine the effect of BRI membership on countries' differential degrees of inter-dependencies with China between the years 2008–2020 from three perspectives: trade relationship, domestic sectoral economy and diplomatic interaction to explore the question of whether BRI participants have developed a larger dependency upon China compared with their counterparts. This research adopts two-way fixed-effects regression models to examine the effect of the BRI programs on different outcomes subsequently where sources of variation exist both temporally and geographically. To minimize selection bias, this research takes time-varying controls and fixed effects. Results reveal that BRI program has a positive effect on increasing trade volume between sample countries and China. BRI also has a positive effect on elevating sample countries' economic wellbeing from a domestic economy standpoint. It has no significant effect on sample countries' agriculture share but do have a negative influence on industry share. Lastly, the study finds no evidence that BRI programs have externalizing impacts on participant countries' political engagement with China seen from bilateral meetings.

**Digital Gaslighting: The Use of Belittling and  
Discrediting towards Prominent Political Women on  
Social Media**

*Ilona Cherepkhina, Mathematics, Sociology*

*Sponsor: Professor Bart Bonikowski, Sociology*

As every election year sees an increasing portion of women within governing bodies, they continue to be underrepresented in politically active professions and overrepresented in the influx of targeted harassment received on online platforms. Previous studies focused on the specific gendered language aimed at women on social media platforms as well as paradoxical power dynamics that result from women rising to influential positions in patriarchal institutions. My research, however, argues that no pre-existing gender theory on online harassment is sufficient in analyzing the distinct language and harassment that prominent, politically active women are met with on social media platforms. Due to the unique, power-latent,

pseudo-intimate relationship these women have with the people tweeting at them, I develop the theory of digital gaslighting. This particular form of online harassment is less violent or explicit than traditional online gender harassment. Rather, Twitter users operate techniques in digital gaslighting by relying on occupational and structural inequalities, paradoxical power dynamics and parasocial intimacy to attempt to belittle and discredit prominent, politically active women on Twitter. In doing so, posters often use the gendered concept of irrationality, oversexualization of women in power and reliance on familial obligations or personal relationships to disparage the influential women.

**Characterizing *Candida Auris*: Charting the Course,  
Risks and Epidemiology of an Emerging Fungal  
Pathogen—New Jersey, 2017–2020**

*Diya Cherian, Global Public Health/Biology*

*Sponsor: Rebecca Greeley, New Jersey Department of  
Health, Communicable Disease Service*

*Candida auris*, an emerging resistant yeast, can cause serious infections in healthcare settings and has led to silent but lethal outbreaks worldwide. The New Jersey Department of Health (NJDOH) conducts *C. auris* surveillance in healthcare facilities to assess patient colonization and transmission events. This research aims to summarize demographics, types of facilities reporting cases, underlying conditions and other risk factors of *C. auris* infection among patients from 2017 to 2020. Information was obtained from 361 case report forms submitted from 44 facilities. 31% of case-patients were male and 23% were female. Most cases had underlying conditions, the most common being cardiovascular and respiratory disease, ventilator dependence, multidrug-resistant organism (MDRO) infections and diabetes. Among patients with indwelling devices, the most frequent were catheters, abdominal feeding tubes and tracheostomies. A majority of patients underwent medical procedures, including wound debridement's and line/tube placements. Most patients were on systemic antibiotics, and many received antifungals. Of the forms received, 13.4% of cases were fatal. By understanding common factors that correlate with the prevalence of cases, extra precautions should be enacted to limit transmission. Because no longitudinal data on case outcomes is being captured by NJDOH, the data represented could result in an underestimate of disease progression and mortality. Data analysis suggests a correlation between long-term acute care patients, co-morbidities, indwelling devices and cases of *C. auris*. Prioritizing active surveillance, education, infection control measures and continued research are key in preventing the spread of this emerging fungal pathogen.

### **A Second Look**

*Caroline Felicia Coyer, International Relations, Journalism  
Sponsor: Professor Jason Samuels, Journalism*

*A Second Look* is a documentary film about Jolene and Bryon Russ and their crusade to pass the Second Look Act in New York. Bryon was sentenced to 49 years in prison after being found guilty of two counts of armed robbery in 2000. Bryon will not see the possibility for release until 2034. During his time in prison, Bryon has exhausted all avenues of rehabilitation available, including college credits and even teaching his own violence prevention courses. He also reconnected with Jolene, once childhood friends, leading to their marriage in 2016. Jolene has now taken on the role of “Advocate for freedom”, as Bryon and his supporters believe his sentence was unjust, excessive and deserves a second look. Second look legislation will allow people like Bryon who have served half their sentence or more the opportunity to be heard, seen and potentially resentenced based on their behavior while in prison and changes in laws. Jolene is working with grassroots organization Communities Not Cages to get this bill passed to stop the racist crisis of mass incarceration in NY. But, this won’t be so easy, with an ongoing debate in New York, as many believe criminal justice reform can be blamed for the uptick in crime and violence sweeping our city. Watch as we follow this family, and their fight for justice and freedom amidst growing tensions in NYC and beyond.

### **Factionalism in the GOP: Insights from Texas**

**Republican Voters**  
*Lincoln Dow, Politics  
Sponsor: Professor Chris Dawes, Politics*

Leadership of the Republican Party (GOP) has experienced notable ideological movement over the past two decades; despite this, the overwhelming majority of voters for John McCain and Mitt Romney have remained Republicans and expressed support for Donald Trump. Although this partisan loyalty is unsurprising, as partisanship is understood to be a highly salient social identity, the ideological evolution of the GOP raises a question of the party’s grassroots composition. Specifically, the policy preferences and personal characteristics of “average” Republican voters are unclear. In this study, interviews were conducted with nine self-identified Republican voters in Texas. Each respondent completed a policy questionnaire which guided interviews. During the interviews, the researcher sought to understand and profile the ideological viewpoint and political motivations of each respondent. From these profiles, at least three distinct categories, comprising five subcategories, of Republican voters emerged, varying in policy preferences, demographic factors and partisan loyalty. Those categories are: traditional conser-

vatives, including policy motivated and religiously motivated; the strong Trump base, including both economic populists and conspiracy adherents; and conservative Trump skeptics. These classifications provide a framework for better understanding of today’s Republican Party, its factions and the political behavior of its members.

### **COVID-19 through an Anthropological Lens**

*Amanda Feingold, Global Public Health/Anthropology  
Sponsor: Professor Melody Goodman, College of Global Public Health, Biostatistics*

“It was like a warzone”. Within the initial 25 days following the first confirmed positive case of COVID-19 on March 1, 2020, positive COVID-19 cases within New York State were already greater than 30,000. During March 2020, approximately 30% of confirmed positive COVID-19 patients hospitalized died from the disease. Vaccination is a key mitigation strategy for addressing the pandemic. Two years into the pandemic we were interested in people’s vaccine beliefs and practices. We conducted a Qualtrics web-based survey of adult ( $\geq 18$  years old) New York State residents in January 2022 to explore their vaccine beliefs, perceptions, knowledge, attitudes and behaviors. Participants were recruited through Centiment and through social media. Inclusion criteria includes internet access and ability to complete an English language survey. This sample included 413 participants, 300 paid participants and 113 unpaid participants recruited through social media. Out of the 413 survey participants, the majority (74%) have been fully vaccinated against COVID-19. At the time of participation, 49% of survey participants have received a COVID-19 booster. The survey sample was primarily white individuals (59%), followed by Black individuals (19%), Latino/Hispanic individuals (9%), Asian individuals (6%) and individuals that identify as other races (7%). Almost half (48%) of participants stated that they were hesitant about the COVID-19 vaccine. While the literature suggests 82% of New Yorkers over the age of 18 have completed their vaccination series, our sample suggests this rate could be lower (74%) than previous estimates.

### **Why the Move: The Reason behind Chinese Migrant Worker’s Moving**

*Isabel Feng, International Relations, Sociology  
Sponsor: Professor Bart Bonikowski, Sociology*

In this research, I studied the factors that affect Chinese Migrant Worker’s experience during COVID-19 through qualitative method. I conducted data through 26 interviews with Chinese migrant workers that are currently working all over China and collect data through the conversation with them. In this process, I realized family structure has a huge impact on migrant worker’s life choices during the pandemic.

**Ethnographic Vocal Interventions and Celebrity Imaginings: Thinking through the Legacy of the Late Mercedes Sosa through Song**  
*Maxwell Freyre, Anthropology*  
Sponsor: Professor Melissa Maldonado-Salcedo, Anthropology

This study explores the legacy of the late singer Mercedes Sosa through song as a form of ethnographic intervention. I put myself in practice as a queer white Argentine-United Statesian of Indigenous Argentine Ancestry with Argentine tango and pop singer Vicky Carambat to employ the singing voice. I argue that the voice can function to “recall” an Argentine history that includes Indigenous and Afro-descendant histories, challenging narratives of a “purportedly” white Argentina with songs *Regreso a la tonada* and *Luna tucumana* (Alberto and Elena, 2016). Here, song acts as a point of reference by which the history of Sosa’s musical focus—the folkloric genre—calls in the racializing, misogynistic conceptions of who Sosa was in the contemporary and how these notions position her as “queer” to Argentina (Sullivan, 2003). Positioning song as central in my work employs a medium not traditionally explored in anthropological inquiry and asks what can be understood regarding the legacy of Sosa and how it relates to the history of Argentina through its use. My exploration of both songs highlights the “queering” that goes into the vocal apparatus as a form of (queer) agency. The work required to actualize the voice in song requires the physiological adaptation of part of the body, a form of queering embodied. Additionally, I recognize that further exploration of my topic is required to produce a true ethnographic narrative. From this vocal practice and subsequent self-reflexive analysis, I pose the question of what it would mean for Argentines and the country’s diaspora to ask new questions regarding how Sosa practiced and related to the music she interpreted throughout her career and how this knowledge can be passed down to future generations in the face of an Argentine national whiteness and racist past for a multiracial, multicultural understanding of Argentina (Andrews, 2016).

**Divergent Politics: Mexican-Americans in Starr County and Their Culturally White Socializations**  
*Laisa Garcia, Drama, Latino Studies*  
Sponsors: Professor Maria Saldaña, Social & Cultural Analysis; Professor Thomas Sugrue, Social & Cultural Analysis

My thesis serves as an examination of Starr County, a region on the South Texas border and how Mexican Americans living in this region construct their political belief system, given the drastic shift in voting preference that occurred there during the 2016 and the 2020 presidential elections. Using Prysby and Scavo’s definition of conventional voting, I argue that the reason Mexican-Americans

in border towns vote outside of what is conventional is not because they think they are white (this being the common assumption) but because the specific cultural context in which they live has allowed them to create their own particular kind of whiteness (1993). In chapter two, I lay out how this started with Mexican-Americans’ “off-white” status during the Mexican-American and Civil Wars in the mid-eighteen hundreds and put it in conversation with the racial categorizations of the Mexican identity today (Gomez, 2018). In chapter three, I discuss the socio-economic framework of Starr County such as jobs, education, the media and religion and compare it to a mainly white, conservative US town, finding similarities (Herrera, 2021). In my final chapter, I conduct interviews with voters in Starr County varying in gender, age, sexual orientation, religion and socio-economic status to find overlap from my findings in chapter two and three. This thesis is significant because the results prove that conventional understandings of politics do not exist in every cultural context, especially those where a racially diverse society is not present.

**The Democratizing Role of US Military Interventions**  
*Leena Haider, International Relations*  
Sponsor: Professor Alastair Smith, Politics

In the past 72 years, the United States of America has had 17 military interventions around the globe. These military interventions are not unsystematic decisions for the purpose of devastation and corruption, but rather they occur to change the regime of the host country or support its government. While these occupied nations undoubtedly experience destruction, they also go through a process of rebirth. Over the decades, there has been evidence to suggest that US military occupation in war-torn countries drives them to adapt to a more democratic regime. This research will measure the level of democracy within a US military-occupied country post-1950 prior to and after the US military’s arrival, while also providing a theoretical analysis on the country’s scale of democracy had the US military never intervened in that particular country. Case studies, polity score, V-Dem and other tools providing statistical data will be utilized to analyze the statistics and conditions that lead to the interventions.

**Becoming Disabled: Type One Diabetes and the Reconstruction of Illness Identity**  
*Paige Hanoka, Sociology*  
Sponsor: Professor Ruth Horowitz, Sociology

Is type-one diabetes a disability? Why are younger diabetics calling themselves disabled while older generations shudder at the idea of that label? This study examines how social changes in perceived stigma and community support alter how type one diabetics come to view their self-concept as a person with a chronic illness. In addition, it surveys the myriad of ways diabetics practice

“strategic disclosure”, or how they choose to hide or reveal their health condition in their environment.

### **Assessing Experience and Perspective amongst Child Welfare Employees and Foster Care Parents**

*Sydney Harris, Sociology*

*Sponsor: Professor Adam Brown, Child and Adolescent Mental Health Studies*

The quality of care that a child receives impacts their life chances, so much so that even just having one person who truly supports a child can re-route a negative life trajectory into a more positive one. Our perspectives and biases inform our care, whether we are parents, family members, teachers or social workers and communicates to children: who is valuable and who is not. I believe that the perspectives and biases held by those in these positions, which have a day-to-day hand in the lives of many marginalized children, may account for failings within the Child Welfare System (CWS). These failings would include cases like that of Gabriel Fernandez, Native American and Black children facing a system of family separation reminiscent of colonization, and that children, especially girls, in foster care are 4x more likely than non-foster care kids to be sexually abused while in foster care. The foster care system, as it is, also seems to facilitate the school-to-prison pipeline, further traumatizing children, and even creating a pool of victims for sex trafficking. In hopes of better understanding the perspectives and experiences that guide these interactions between child welfare professionals, foster care parents, and children in the child welfare system, I interviewed professionals, and foster care parents. Interviewees were asked about their general background, childhood, experiences working in foster care or being a foster care parent, their opinions on specific scenarios of child welfare and how they view their employment or parenting role. The responses to these questions were then coded and allowed for analysis that corroborated preceding literature on foster care data.

### **Manifesting American Destinies: The Effects of Different Historical Depictions on Modern Political Attitudes**

*Taylor Hvidsten, Politics*

*Sponsors: Professor Chris Dawes, Politics; Professor Amy Catalinac, Politics*

School boards across the United States are making increasingly politicized decisions after many states are beginning to cede education policy decisions to the local level. Some of these controversial decisions focus on the content children are taught. In this study, I focus on understanding how different depictions of history influence individuals’ political attitudes, specifically through the depictions of US Westward expansion and their effects on attitudes towards redistribution. I argue that exposure

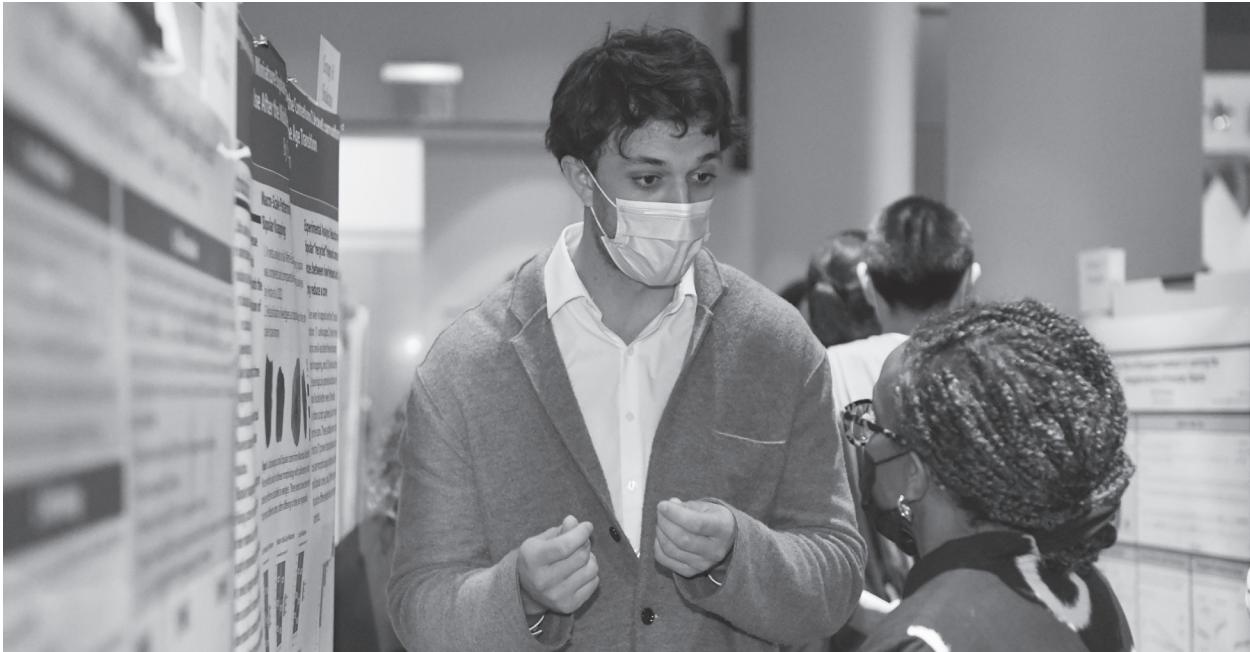
to a positive frame of US Westward expansion will decrease support for redistributive policies due to increased salience of individualism. To test this argument, I conduct a survey experiment to analyze the effects of a positive, negative or control passage on participants’ attitudes. I find no overall effects from exposure to the positive or negative depiction of US Westward expansion on general attitudes towards redistribution. However, I do find that exposure to both the positive and negative depictions of US Westward expansion has a significant, decreasing effect on conservative participants’ support for some redistribution policies including food stamps and general measures to address income inequality. This research is important to understanding how the seemingly apolitical materials we are exposed to in schools can influence our policy attitudes and how these effects may vary in people from different states and of different identities.

### **Who “Likes” Pandemic Misinformation?: How Partisanship and Ideology Influence the Likelihood of Believing and Interacting with COVID-19 Vaccine Misinformation on Facebook**

*Taylor Hvidsten, Politics*

*Sponsor: Professor Nathaniel Beck, Politics*

Throughout the COVID-19 pandemic, Americans faced a staggering amount of information—particularly through social media—related to the virus. However, the information that people saw was not equal in quality. In fact, many Americans were exposed to misinformation about COVID-19 on their social media feeds. In this study, I focus on the presence of misinformation on Facebook specifically, as it is the most popular social media platform. I argue that Facebook has the potential to have a large, negative impact on health outcomes in the United States. To make this argument, I conduct a survey experiment to analyze people’s likelihood of believing and sharing Facebook posts containing COVID-19 vaccine information and misinformation and the role that partisanship and ideology play in this relationship. I find that party identification and ideology have significant effects on the likelihood of believing in COVID-19 vaccine misinformation, but do not predict the likelihood of interacting with this misinformation. I also find that there is a significant and negative relationship between age and believing in and interacting with COVID-19 vaccine misinformation. This research is important to understanding how misinformation during a public health crisis is received and shared on Facebook, which can provide insights on how to address health-emergency misinformation in the future. This paper also contributes to the growing literature on why many Americans choose not to get vaccinated against the COVID-19 virus.



### **Kings and Things: Drag Kings Making Queer History**

*Cate Hynes, Journalism, Media, Culture and Communication*

*Sponsor: Professor Jason Samuels, Journalism*

*Kings and Things* is a documentary film following an NYC drag king collective, The Cake Boys, as they make queer history. Drag Queens have erupted in mainstream media, but it is the non-biological men in wigs who are the forgotten members of the drag community. Meet the non-binary and transgender individuals who have revolutionized drag performance while trying to fight discrimination within the LGBTQ+ community through gender liberation.

### **Fragment Answers and Focus Exempt Anaphora**

*Cassi Jones, Economics, French and Linguistics*

*Sponsor: Professor Christopher Collins, Linguistics*

My research focuses on the ability of reflexives to break the rules of binding in contexts of focus. An analysis of fragment answers by Merchant (2004) states that fragments receive their meanings from underlying structures. The targeted fragment is first fronted from the full sentence, then the remainder of the sentence is deleted. According to this analysis, “himself” in response to the question “Who will punish Bill if he fails?” should not be acceptable. Since “who” in the question refers to a subject, the fragment answer must also refer to a subject, in a phenomenon known as connectivity effects. In this case, “himself” in the underlying structure would be in the subject position without an antecedent, therefore making it an unacceptable fragment answer, as seen by the ungrammaticality of “Himself will punish Bill if he fails.” However, I conducted a survey and found that about 40

percent of participants found the above question and fragment answer to be grammatical or somewhat grammatical. Through an exploration of possible underlying structures for this answer, as well as their overt counterparts, I conclude that this fragment answer is a kind of exempt anaphor, meaning that it does not need an antecedent to be grammatical. However, this case does not fit the criteria of the exempt anaphora described in Charnavel and Zlogar (2015), so it must be of a different kind. After examining elements of stress and various clefting structures, I conclude that focus allows for this exempt anaphor. This exemption due to focus can be applied in other anaphoric cases and could provide insight into the irregular usage of accusative pronouns in English, which pattern similarly to exempt anaphora.

### **NGOs and Democracy: Ties Unravelled**

*Fabiha Khan, Global Liberal Studies, Politics*

*Sponsor: Professor Chris Dawes, Politics*

With the rise of the neoliberal state, NGOs have grown so immensely in presence and impact that they have been labeled as the shadow state in Bangladesh. As their role has shifted over time, NGOs have been declared as both protectors and inhibitors of democracy, depending on the type of programming they pursue. On one side of the debate, academics have theorized that increases in NGO presence may lead to the accumulation of new resources and an increase in association and social capital, which in turn would decrease the costs of political participation. If this domino effect were true, then arguably all NGOs would be capable of bolstering democratic institutions, regardless of their program or political intent. This allows for a logical foundation which steps outside of the

dichotomous paradigm used to analyze NGOs in Bangladesh in the past. It is on the basis of this theorization that this research asks a new question: does the presence of an NGO influence voter turnout in parliamentary elections in Bangladesh? To test this relationship, this research examines voter turnout from the three parliamentary elections that occurred in 1991, 1996 and 2001 in relation to the number of NGOs that existed at each of these points. The results demonstrate that NGO presence had a slight but statistically significant negative effect upon voter turnout in parliamentary elections. This conclusion has enormous implications for the relationship between NGOs and the Bangladeshi state and furthers the argument that it is only NGOs within a particular subset that enhance democratic institutions.

### **Is Your Speech Prestigious? Understanding Prestige Bias in Google's Dialectal Arabic Voice Assistants**

*Raef Khan, Computer Science, Linguistics*

*Sponsor: Professor Laurel MacKenzie, Linguistics*

Natural Language Processing (NLP) and language-based Machine Learning (ML) have focused their work heavily on “standard” languages, such as Modern Standard Arabic (MSA) for Arabic, rather than the dialects of each language. Arabic, however, is a language that exists in a diglossic state (Ferguson, 1959). MSA is taught in schools and used in formal contexts, while Dialectal Arabic is what is spoken in everyday life. One way to classify Dialectal Arabic is to use the regions they are spoken in, broadly: Egyptian, Levantine, Gulf and Maghrebi Arabic. Each dialect holds certain prestige in the Arab community, depending on the number of speakers, outside language influence and usage in mainstream culture and media. Google is aware of Arabic consisting of multiple dialects and has trained its voice-based assistant, Google Assistant, on these dialects. However, Google may not be aware of the prestige levels of each dialect and how that influences whether speakers will use their own dialect or switch to another during data collection. This paper aims to discover whether Google Assistant is biased against low-prestige dialects and functions better on high-prestige dialects. Using native Egyptian, Hijazi and Moroccan speakers, we present how Speaker’s country of origin and Variety used (whether MSA or a local dialect) affect the expected output, discuss the various factors that lead to potential bias in the voice-recognition system and propose possible solutions for accurately modeling dialects.

### **A Trip to the Future: The Unfolding of the Psychedelic Renaissance**

*Matigan King, French, Journalism*

*Sponsor: Professor Robert Boynton, Journalism*

Psychedelics gained popularity in the United States in the mid-twentieth century, especially after the

banker-turned-mycological enthusiast R. Gordon Wasson recounted his experiences with traditional sacred mushroom ceremonies. With this came a flurry of commercialization, scandal and imprudent use and illegal distribution. Research into these substances—and the promise of further research—was shut down. Half a century later, America is experiencing what some call a “psychedelic Renaissance”. Studies conducted by institutions including Johns Hopkins, New York University and UCLA have produced promising results suggesting that psychedelics, coupled with intentional psychotherapy, may be a powerful healing modality for those suffering from conditions ranging from treatment-resistant depression to addiction. This field is not devoid of problems, however. Unlike pharmaceutical products, the psychedelic treatment model includes thoughtful integrative and therapeutic work. Untrained therapists recklessly conducting sessions underground threaten to reverse any progress already made. And, like any industry, psychedelics pose a ripe opportunity for reaping a handsome profit. Will psychedelics fall victim to the commercialization and fetishization Wasson witnessed in the 50s and 60s? Will they be forced along the path of more traditional drugs, as many researchers worry, thereby losing their profundity? What will a future in which psychedelics-assisted therapy is legal and available look like? Could psychedelics be the answer to America’s mental health crisis? How it is used will make all the difference.

### **The Hidden Mind: How Algorithms Impact Our Everyday Lives**

*Nandita Kohli, Integrated Digital Media, Journalism*

*Sponsor: Professor Jason Samuels, Journalism*

In this documentary project, I plan to illuminate how artificial intelligence works behind the scenes in our lives, secretly making choices for us. I focus specifically on the impact these algorithms have on our social media and, consequently, our lives. I will be interviewing experts, activists and victims of algorithmic bias and artificial intelligence to gain a deeper understanding of these algorithms and their impact on society. These interviews will be used to create a series on algorithms in social media. My goal with this project is to shed light on the impacts of this new form of technology that currently remain largely hidden and obscure in the mainstream media, where these algorithms and artificially intelligent programs are labeled as “black boxes”.

### **Prepper, Inc.: COVID-19 and the Doomsday-Industrial Complex**

*Anna Langlois, Journalism, Politics*

*Sponsor: Professor Robert Boynton, Journalism*

With the seemingly endless onslaught of a pandemic, civil unrest, wars and the ever-present threat of climate

change, doomsday prepping is entering the limelight. Especially as the government continues to disappoint with its limited assistance, people are realizing that they need to help themselves too. As doomsday preppers—individuals who accumulate supplies and survival skills in preparation for some disaster or cataclysmic event—also relish in this attention, there are newly opened doors for economic achievement. On social media, preppers are able to find each other and build communities, educate newcomers and make a profit on YouTube and Instagram in particular. As outside interest grows, small businesses and large corporations alike can sell more “bug-out” bags, dehydrated foods and other essential survival gear. Both prepper expos (events where vendors sell the newest products and classes are taught) and interest in prepper-consultant companies spike and wane periodically. Although there is potential for economic gain, it may be fickle. At the intersection of innovation, capitalism and media, doomsday prepping has a new future ahead of it as the next disaster inevitably unfolds. What does the increased economic factor mean for the future of doomsday prepping, when prepping itself is about ensuring self-sufficiency when the system fails? How will COVID-19 fit into the future of survivalism? Above all, how does selling “prepping” as a product fit into the narrative around doomsday prepping?

#### **A Study of Differences in College Students' Interactions with Professors**

*Olivia Leal, Sociology*

*Sponsor: Professor Bart Bonikowski, Sociology*

There is well-established literature about the inequalities students of color, low-income students and first-generation students face in higher education. Research has found that students from high schools that are situated in areas with a low socioeconomic index (SEI) have more difficulty navigating university life and more specifically, fostering positive experiences and relationships with their professors and faculty (Jack, 2015). Other research indicates that the unequal nature of the university hierarchy can help explain students' hesitance to engage with their professors (Chemosit and Rugutt, 2020). This paper aims to fill gaps in existing knowledge about college students' experiences in interacting with their professors, looking specifically at differences between different racial groups and socioeconomic classes. I will use qualitative data derived from a survey and follow-up interviews, distributed among Sociology majors at NYU, to explore this subject. My data collection indicates that students with a lower SEI and students of color had more reservations about interacting with professors and had more negative experiences than students of other groups. Although all students spoke about the university hierarchy, this hierarchy seemed more pronounced for lower-SEI students and students of color. In addition, students' experiences with

professors also varied across majors, specifically between the social-science departments and STEM-based departments. The implications of this research are that more should be done to minimize the structural inequality between students and professors, specifically within STEM-based departments.

#### **The Impact of COVID-19 Pandemic on Student Affairs: Understanding the Neglected Perspective of Youth**

*Soobin Serena Lee, Environmental Studies*

*Sponsor: Professor Rohini Qamra, Chemistry*

The COVID-19 pandemic has continued to characterize itself with unprecedented uncertainty. Amongst this unpredictability, the youth perspective has been neglected, though young people may be one of the groups most affected by the pandemic. Despite drastic transitions and upheavals on various aspects of student life and academics, mechanisms to deeply consider and acknowledge the wide range of consequences faced by students are limited. Within this study, 35 interviews with NYU undergraduate students—ranging from first- to fourth-year—were conducted, either in-person or remotely, that focused on providing a comprehensive overview of the various ways that the pandemic has affected their academics, affairs, career preparations, social and mental health, etc. This study is markedly different from other statistical surveys because it provides an intimate perspective held specifically by NYU undergraduate students within a global city. Significantly, many interviewees noted how they came to be more present within their NYU community, being proactive in outreach and activity, but also showed greater concerns for career preparation, at all grades, in terms of academic abilities and limits in extracurricular opportunities. Importantly, I hope that the applicability of these responses and our awareness of specific concerns can be well utilized for future potential situations as a source of information and guidance for academic institutions, professors and other stakeholders in determining the most holistic and effective means of student affairs and learning.

#### **Effect of Bilateral Trade with China on Domestic Public Opinion**

*Zachary Lee, Politics*

*Sponsor: Professor Pablo Querubin, Politics*

After decades of engagement with the People's Republic of China (PRC), American policymaking has undergone a paradigm shift, moving from a cooperative mindset towards a more competitive and adversarial determination. Just a year into the current Biden administration, China has been designated as the greatest foreign policy challenge facing America. To counter its relative decline against China, Washington will seek to rally a set of global partners to form a multilateral coalition. At its

core, the strategy seeks to repackage an old but successful model of “containment” used against the Soviet Union in the twentieth century. But China is far more intertwined in global supply chains than the Soviets ever were, presenting America with a challenge. With a growing number of Washington’s closest allies trading extensively with the PRC, many will be unwilling to take significant action to curtail Beijing. A proxy in assessing a nation’s willingness to take action against a given country can be obtained from their public favorability ratings of the latter state. With that in mind, this study seeks to quantify the extent to which bilateral trade with Beijing affects public favorability of the Chinese state in individual countries around the world.

### **A Leader’s Sphere of Influence: How French Mayors Shape Attitudes towards the European Union**

*Victoire Aglaé Marie Yuwen Legrand, International Relations*

*Sponsors: Professor Pablo Querubin, Politics; María Ignacia Curiel, Politics*

How do leaders, especially those whom we deem trustworthy, affect our political attitudes? More specifically, in the wake of rising Euroscepticism, can leadership, particularly that of French mayors, contribute to the amplification or taming of this sentiment? Given the high regard French citizens bestow upon their mayors, this paper hypothesizes that a mayor’s political stance on the European Union (EU) will positively affect his or her constituents’ attitudes towards the EU. By determining whether these political leaders impact EU leanings within their municipalities, this paper aims to differentiate between the mobilization, socialization and coattail effects that result from electing leaders, ultimately demonstrating these politicians’ importance in shaping public opinion. Using a close election regression discontinuity design, this paper quantifies the effect of having a Europhilic or Eurosceptic mayor on their constituents’ voting patterns in European Parliamentary (EP) elections. The results indicate that Europhilic mayors bring forth a socialization and coattail effect, while Eurosceptic mayors produce a mobilization effect in both the short and long run. These findings are surprising, given that inciting fear in an institution is presumably easier than building trust in one. Subsequently, the paper concludes that Europhilic mayors are more apt in generating support for their cause, while Eurosceptic mayors, through the relative radicalness of their political party, create a window of opportunity for the opposition to strengthen its support base and manifest its discontent. As such, electing a mayor on either side of the EU-spectrum produces a similar effect: a strengthening of the Europhilic voter base.

### **What Causes the Difference? The Effect of Limited English Proficiency of Minorities on Hate Crimes in the US**

*Alice Li, International Relations*

*Sponsors: Professor Pablo Querubin, Politics; María Ignacia Curiel, Politics*

This article aims to investigate the percentage of Limited English Proficiency (LEP) households among minority ethnicities to observe the potential outcome effects on the number of hate crimes targeting these groups across different counties in the United States. In the United States, issues involving the rise in hate crime incidents with specific minority groups targeted have remained a dilemma for a long time. Drawing on a multivariate county-level panel analysis of English proficiency and hate crime incidents, the initial hypothesis is that the percentage of Limited English Proficiency (LEP) households is positively correlated to the number of hate crimes in the corresponding county. While COVID-19 exposed a number of social problems behind the occurrence of these hate crime incidents, it is undoubtedly not the root cause of this long-lasting ethnic conflict in the United States. Although much existing literature on hate crimes attribute the motivation of violence to socioeconomic and psychological factors, few take a step further, probing into limited English proficiency in minority groups might create the difference in these factors.

### **By Accident or Design: Has the One Child Policy Boosted the Economic Development of China**

*Miao Li, International Relations, Psychology*

*Sponsors: Professor Pablo Querubin, Politics; María Ignacia Curiel, Politics*

Implemented for more than 30 years, the One Child Policy (OCP) was one of the “basic national policies” of China (*ji ben guo ce*), imposing a significant influence over the country. While the falling birth rate is believed to offer demographic dividend and thus economic benefits, it remains unclear whether the OCP was indeed effective in lowering fertility and creating the dividend. To explore its impact on regional economic development, this study collects county-level data in 9 provinces in Western China from 1999 to 2013 and conducts a regression discontinuity design (RDD) to compare the GDP per capita and birth rate in neighboring counties that have different versions of OCP. The results suggest that during that period, regions where policy allowed fewer children did not have significantly lower fertility rate nor consistently faster GDP per capita growth. Accordingly, the OCP had relatively limited role in shaping fertility decisions in the last 15 years of its implementation and the demographic dividend theory does not fully explain the economic growth during that time.

## **From Tuberculosis to Coronavirus: Art Therapy's Restorative Effects during Global Pandemics**

*Katherine Libenson, Journalism, Psychology*

*Sponsor: Professor Robert Boynton, Journalism*

My research focuses on how art therapy responds and adapts to collective trauma produced by pandemics, primarily the Coronavirus pandemic. I will follow Clinical Assistant Professor of Art Therapy at NYU Marygrace Berberian's art therapy project, The Parachute Project, to answer the primary question: how does art therapy promote the reestablishment of self-confidence, self-affirmation and emotional expression following trauma? My goal is to report on the field's current applications by assessing how The Parachute Project approaches healing collective trauma while participating in the execution of The Parachute Project myself. I feature expertise from other clinical professionals, art therapists and patients of art therapy to bring the story to life. Incorporating personal anecdotes, scenes and characters personalize the story and balance my summaries of scientific research findings on the long-term health effects of trauma and treatment. In my final project, I hope to legitimize the importance and effectiveness of art therapy and provide my reader with a more holistic sense of the field grounded in research following pandemics.

## **Nation Branding, Image Campaigns and Soft Power: How China Shapes Its Narrative and Why It Has Had Limited Success**

*I-Ting Shelly Lin, Journalism, Public Policy*

*Sponsor: Professor Robert Boynton, Journalism*

As China has achieved superpower status and expanded its economic and military influence over the last two decades, its reputation abroad has steadily deteriorated. From human rights violations, territorial disputes with its neighbors and expansions into the developing world, China is often perceived as combative and aggressive. COVID-19 has only made matters worse, causing many to blame China as the source of the outbreak. To repair its image while expanding its influence, China has invested an estimated US\$10 billion annually in soft power and image-building campaigns—not only to win over a global audience but also to boost the patriotism of its own citizens. This article examines six initiatives undertaken by China to repair its image: the Confucius Institutes; development projects in Africa; the seeding of high-end, domestically made products to redefine what “Made in China” means internationally; global communications campaigns using state-run media; an attempt at vaccine diplomacy; and Beijing’s branding efforts during the 2022 Olympics. By including sources on the ground—African businessmen, expats, former employees of Chinese state-owned media and China studies scholars in China and the United States—this article lays out where China stands

globally and how it is viewed domestically. Despite all of the Party’s global image-building initiatives, these campaigns have not paid off, and that has left the country to turn inward in recent years. While China has no easy answers, if it wishes to use its soft power and branding efforts more effectively to charm other countries, it might try the one thing it has not done: loosening up tight party control over its society and allowing its people to form organic people-to-people exchanges with foreigners.

## **Is Crowdfunding the New Welfare?**

*Salma Lozano, Journalism, Politics*

*Sponsor: Professor Robert Boynton, Journalism*

People share their most painfully intimate moments in the hopes of financing exorbitant medical bills. But, what can trauma buy? Crowdfunding sites have paraded as a bastion of democracy in a world where the little guy is left behind. The most popular crowdfunding site for personal campaigns, GoFundMe, channels that same democratic idea in its purpose statement claiming to incite change by “turn[ing] compassion into action”. Individuals from virtually anywhere in the world can create a campaign at no cost and raise funds for ideas, needs and wants. That’s the theory anyway. The reality doesn’t always bear it out. According to a Journal of Open Innovation, donation crowdfunding is defined by the participation of a group of common individuals coming together online to finance a single goal, creating “community-enabled financing channels”. While crowdfunding is open to all, not everyone can do it. A successful campaign requires a modicum of tech-savvy, the ability to write a coherent story describing your situation requires a certain level of education and the ability to gather funds requires a social network with means sufficient to give. Even if all criteria are met the financial goal specified may remain light-years away. Crowdfunding sites have become the virtual playgrounds of real-world inequalities. The result: the rich grow richer at the expense of the poor and needy.

## **Musical Interventions for Hypertension Control among Minority Populations in the United States**

*Shreya Meda, Global Public Health/Biology*

*Sponsor: Joyce Gyamfi, College of Global Public Health, ISEE Lab*

Background and objective: Minority populations are disproportionately burdened by hypertension. We sought to evaluate evidence from published literature on the effectiveness of music therapy for hypertension control within minority populations in the United States. Methods: Systematic review of intervention studies that utilized music therapy to manage high blood pressure was conducted in June 2021. We searched PubMed/Medline, Global Health, Embase, Web of Science, Scientific Electronic Library Online (SCIELO), Music Index, CINAHL,

Wiley Cochrane Library, the grey literature in OpenGrey, WorldCat, the New York Academy of Medicine (NYAM) Grey Literature databases and references of recently published systematic reviews. We focused on interventions that included music therapy for hypertension control, and studies involving minority populations. Results: 244 articles were identified; five studies met the inclusion criteria. Of the five studies, four were randomized control trials and one was a quasi-experimental design. The sample size ranged from 20 to 217. Only two studies solely included minorities. Three out of the five studies were conducted in practice-based settings. The music therapy included classical music, classic jazz, classic rock and roll and gospel music implemented over a duration of a few hours to one year. The studies reported a significant mean blood pressure reduction ranging from 4.0–39.9 mmHg (Tx SBP) and 2.0–39.5 mmHg (Ctrl SBP). Conclusion: There are limited studies that examine the effect of musical interventions for hypertension control among minority populations in the United States. Future evidence-based interventions should target this underserved high-burden group to improve hypertension control.

### Lobbying and the Effective Tax Rate

*Dhanesha Mirpuri, Economics*

*Sponsor: Professor Hye Young You, Politics*

For my research, I chose to examine the effect of tax lobbying by measuring changes in tax rates. This is because from all the issues that a firm may lobby for, tax laws are one of the only legislations whose returns are quantifiable. Therefore, I can attempt to determine the gains to firms that lobby on this specific cause. Each firm benefits from a lower tax rate as it can lead to an increase in profit, research and expenditure or in investment. Hence, even if not every firm lobbies, every firm would prefer paying lower taxes. This does create a large incentive to lobby for this issue which is why it is one of the most lobbied. Furthermore, it is equally, if not more, important to investigate lobbying in taxes because lower tax returns imply lower government revenue. The direct impact on the changes in government expenditure triggers changes in the economy through fiscal policy which makes it vital to examine the impact.



## **Sanctioned Country to Crypto Economy: On Iran's Uptake of Cryptocurrencies**

*Mina Mohammadi, Politics*

*Sponsor: Professor Yass Alizadeh, Middle Eastern and Islamic Studies*

Iran has faced the past decade with crippling sanctions and economic turmoil, forcing the country to look ahead at more technological options to boost the economy. Iran has become a hotspot for cryptocurrency, initially sparked from its young wealthy populace finding new means at creating economic stability for themselves. The regime itself has also begun creating its own initiatives in the newfound industry, legalizing and backing crypto mining as a new government backed industry. Iran, in the past year alone, mines 5% of all cryptocurrencies worldwide, and this number is projected to keep rising. This paper will outline what the current cryptocurrency landscape looks like in Iran given the government's interventions and continued international sanctions. We will also look ahead and postulate the economic gains that Iran may retrieve from boosting its crypto expenditures and what this new monetary exchange means for Iran's cultural and social future.

## **From Queens to Capitol Hill: Young Socialists Have Won Political Power and Intend to Keep It**

*Michael Morris, Journalism, Politics*

*Sponsor: Professor Robert Boynton, Journalism*

The Democratic Socialists of America (DSA) is the largest socialist organization in the country. In 2016, Bernie Sanders, the most high-profile DSA-affiliate, ushered the organization into a new era. Chapters all over the country saw a dramatic uptick in membership. In particular, leftist candidates of color with working-class backgrounds flocked to meetings and eagerly sought DSA's influential endorsement. Queens, New York is where DSA has had the most electoral success. The poster child for Queens DSA is Congresswoman Alexandria Ocasio-Cortez, but the organization has had other significant, but lower profile, victories. 31-year-old first-generation Ugandan immigrant, Zohran Mamdani won his seat in the New York State Assembly in 2020. Tiffany Caban, a public defender also in her 30s, won her seat on the New York City Council in 2021. These were hard fought victories on Queens DSA's part. There are real people behind these campaigns. Queens DSA Electoral Working Group Co-Chair Aaron Fernando met his partner, Katelin Penner on Tiffany Caban's unsuccessful 2019 campaign for Queens District Attorney. They bonded over the hours they spent handing out Caban fliers at the Jamaica-179th Street Station. At that same time, Matt Thomas was working as a researcher on the Caban campaign. Thomas had never voted

in any election until 2018 when he cast a vote for AOC at his local polling place in Astoria. He joined Queens DSA because of her, and, a year later, he was working for Caban. How has Queens DSA achieved so much success compared to other branches? How do young people become involved with socialism? What inspires Aaron and Katelin to spend hours hanging out in subway stations advocating for Good Cause Eviction, or to ride around Queens in a packed minivan all day and knock on doors?

## **The Physiological Impact of Digital Remote Learning during the COVID-19 Pandemic on NYU Undergraduate Students**

*Morayo Olateru-Olagbegi, Global Public Health/Sociology; Lolayemi Charles, Global Public Health/Sociology*

*Sponsor: Professor Karyn Faber, College of Global Public Health, Social and Behavioral Sciences*

The coronavirus pandemic resulted in a global shift towards digitally-based learning, work and social environments that led to more sedentary lifestyles. Existing literature presents an abundance of studies examining the mental health impact of digital distance learning, but there is a lack of literature studying the physiological impact. Therefore, this cross-sectional study examined the physiological health impact of the shift in learning methods on NYU undergraduate students. The Recent Physical Activity Questionnaire (RPAQ) was adapted and implemented to accurately depict students' experiences with specific health outcomes including but not limited to musculoskeletal discomfort, headaches and sensitivity to white lights. 165 NYU undergraduate students participated in this study and were grouped based on their mode of instruction. Survey questions asked respondents about their pre-existing health history, history of learning modes, modes of transportation used and the physical nature of their work. Likert scale questions were utilized to determine the severity of each experienced health outcome. There was a distinct increase in experienced health outcome frequencies for headaches, dry eyes, irritated or burning eyes, difficulty or slowness in refocusing eyes from one distance to another, neck pain, upper back pain and lower back pain during this period. Within each experienced health outcome, 20+ students indicated an onset between the time period before the transition to digital remote learning and after the transition to digital remote learning during the Spring 2020 semester. The results suggest that digital distance learning resulted in increased sedentary lifestyles and a higher reported frequency of health outcomes.

**Machismo, Parenting Practices and Awareness of the Self among Dominican American Brothers and Sisters**  
*Sofia Olivarez, English and American Literature, Sociology*  
*Sponsor: Professor Ruth Horowitz, Sociology*

Throughout all of Latin America, “machismo”, or aggressive male pride, is a concept that dominates nearly every sphere of people’s social lives. It is the fundamental principle behind the Dominican Republic’s male-dominated family structure as well as its established gender roles and modes of conduct. As a result of this cultural phenomenon, sons and daughters are treated and raised very differently by their shared parents, from the tasks and roles they are expected to take on to the values instilled in them from childhood. Moreover, my concept of self-awareness in this context serves as an umbrella term which encompasses three key concepts: self-image (how one perceives themselves), how aware one is of their role in the family and how aware one is of how other people them. Thus, the purpose of my research is to investigate the following questions: What are specific examples of parental differential treatment occurring in Dominican American households as a result of machismo and how does this differential treatment relate to differences in siblings’ respective self-awareness? My methodology involved interviewing a number of opposite-sex siblings, each primarily American-bred with at least one parent having immigrated to the United States from the Dominican Republic. Half of the interview questions pertain to the participants’ upbringing and family dynamic/relationships, while the other half are asked with the intent of gauging to what extent one’s upbringing with their immigrant parents influenced their level of self-awareness. Brothers and sisters provided varied answers, with brothers feeling more secure and confident in themselves than their sisters, particularly regarding assertion, engaging with authority figures and self-advocacy. However, as a result of the many restrictions and expectations imposed on Dominican sisters rather than brothers, the sisters demonstrate a level of self-awareness that surpasses that of their brothers.

**Pressures of the Greek Life System: The Tragedy of Antonio Tsialas**  
*Maria Olloqui, Journalism, Language and Mind*  
*Sponsor: Professor Jason Samuels, Journalism*

The goal of my project is to create a 25-minute documentary investigating the pressures of the Greek life system in college through the tragic story of my friend, Antonio Tsialas, who died at a Cornell University unregistered frat party. This documentary will highlight a particular case among a sea of stories, specifically profiling a family’s crusade to end hazing. Although, at first glance, this seems like a one-college-centric topic, it represents a macro subject through a micro lens, reflecting the realities

of hazing, peer pressure, belonging, power, ritual, secrecy and violence in American college campuses today. This is the first documentary ever produced about Antonio’s story. Filmmaker Byron Hurt explored the culture of hazing in a self-produced documentary, talking to several families of deceased young people, as well as survivors. In contrast, my interviews fabricate a parallel story, centered on a specific case that holds a deep meaning.

**December 11th, 2020**  
*Jae Ortiz, Social & Cultural Analysis*  
*Sponsor: Professor Emmaia Gelman, Social & Cultural Analysis*

On December 11th, 2020, a protest was held in Times Square in solidarity with Bergen County ICE Detainees. At the time, they had been on a 28-day hunger strike to protest the human rights abuses they were experiencing in the jail. The protest was taunted by NYPD’s Strategic Response Unit (SRG). However, a car, driven by Kathleen Casillo, was allowed to surpass the SRG’s bike line and speed through the protest. Over eight people were physically injured and dozens were traumatized. A year and a half later, Casillo, a 53-year-old white Trump supporter, is only being charged with hitting one of the eight—and it isn’t the person who has several bulging discs and a brain injury. This documentary creates space for the people who were harmed to share their story, since the majority were never contacted by ADA Andrew Mercer’s office who is conducting the investigation. We explore the precedent set—if Casillo really does only receive six days community service and a one-year license suspension—for the safety of protestors and the implications this has for Black and Brown lives. We explore the sensationalization and impact of media stories that paint this as a violent BLM protest. And, most importantly, we ask one of the fundamental questions of abolition: how do we address harm in a non-punitive way? And, can a transformative justice process occur if the harm doer is not in our community?

**Solar Power Structure: New York State’s Representation of Low-Income Households in Community Solar Public Records (2010–2022)**  
*Olive Ottaviano, Anthropology, Environmental Studies*  
*Sponsor: Professor Christopher Schlottmann, Environmental Studies*

As the United States begins to transition to renewable power sources, energy justice and equity must be at the forefront of the conversation. Historically, the unequal deployment of solar photovoltaic technology has led to high-income households receiving greater energy savings. Community solar (CS) can help bridge the gap between energy savings and low-moderate (LMI) communities. Previous research has presented the barriers

to CS deployment and policy tools that can be used to encourage development. However, this research fails to examine how public records represent and frame the LMI community. By analyzing LMI representation, we can see how much agency the community holds in the shaping of their political identity and how their interaction with the policy reinforces the identity. By studying New York State CS records from the legislative assembly, Department of Public Service and New York State Energy Research and Development Authority, I found that New York state positively represents LMI communities. The state's reported emphasis on LMI inclusion translates to policy and programs that increase the visibility of the LMI target group. In contrast, the public comments period for rules was dominated by industry stakeholders and few LMI advocates, leading me to conclude that industry stakeholders had a greater influence on the final orders. There is no conclusive evidence that industry stakeholders shaped LMI written representations. My findings indicate that the positive construction and visibility of the LMI community, in tandem with their limited participation in public comments, make them dependent on higher powers in the political hierarchy

### **The Scope of Policy Responses to New Sulfur Pollution Abatement Technology for Vessels Traveling within US Waters**

*B. Eni Owoeye, Environmental Studies, International Relations*

*Sponsors: Professor Matthew Hayek, Environmental Studies; Professor Jennifer Jacquet, Environmental Studies*

The United States' influential maritime heritage began in the country's early colonial period. Fine particulate matter, sulfur oxides (SOx) and nitrogen oxides emitted from ship smokestacks led to premature mortality and morbidity effects. To protect public and ecological health in marine and coastal regions, the shipping and cruise industries are pressured through new regulations and technologies to achieve more sustainable vessels. Exhaust gas cleaning systems, or scrubbers, are one way the industry can address air pollution and comply with the current International Maritime Organization (IMO) SOx regulations in marine fuel exhaust. But, scrubbers are not the solution they seem: scrubber discharge produced after treatment can pose a water quality issue due to the high concentrations of heavy metals, PAHs and other toxic substances. Here, I examine the federal policy framework to regulate and enforce discharge standards, with case studies of states with and without scrubber bans. This comparison between the national and statewide responses demonstrates California and Connecticut's preemptive action against detrimental effects scrubbers cause through their discharge, while Florida and Texas display the potential

disproportionate harm done if scrubber discharge procedures remain unchecked. Other major players, such as the Port of New York/New Jersey, are adopting separate environmental regulations to address their air pollution concerns. The tradeoffs widespread scrubber discharge has on environmental and public health considerations should warrant concern for US waters. Scrubbers do not go far enough and should therefore not distract the industry from investing in more sustainable mitigation strategies.

### **Divided, Gay Republicans Fight for Their Place in the GOP**

*Jared Peraglia, Film and Television, Journalism*

*Sponsor: Professor Robert Boynton, Journalism*

Being gay and Republican has never been easy. But, in recent decades, being an openly gay elected official in the GOP has become increasingly painless. Even though Democrats proportionally outpace Republicans with the number of gay office-holders, the number of gay Republicans sitting and running for government is growing. The trend may seem paradoxical for a party that has historically embraced such homophobic policies such as conversion therapy and bans on civil unions. Democrats have long been the party of not just gay voters but LGBTQ individuals in general. But, gay Republican representatives like Joshua Higginbotham see a tidal wave of change approaching the GOP shoreline. They envision a party that accepts transgender and gender non-binary folk as well. But, that future may be a ways off. Some gay republicans, such as New Hampshire Representative Joe Alexander, don't see the entire LGBTQ acronym part of the future of the Republican party. In fact, there is a decent list of gay Republicans who see transgender and gender non-binary folk as an impeding "danger" on the progress made inside the GOP concerning gay rights. How will gay Republicans navigate this schism? Can they become the party of the LGBTQ community or will fear of a setback narrow who is welcome and who isn't? The answer to these questions have major implications not only to the future of LGBTQ rights—but for the future of the Republican party itself.

### **Fundamental, Psychological and Knightian Uncertainty (KU) Factors in Movements of Stock Prices and Volatility**

*Xinyu Qu, Economics and Computer Science*

*Sponsor: Professor Roman Frydman, Economics*

Wraps from September 21st, 2021 to April 1st, 2022. The study relies on this dataset to examine whether the models based on the Rational Expectation Hypothesis (REH) and behavioral considerations adequately characterizes the movements in stock prices. Corroborating the findings in Frydman, Goldberg and Mange (2015), the analysis reveals that Knightian Uncertainty (KU),

which has been assumed away by the earlier approaches, has significant impact on the stock-price movements. In addition, the author also constructs the Expectation Concordance Index (ECI) proposed by Frydman and Mangee (2021) to analyze how market participants' expectation concordance affects stock market volatility. The hypothesis is that the similar expectation across all KU events (increase in ECI) has reinforcing effects and increases stock market volatility and vice versa. The study finds out that the hypothesis holds for ex ante measures of volatility but not for ex post measures of volatility. It also finds that the scoring for certain dominating KU events, for example, the Russia-Ukraine war, needs to be accorded a greater weight in the ECI for the hypothesis to hold.

**When Stigma Perverts Trust: A Historical and Social Analysis of Medical Mistrust among People Living with HIV/AIDS (PLWHA)**

*Diego Quintana Licona, Chemistry, Gender and Sexuality Studies*

*Sponsors: Professor Marybec Griffin, College of Global Public Health; Professor Kimberley Johnson, Social & Cultural Analysis*

Although patient-clinician trust is recognized as a fundamental building block of the healthcare professions, the impact of mistrust has not been studied until the last two decades. Medical mistrust is usually defined as a lack or absence of trust in health organizations and medical personnel. However, this reductionist definition negates the many historical, social and cultural factors that may generate mistrust, especially in marginalized communities. While some physicians may categorize medical mistrust as a communication issue or a natural consequence of human diversity, others have pointed out the need for more holistic and intersectional approaches to amplify the understanding of medical mistrust and deter from the "absence of trust" perspective. The lack of a comprehensive analysis on this issue has perpetuated the worsening of marginalized populations' health and increase in health disparities. It is essential, then, to shift the focus from rigidly defining mistrust to instead understanding its roots through testimonies of those affected. Therefore, the overall goal of my project consists of providing a different perspective of mistrust and understanding it along an intersectional and historical continuum. Through this lens, I aim to show how stories of neglect, imbalanced power dynamics and forms of systematic oppression not only come together but walk together through time, creating transgenerational and intergenerational mistrust. This project uses as its population of interest people living with HIV/AIDS (PLWHA) due to the unique characteristic of being a community whose identity has been socially constructed around a viral agent, which poses partial solutions to

some of the caveats in contemporary literature on medical mistrust.

**Demystifying Latinidad: Intersections of Race and Latinx Identity**

*Marilyn Ramos, Social & Cultural Analysis, Sociology  
Sponsor: Professor Ruth Horowitz, Sociology*

When filling out the census, we are used to seeing Race and Ethnicity broken up into two questions. The first asks people if they are of "Hispanic, Latino or Spanish Origin". After filling out either yes or no, respondents are asked about their race. Latinxs are increasingly choosing to identify racially with "other" no matter their racial presentation. How others identify your race, however, has been shown to be a large factor in how you experience life. Hispanic/Latinxs identifying as "other" won't erase the fact that many are racialized as Black or Brown, or that others experience white privilege. We cannot ignore race or color in the United States. My research aims to contribute to work that is already aiming to transform the field of Latinx studies from the generalization of the identity to highlighting the intersection of race and ethnicity. It is an active effort to uplift Black and Brown voices that have been silenced in the creation of homogenous experience in a society that centers on whiteness. Thus, my research focuses on the specific experiences of Latinx surrounding their race and color. Through the comparison of what being "Latinx" means to white, Brown and Black Latinxs, I hope to uncover the importance of intersection of race and ethnicity and how/when they are able to manipulate these identities in different areas of their lives.

**Queer and Trans Students of Color's Development and Expression of Multiple Identities**

*Ted Ravago, Journalism, Sociology*

*Sponsor: Professor Bart Bonikowski, Sociology*

For many, college is a pivotal moment in the development of identity. Going to college, especially when it is outside of your hometown, will introduce you to people of a wide variety of backgrounds. Queer and Trans People of Color (QTPoC) face many different obstacles as a result of their intersecting identities. My research seeks to understand the exact social mechanisms that affect Queer and Trans Students of Color's ability to develop and express their racial/ethnic, gender and romantic/sexual identities. How do Queer and Trans Students of Color find others of their same identities, how do they interact in predominantly white queer and trans spaces, how they interact with cisgender heterosexual people in their racial/ethnic communities and how these experiences can affect their identity expression and development are all core questions that I seek to answer in my research. In addition, I seek to create a model to compare how many factors students of varying identity combinations have that

are supportive to identity development and expression to find which students are feeling the least support and what mechanisms are at play with the differences.

### **Arcadia in the Minecraft Age: Pastoral Escapism in Popular Media of the 2020s**

*Ian Reid, Dramatic Writing, Environmental Studies  
Sponsors: Professor Jennifer Jacquet, Environmental Studies; Professor Dale Jamieson, Environmental Studies*

Since the origins of pastoral poetry in the third century BCE, the idea of the pastoral has developed into a loose form, characterized by romanticized images of nature, a sense of escapism and a perceived division between the “natural world” and “civilized world”. As political, social and environmental contexts have changed over time, the pastoral has continually shifted to incorporate the world around it. This paper compares four pieces of popular pastoral media from the 2020s—Taylor Swift’s *Folklore* (2020), Chloe Zhao’s *Nomadland* (2020), Joe Pera’s *Joe Pera Talks with You: Season 3* (2021) and *Minecraft* (2011)—to gain insight into contemporary pastoral narratives and better understand popular perspectives regarding nature, civilization, escapism and the environment.

### **A Test of Economic Diplomacy: Analyzing Chinese Foreign Direct Investment’s Impact on US-Latin American Relations**

*Tomas Rios, International Relations  
Sponsors: Professor Pablo Querubin, Politics; Maria Ignacia Curiel, Politics*

While there is a wealth of research that analyzes different aspects of Chinese investment in Latin America, none looks to quantify and correlate the relationship between these investments and the shifts in political, social and economic relationships that they bring. This paper focuses on exploring the effect of Chinese foreign direct investment in Latin American countries on the changing political and economic ties of these host countries with the United States and China. Using representative repeated cross-sectional survey data from Latinobarometro and bilateral trade data from the World Bank and the Atlas of Economic Complexity, I analyze whether the growing FDI from China to Latin America affects public perceptions and bilateral trade with China and the United States across 17 countries over the 2005–2020 period. I use a two-way fixed effects model that incorporates a time-continuous analysis of Chinese FDI with each host country’s polling opinions on the US and China and bilateral trade patterns with the US and China. My expectation is that countries with the strongest concentrations of foreign investment (accounting for country size and politics) will have intensified views of China and the United States. I

also expect bilateral trade to be heightened between these countries due to the United States’ desire to remain the dominant ally in Latin America and the greater trading power of host countries that develop broader trade profiles as a result of Chinese greenfield FDI.

### **Quantities and Intensifiers in the Pekigbe Dialect of Ewe**

*Joshua Chaz Rivera, Linguistics, Mathematics  
Sponsor: Professor Christopher Collins, Linguistics*

Questions phrases in the Ewedomegbe dialects of Ewe such as Pekigbe have numerous different characteristics that make it distinct from the standard dialect of Ewe which are not well attested. This includes a stark difference between the standard interrogative words which all end with “-ka” while the Pekigbe words have no common characteristic between them such as the case for “nuka” vs “tsie” which both mean “what”. There is also a modifier “sunu” that has no direct equivalent in Standard Ewe. This modifier appears in phrases regarding a quantity, including “how much” questions and related relative clauses where it is often said to emphasize the quantity, but also is used to indicate approximation in other cases. Without a clear definition or precise translation into a Standard Ewe equivalent there arises potential contradictions regarding its perceived meaning in different contexts. I propose that “sunu” is a type of Ewe modifier called an intensifier, but uniquely has no semantic value or any overt meaning. Instead, it creates a scalar implicature in contrast to the intensifier “tututu”, which means “exactly”, giving it a perceived meaning of approximation in context without explicitly having the meaning and it indicates a presupposition that the noun phrase being modified deals with a quantity.

### **NFTs: Everywhere and Nowhere**

*Maria Gracia Santillana Linares, Comparative Literature, Journalism  
Sponsor: Professor Robert Boynton, Journalism*

Non-fungible tokens (NFTs) merge the tech world of cryptocurrency with the high-brow world of art, creating an industry allegedly worth \$41 billion. But, would you spend millions on a jpeg? On March 11, 2021, artist Mike Winkelmann, aka “Beeple”, made history by selling an artwork for \$69 million. The catch? The piece, titled “Everydays—The First 5000 Days”, possesses no physical manifestation. It is a unique jpeg file living on a blockchain, a digital system that is distributed across a decentralized network of computers. With certified unique identity and ownership, the work made headlines for the record-breaking price for a non-fungible token (NFT). Minted, or encoded, into the blockchain, the process of buying the NFT allows the buyer of the piece to verify and track its subsequent ownership. Meaning that if, or

when, the first buyer chooses to resell the piece, a history of its ownership will remain on the blockchain, creating a ledger for the specific work. But, since Beeple's sale a year ago the NFT boom has moved past digital art. While headline-making prices still largely remain within the arts, NFT technology is now being used across a multitude of industries. The real estate industry, for example, has shown a willingness to adopt NFTs onto property transactions. Beyond selling virtual land in the metaverse, investors and developers are looking at how to use blockchain's authentication process to sell leases. Supply chain companies are using the blockchain to prevent theft and corruption. With new uses, why are only art sales making headlines? Do we even understand what NFTs are? This article will go past the artistic applications of NFTs and explore what an NFT is, what it entitles you and how different entrepreneurs are looking to maximize NFT and blockchain technology.

#### **Examining the Impact of Telemedicine on Doctor-Patient Relationships and Patients' Experiences with Medical Care**

*Kathrine Serebrianski, Global Public Health/Sociology*  
*Sponsor: Professor Ruth Horowitz, Sociology*

With the pandemic continuing in different areas of the world, we are witnessing the natural experiment of the increase in use of telemedicine shaping patients' experiences with healthcare, doctor-patient relationships and the role technologies play in these processes. This paper seeks to understand what factors influence people to seek telemedicine, how they view the transition to virtual care, often driven by the COVID-19 pandemic, how the transition influenced healthcare experiences and how the virtual environment shaped doctor-patient relationships from the patient's perspective. This project seeks to examine patients' relationships with their doctors since doctor-patient interaction is one of the key centers of a person's healthcare experiences, in both virtual and face-to-face environments. Such factors as the level of trust, comfort, open communication, the feeling of needs and wishes being respected are some of the key aspects that determine doctor-patient relationships from the patient's side (Berwick, 2009). Therefore, to understand the role of these factors in telemedicine, this study seeks to explore the research question through the lens of the concept of patient-centered care. I argue that the degree of patient centeredness the patient perceives during a virtual visit is one of the factors that shapes patients' experiences with telemedicine. The findings of this paper are based on 15 in-depth interviews with individuals who have experience using telemedicine for routine treatments and chronic condition management.

#### **Ethnic Authenticity in New York City's Chinatown**

*Caitlin Shoemaker, Sociology*  
*Sponsor: Professor Bart Bonikowski, Sociology*

My thesis hopes to address the research questions, how do Chinatown business owners and customers understand ethnic authenticity? How does ethnic authenticity appear and operate within an American cultural context? The goal of this thesis is to utilize an insider/outsider analysis approach to define "ethnic authenticity" and understand if and to what extent, Chinese business owners appeal to American taste preferences. This project also necessitates a historical analysis to provide background for the mechanisms underlying the strategies Chinese business owners utilize to fit into or remain distant from the American cultural matrix. I will be conducting interviews with business owners and Chinatown patrons; I predict I will see a great variety of responses whereby the term "authenticity" may mean different things to different people, creating a wider application for its definition. In essence, this is a study on ethnic authenticity, with secondary considerations on cultural assimilation, the treatment and social status of Chinese-Americans and tertiary considerations on policies and historical proceedings that have affected the function and perception of Chinatown.

#### **Breaking Bad: Confusion in the Study of Bipolar Stone Tools**

*Saul Shukman, Anthropology*  
*Sponsor: Professor Justin Pargeter, Anthropology*

Bipolar knapping—a stone tool making strategy that involves striking a nodule of rock from above while it rests on an anvil—represents one of the most widely used and oldest methods of lithic reduction (Horta et al., 2022; Harmand et al., 2015). However, at some point starting around the Middle to Later Stone Age (MSA/LSA) transition (~70–20ka) in Africa and the Middle-Upper Paleolithic (~50ka) transition in Europe small, pillow shaped, rectilinear bipolar objects became common (Horta, 2022; de la Peña, 2015). Often called *pièces esquillées*, splintered pieces or bipolar cores (among other less frequently used names), there has been a great deal of debate as to whether these bipolar objects are small bipolar cores or tools used for wedging (de la Peña, 2015; Schott, 1999, 1989; LeBlanc, 1992; Hayden, 1980). The most parsimonious explanation for their function is as small bipolar cores. This project aimed to contribute to the study of bipolar knapping by completing analyses at three different scales: first, a macro-scale meta-analysis of all known Afro-Eurasian uses of bipolar knapping was completed to understand and summarize trends about bipolar spatial and temporal patterning and use. This meta-analysis was largely done to question the conclusions of a recent paper conducting a similar analysis by Horta et al. (2022). Second, an assemblage-scale reduction intensity study



was completed on cores first knapped with freehand techniques and then recycled with bipolar reduction in order to better understand the use of bipolar knapping at the MSA-LSA archaeological site of Mumba Rockshelter in Tanzania and contribute a new method to the study of reduction intensity in archaeology. Lastly, a small-scale, purely experimental study was conducted in order to visualize and understand the ways in which bipolar and freehand knapping reduce a core differently.

### **Sharing the Wealth: EU Expansion and Economic Development in the Western Balkans**

*Bojana Starcevic, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;  
María Ignacia Curiel, Politics*

The European Union (EU) is a transnational political and economic body that serves as a key actor in both European and world politics; but, what makes it favorable for countries to become member states? This paper looks at the economic development and growth of two Balkan countries, Croatia and Serbia, following the fall of Yugoslavia and their transitions away from communism. The critical difference between the two is that Croatia is an EU member state, while Serbia is not. Data is collected at the town and county levels from slightly before Croatia's admission into the European Union in 2013 through now, nearly one decade later. The goal of this research is to compare economic development between Croatia and Serbia, as well as within different regions Croatia itself and analyze the underlying mechanisms for the observed

effects. This data is compiled into difference-in-difference analyses using ordinary least squares (OLS) regressions to measure the effectiveness and immediacy of EU membership on economic performance within an individual member state and within the Balkan region. The outcome of the regression analyses suggests that EU membership has not had a profound effect on the economic outcomes of Croatia over Serbia but also that continental regions of Croatia have seen greater economic benefits from accession than their coastal counterparts. These results raise the question of the future desirability of EU accession, as well as the fate of the union as a prominent actor within the Western Balkans.

### **The Cost of Development: Impact of Foreign Direct Investment on Worker Wellness**

*Jorge Tagle, East Asian Studies, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;  
María Ignacia Curiel, Politics*

This paper examines foreign direct investment from the perspective of worker wellness, which includes a quantitative analysis of industry-level investments with wages, fatal and non-fatal accidents. According to the historical capital allocation models, the relationship between the host nation and investor often presents imperialist relations due to economic leverage. This idea is reaffirmed with historical and cultural facts that have reached conventional wisdom in mainstream academic discourse. Yet, in contemporary economic development theories, the integrity of such truths has been challenged.

According to many scholars, foreign investment is a crucial tool capable of enhancing sociopolitical stability in the host nation, leading to increased worker welfare and rights due to increased access to services, collective bargaining powers and economic freedom. After analyzing such a dichotomy, I found positive and negative causal relations between FDI and differing worker wellness outcomes. In other words, the relationship between FDI and worker wellness varies depending on the outcome, and thus, claiming a wholly negative or positive correlation would fail to encapsulate how FDI interacts with workers across different industries.

**Souls above the Altar: As Americans Stray from Christianity, Some Black People Have Felt Called by the Spiritual Traditions of Their African Ancestors**  
*Tatyana Tandanpolie, Africana Studies, Journalism*  
*Sponsor: Professor Robert Boynton, Journalism*

As Americans continue the decades-long trend of deviating from Christianity and religion, Generation Zers and Millennials are adopting New Age spirituality, a set of beliefs and practices accumulated from various non-Abrahamic religions that first gained prominence in America in the 70s. From astrology to tarot cards and oracle divinations, young people have flocked to the practices on and offline to find the inclusive community and comfort that their parents' religions didn't provide. For many young Black people, these practices have become a gateway to the spiritualities of their imagined past: African/Diasporic traditional religions (ATRs/DTRs). Though at times widely but secretly practiced, traditions like Isese, Lukumí and Hoodoo (the last of which is exclusive to African Americans), have become a respite from recent years heightened racial tensions and increased social unrest. As they connect with their ancestors through self-made altars and spiritual practices, many form deeper understandings of their heritages and affirm their African roots and Blackness. ATRs provide a refuge, too, as each tradition's philosophy makes more space for their multifaceted identities than the Christian churches they grew up in. What these young Black Americans seek is salvation with another name and from a different place—one that they believe will connect them with the rites of passage that chattel slavery separated them from. Where they're finding it is through their spiritual journeys with ATRs. What they're calling it is a homecoming.

**"I Wish I Could Be Rich": A Study of Male Sex Workers in China**  
*Chaoting Tang, Sociology*  
*Sponsor: Professor Siwei Cheng, Sociology*

Since the 1980s, China's rapid economic growth and urbanization have provided Chinese cities with sufficient financial and human resources that allow sex work

as an industry to foster. Most research on sex workers in China focused on heterosexual relationships, assuming men as clients and women as service providers. Previous works on Chinese male sex workers predominantly focused on migrant workers, mostly from rural areas and seldom received tertiary education. However, based on forty in-depth online interviews, I observed a unique group of Chinese male sex workers that received little attention from scholars: students and college graduates. Compared with migrant workers, student and college graduate sex workers more often come from urban areas. The primary reasons for them to do sex work are a mismatch between their consumption desire and economic status, personal sexual desires and upward social mobility. Under the trend of consumerism, some students' desire for consumption rose to the level of middle-class young people in the big cities, but the money they got from their parents was not enough to support such desires, so they turned to sex work as a result. Many student sex workers perceive sex work more as "transactional hookups" instead of a job: they select clients based on their appearance, background and personal characteristics, so they are also doing sex work partially because of their sexual desires. Some college graduates and migrant workers are doing sex work for upward social mobility. After gathering enough capital, they would want to exit this industry and return to the "normal life". I observed that many underage children are in the sex industry by doing online ethnography in clients' group chats. Like many other industries, the sex industry in China has been deeply affected by the COVID-19 pandemic.

**The Prisoner Reentry Experience and Presentation of Self in the Digital Information Age**  
*Laila Tijani, Sociology*  
*Sponsor: Professor Ruth Horowitz, Sociology*

This research follows online prisoner reentry discourse. Previously incarcerated people have spoken about the character of reentry for decades, especially since the beginning of mass incarceration. In the Information Age of the twenty-first century, this same demographic of individuals has broadened the landscape of where they choose to speak about their challenges and successes during reentry, as they have now taken to online spaces to share their stories. Through examining uploads on YouTube, this study gathers anecdotes from previously incarcerated people, of several demographic markers, in online spaces in order to probe how people who have been institutionally involved, speak about the process of reintegration, while simultaneously managing and constructing an online self. This research is significant as the way people speak about a certain topic has broader implications. In the context of prisoner reentry, the substance of what previously incarcerated people speak on in virtual spaces, especially considering the far reach of social media, may

influence what happens in incarceration, reentry programming and policies.

**The Minimum Wage and Its Trade-Off between Income Inequality with and without the Unemployed**

*Anh Tran, Economics*

*Sponsor: Professor Christopher Flinn, Economics*

The minimum wage has never ceased to be a contentious economic and political issue. However, the policy's source of controversy comes almost entirely from its disemployment effect. The *raison d'être* of the minimum wage, which is to reduce inequality, has been studied relatively less. On the one hand, the minimum wage can unambiguously reduce the income gap among the employed. On the other hand, when the unemployed are considered, if the minimum wage's disemployment effect triggers sufficient income losses, the whole population's wage gap may be widened and the policy will become counter-productive. Thus, this paper strives to examine this trade-off between income inequality with and without the unemployed through both a structural and a reduced-form approach. Relying on a Nash-bargaining continuous-time search model and numerical simulation, I derive some theoretical insights about the minimum wage's effect on unemployment, wage distribution and thus the income gap trade-off. This model predicts that the minimum wage widens the income gap between the very poor and the ultra-rich, but compresses the gap of those in between. Empirically, this study will utilize and extend the few previous studies on this topic as well as apply some recent developments in the difference-in-differences literature that can take into account both time and state heterogeneous treatment effects. Overall, even when the disemployment effect is considered, the lower-tail inequality compression effect remains positive, even though this effect seems to only benefit the employed and its magnitude is considerably attenuated compared to the case when only the employed is included.

**A Multi-Method Approach to the Non-Binary -Self and -Selves: Asymmetries between Speakers' Judgment and Production Patterns**

*Declan Morrow Urffer, Environmental Studies, Spanish and Linguistics*

*Sponsor: Professor Gary Thoms, Linguistics*

Using three separate sociolinguistic data collection methods, this study seeks to provide an account of the variation between the two possible reflexive forms of singular "they", "themself" and "themselves". Past investigations relying on grammaticality judgment survey data have broadly found a reported preference for "themself" over "themselves" in contexts of definite singular

reference (i.e., the emerging "non-binary" use of singular "they") (Conrod, Ahn et al., 2022; Sheydae, 2021). The study's first two experiments involved data collected from two types of surveys (grammaticality judgment and written fill-in-the-blank prompts, respectively), which largely replicated the findings of the cited investigations. A third experiment analyzing tokens extracted from Twitter produced the opposite result, with users strongly favoring singular "themselves" in their posts. These results highlight the drawbacks of survey data for the purposes of sociolinguistic research, the results of which can be muddled by metalinguistic analysis on the part of respondents. In short, there are often stark disparities between the language speakers report to use and the language they actually use. This observation may be of particular relevance to studies of queer linguistics, as speakers tend to be highly aware of the social and pragmatic functions of related variants and sensitive to the metalinguistic debate surrounding them.

**Latine Youth: The Untreated Generation**

*Natalie Urgiles, Journalism, Politics*

*Sponsor: Professor Robert Boynton, Journalism*

My research project investigates the toll of mental health on Latine youth, primarily in low-income, immigrant families. As research shows, Latine children are more depressed, but less likely to get mental health care than their peers. I will attempt to answer this question by analyzing modern forms of psychotherapy, specifically how social media can be used to begin conversations of mental health for Latine communities that have traditionally neglected such topics. Approximately 22 percent of Latinx youth are depressed, but even fewer, 8 percent, have ever received mental illness treatment compared to the white children, 14 percent. (Sansom, UT Health) My project seeks to understand, and later answer, what accounts for the dramatic difference? Why aren't they seeking or receiving the help they need? Can social media therapy serve as a solution model to this vicious cycle? This is particularly concerning because the Latinx community faces specific institutional and systemic barriers such as language, cultural stigmatization and lack of access to healthcare that makes treating mental health disorders increasingly difficult. My goal is to narrow in on the culture of mental health in Latinx low-income immigrant families and compare how it varies from their non-Hispanic counterparts to understand why Latinx rates of mental health are so low, what can be done to help and if the current measures of support are enough to change the course of mental illness rates for Latinx children in the future.

### **Mutual Aid during the Pandemic: Sustaining Community Care after Crisis**

*Maggley Vielot, American Studies, Public Policy  
Sponsor: Professor Tyson Patros, Social & Cultural Analysis*

My research question is “Why Mutual Aid?”. Although mutual aid is not a new concept, it has entered mainstream consciousness during the COVID-19 pandemic. Looking at mutual aid during this specific time frame of a public health dilemma will help me make the argument that mutual aid has benefits that go beyond being a response to crisis, it can serve as a way for improving the material lives of the most vulnerable communities. Adopting a politics of care and using mutual aid as an organizing principle of society can radically change the lived experiences of the most disenfranchised communities. The COVID-19 pandemic has only highlighted the existing failures of racial capitalism and neoliberalism. Turning to mutual aid in a time of government abandonment allows marginalized communities to get their material needs met in a timely manner without any conditions. One of the main goals of my project is to investigate whether or not and to what extent mutual aid can only address immediate suffering and crisis or be extended and institutionalized as a constant form of community care.

### **Sonder: Making a Home in the Hamptons. The Immigrant Struggle**

*Amari Weddle, Journalism, Sociology  
Sponsor: Professor Jason Samuels, Journalism*

When one thinks of the Hamptons, what jumps to mind are summer parties, wildly famous people and their mansions by the sea. But, right next door, a strong, steady stream of immigrants has been flowing to the area for years, drawn by a service economy that demands hedges trimmed and houses cleaned. My film, *Sonder*, investigates and grapples with the question of how a county with so much wealth has so many hidden and underlying issues and what that means for its residents. Featuring several first and second-generation immigrant families who have settled in the East End of Long Island, my film looks at their individual stories and focuses on how the Latinx working-class population lives year-round in the ultra-wealthy summer destination of the Hamptons. In doing so, I highlight the contrasts within the community and the various inequalities and everyday struggles they face—wage theft, food insecurity, educational disparities and illegal evictions.

### **Re-Examining RAND Health Insurance Experiment with Modern Approaches: Application of Causal Inference and Machine Learning to Health Economics**

*Bruce Wen, Economics  
Sponsor: Professor David Cesarini, Economics*

The groundbreaking RAND Health Insurance Experiment (Newhouse, 1974) was the first large-scale randomized study on healthcare and health insurance. Before the RAND study, estimating demand for healthcare services was difficult due to the problem of adverse selection: people who purchase generous insurance plans—and thus face lower out-of-pocket prices—tend to be less healthy than the typical population and, as a consequence, demand more healthcare services. Estimating the demand curve by simply recording the quantity of healthcare services offered and the prices at which they are offered will therefore be biased. Researches on this experiment that study the impact of insurance assignment on the demand for healthcare services usually utilize linear models such as linear regression and Analysis of Variance (ANOVA) to estimate causal effects. Yet, some assumptions for the linearity model, especially homogeneity in effects, are very likely to be violated in the experiment. Therefore, the treatment effects estimated using such models are potentially biased. This project aims to investigate two main questions: whether the effects of insurance assignments on healthcare demand in the RAND HIE were heterogeneous and if so, what are the unbiased, consistent and efficient estimators for the causal effect.

### **Salient Identity and Political Polarization: The Effects of Altering Salient Identity on Political Polarization in Guyana**

*Ebony Williams, Politics  
Sponsors: Professor Chris Dawes, Politics; Rajeshwari Majumdar, Politics; Professor Amy Catalinac, Politics*

The political polarization in Guyana leads to political violence and threats of political violence between the two largest ethnic groups: Afro-Guyanese and Indo-Guyanese. Tensions between the two groups are viewed most clearly during presidential elections. Past research has tried to explain how countries like Guyana have become polarized, but this study attempts to reduce polarization by highlighting commonalities through reframing out-group members as ingroup members. I used a survey experiment to test whether altering a Guyanese participant’s salient identity allows for the decrease of political polarization between Afro-Guyanese and Indo-Guyanese. By emphasizing genetic similarities specifically, this research found evidence suggesting that participants who received the treatment passage liked potential policy ideas from the People’s Progressive Party and A Partnership for National Unity more than participants who received the control

passage. My findings could be a vital step in encouraging political cooperation between the two largest ethnic groups in Guyana. I hope that the method used in this research can be implemented in Guyana and other countries with backgrounds similar to Guyana to lessen political polarization.

### **Backlash: The Effect of Information about Voter Identification Laws Measured across Racial Groups**

*Jeremy Williams, Politics*

*Sponsor: Professor Chris Dawes, Politics*

Voter Identification laws, which require voters to show identification at the polls in order to vote, have become a prominent part of American election laws. Such laws have been a source of controversy over their alleged harmful impact on the ability of many Americans to exercise their right to vote. However, the exact impact of voter identification laws on voter turnout has produced mixed results throughout years of academic research. One theory behind this ambiguity is “backlash effect”, which posits that anger about voter identification laws mobilizes minority voters and in turn increases turnout come election time. I tested this theory by surveying 500 voting-aged Texans in order to see how being presented with information about the racial controversy behind voter identification laws impacted participation likelihood and attitudes toward voter ID laws. While I did not find evidence to suggest that racial priming increased intention to vote, both overall and across individual racial groups, I did find that racial priming decreased overall intention to donate to a political campaign, intention to attend political events and support for voter identification laws. Across individual racial groups, I found that racial priming had a statistically significant impact of decreasing support for voter ID laws among Asian and Latino respondents and increasing anger among Black respondents.

### **Mixing and Matching Gender: The Interaction of Gender Assignment/Rules in Spanish-English Codeswitching**

*Ashlyn Winship, Linguistics*

*Sponsor: Professor Gary Thoms, Linguistics*

Codeswitching occurs when someone switches from one language to another within the same utterance, which causes the grammatical rules of the different languages to interact. This paper focuses on one specific context in Spanish-English codeswitching, noun phrase (NP) ellipsis. The study investigates the way in which the grammatical gender rules for Spanish words interact with English, which lacks similar gender assignment rules. NP ellipsis occurs when a noun is omitted from a sentence rather than repeated (e.g., “Don’t pick the blue flowers or the red”, in which “flowers” is omitted after “red”). A sentence that combines codeswitching and NP ellipsis

presents the speaker with multiple options. For example, one could say either, “Do you like the green shirt or the blanco?”, or “Do you like the green shirt or the blanca?”. “Camisa” (“shirt”) is a feminine noun, so the gender of the adjective “blanco/a” (“white”) may depend on whether the adjective is referring to the gender-neutral “shirt”, or the feminine “camisa”. Recent research suggests that the gender markers on adjectives like these can provide information about the gender of the elided material (González-Vilbazo and Ramos, 2018). Data for this study was gathered by administering an acceptability judgment survey to bilingual speakers, which tested different options for assigning gender in sentences like the examples above. The analysis showed that the language of the adjective determines the way in which gender assignment rules function at the ellipsis site. If the adjective requires grammatical gender agreement (i.e., is in Spanish), then it will check the deleted noun for gender features. If the deleted noun does not possess gender features (i.e., is an inanimate English noun), it is forced to switch to Spanish. Notably, biological gender is sufficient for an English noun to possess gender features (e.g., “woman”, “boy”).

### **Addressing Social Needs of Families with a Phone-Based Social Determinants of Health Screener at a Pediatric Clinic**

*Jenna Wisch, Prehealth Studies*

*Sponsors: Dr. Leora Mogilner, The Mount Sinai*

*Hospital; Dr. Lauren Zajac, Icahn School of Medicine at Mount Sinai; Dr. Jennifer Acevedo, Icahn School of Medicine at Mount Sinai*

Over 80% of factors influencing health arise from environmental and socioeconomic circumstances, known as “social determinants of health” (SDH) (McGinnis, Williams-Russo et al., 2002). Adverse SDH are inextricably linked to negative health outcomes, so identifying such factors is crucial, particularly in underserved communities. Our team screens families attending a pediatric clinic in East Harlem to determine unmet social needs and offer resources and referrals to social work and community-based organizations. Limited evidence exists on the success of such programs in healthcare settings, so I studied families’ needs and referral acceptances to validate this outreach method and enhance future interventions. Our team administered a phone-based survey to caregivers weekly before appointments, assessing twelve needs. Reports of these calls were added to children’s electronic health records (EHRs) and shared with their physicians. Using descriptive statistics, we analyzed screening results from November 2020 to December 2021. Of the 1,568 families called, 771 (77%) completed the screener, 513 (67%) identified at least one need and 416 (81%) accepted a referral. Families reporting at least one need were more likely to be enrolled in public health insurance and pub-

lic assistance programs. These families were also more likely to reside in public housing and be Hispanic. The most prevalent issues included home environment (32%), food insecurity (25%) and childcare (25%). Childcare had the highest resource acceptance rate at 100%, then food insecurity at 86% and environmental issues at 62%. Thus far, the screenings have successfully identified a range of needs in our population. Patients are often unaware of the scope of services physicians can provide, so administering screenings before visits may facilitate valuable interventions in outpatient settings. Future research will study referral completion and impact and how the inclusion of such information in EHRs influences clinical care.

### **The Impact of Subway Extension on Demographic Characteristics of the Surrounding Areas**

*Tianyu Yan, Computer Science, Economics*

*Sponsor: Professor Karl Storchmann, Economics*

This study investigates the economic impact of extending the subway line on the demographic characteristics in its surrounding areas. We apply a case study approach to explore the economic impact of the Second Avenue Subway in Manhattan, NY. The Second Avenue Subway is a 6-station extension of the Q-line from time square station to 96 St. station that opened to the public on Jan, 1st 2017. Since this extension geographically

connects the upper east side with lower Manhattan and Brooklyn, the transport cost for commutation from/to the upper east side decreases. We employ a difference in differences (DID) estimator to analyze the causal impact of this lower transport cost on the demographical change in the upper east side. We use the upper west side as a control group and the upper east side as the treatment group. We collected longitudinal data of selected regions by census tracts in both control and treatment groups on the distribution of socioeconomic variables such as income, education attainment and housing rent in the years 2015 and 2018 from the American Community Survey by the Census of Bureau. By running the DID analysis on the data, we have observed that for most of the variables, there is no strong statistically significant change; however, we indeed find that the percentage of people who moved in 2017 is statistically significantly 8.1% higher than the percentage of people who moved in 2014. So, we have observed a phenomenon of “residential stickiness” in the short run, where there is no obvious change in the demographics. We also observe that housing owners are more reluctant to move than housing renters. For future study, we will investigate the demographic characteristics of people who moved after the Q-line extension to understand who is more responsive and sensitive to this change.



**Does Using WeChat Subscription Accounts as a Primary Information Source Affect First-Generation Chinese Immigrants' Opinion on the Black Lives Matter Movement?**

*Stella Ye, Sociology*

*Sponsor: Professor Bart Bonikowski, Sociology*

WeChat is currently the most popular social media platform in China, with a total of approximately 1225.0 million monthly active user accounts around the globe. It remains a widely-used application among Chinese Americans, especially for first-generation Chinese immigrants, thanks to its broad range of functions, its role as the major tool for Chinese Americans to connect with the local Chinese community or with relatives and friends back in China etc. Besides these, WeChat also enables individuals, organizations, agencies or companies to run subscription accounts for providing public content based on their own choices. For instance, there have been numerous subscription accounts run by Chinese immigrants that primarily focus on reporting US domestic news. Their articles are usually summaries of existing English news reports, as they serve the purpose of allowing Chinese immigrants who are not perfect in English to also catch on with current events. Since a large proportion of first-generation Chinese immigrants' face dilemmas such as the language barrier in US society, many of them tend to rely heavily on these subscription accounts articles as a primary information source. However, because many of these most popular subscription accounts have their own political persuasion, some of them have the tendency to twist or delete certain contents of the news based on their own interests. Through constantly gaining information from these accounts, one is likely to form biased understandings on specific issues. As previous researches have suggested that a strong attention on racial relations is commonly demonstrated by subscription accounts, the objective of this research is to investigate the potential relationship between using WeChat subscription accounts as the primary information source on first-generation Chinese American's opinion on US racial issues, to be more specific, the Black Lives Matter movement.

**The Impact of E-Commerce on China's Rural Poverty**

*Luopeiwen Yi, Economics, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;*

*Maria Ignacia Curiel, Politics*

Global poverty is a critical topic nowadays, and China's E-Commerce market provides a new approach to poverty reduction. The growth of China's E-Commerce is largely driven by Taobao, a Chinese online shopping platform similar to Amazon in the US. As the internet penetrated China's rural areas, more and more rural residents became Taobao sellers, which led to the emergence of "Taobao villages". In general, Taobao village refers to

a village where the number of active online stores reaches more than 10% of the number of local households and the annual E-Commerce transaction volume reaches more than 10 million RMB. In 2009, the first 3 Taobao villages were discovered. By 2020, there were 5,425 Taobao villages in 28 provinces (autonomous regions and municipalities) across the country. The rise of Taobao villages in Chinese rural areas brings huge E-Commerce success. This paper investigates the impact of E-Commerce on China's rural poverty using Taobao villages as a measurement of rural E-commerce development. I seek to answer the following question: How does having E-Commerce villages at the county level affect regional poverty in China? Using a two-way fixed effect panel data regression with data from a large sample of counties in different provinces, I find Taobao villages particularly advantageous to poorer counties in China. My research would provide valuable insights for other countries or regions that also engage in rural E-Commerce to promote the development of rural economies. It would contribute significantly to the grand challenge of poverty alleviation in China and globally.

**Taboo to Trendy; Pole Dancing Gone Mainstream**

*Jean Zamora, Journalism, Photography*

*Sponsor: Professor Robert Boynton, Journalism*

For as long as there has been pole dancing it has been tied to sex work and because of that has been stigmatized as something dirty and taboo. Yet, more and more people have been taking up pole dancing and there have been big pushes to destigmatize the practice. Musicians such as FKA twigs, who pole dances in her music videos, and Jennifer Lopez, who brought pole dancing to the Super Bowl halftime show in 2020 after starring in the movie Hustlers, have popularized it. The International Pole Sports Federation is even trying to get pole dancing admitted to the Olympics, which could happen as early as 2024. Still, the road to acceptance is not straightforward. In 2016, in an effort to gain acceptance for the idea of pole dancing as a sport, some pole dancers started to use the hashtag #notastripper. Likely tired of the hyper-sexualization that comes with saying they pole danced, they attempted to shut down the judgmental remarks by distancing themselves from pole dancing's sexual history. However, attempting to reclaim the sport by denouncing its origins caused controversy, and a competing faction of pole dancers and strippers objected to this attempted gentrification, creating the counter hashtag #Yesastripper. Pole dancing's increasing acceptance has come with difficulties for practitioners, especially the most marginalized participants who rely on pole to survive, leaving them trying to negotiate their own social standings in a sport so deeply connected to sex work and wondering if the perfect balance can ever really be found. Will the popularization of the sport help destigmatize sex work, or will

its mainstream acceptance gentrify the sport, leaving its most vulnerable members behind?

### Afghan Refugee Inflow on Anti-Americanism in France

*Kelly Zhang, International Relations*

*Sponsors: Professor Pablo Querubin, Politics;*

*Maria Ignacia Curiel, Politics*

This study investigates whether the political salience of anti-Americanism increases as evidence of American mistakes in the Middle East suggests to France that it is time for a stronger Europe. In the multipolar, post-Cold War world, US leadership is called into question as French and ultimately European disapproval of American interventionism brings the suggestion of a stronger Europe into a new light. This study utilizes a survey experiment with randomly assigned treatment and control groups to examine the effect of Afghan refugee inflow as a result of the withdrawal of American troops from Afghanistan in 2021 on French residents' anti-American and pro-European political opinions. Due to the relatively small sample size, this study is unable to come to a statistically significant consensus on the causal effect of Afghan refugee inflow on anti-Americanism and pro-EU sentiment. Nevertheless, the general trends of the coefficient of interest indicate that Afghan refugee inflow is correlated with increased anti-Americanism and pro-EU sentiment.

### Coordination and Competition of Guangdong-Hong Kong-Macao Greater Bay Area City Clusters: A Case Study of Foshan, China

*Chengzhe Angelina Zhou, Economics, Sociology*

*Sponsor: Professor Jia Miao, NYU Shanghai, Sociology*

This research explores Foshan's dynamics of development as a traditional industrial city under a broader geographical and institutional framework of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) of China, focusing on how Foshan develops its uniqueness in competition with other cities in the Greater Bay Area while achieving the overall coordinated and integrated development of the GBA. This study is mainly qualitative with an emphasis on in-depth interviews with government administrators regarding policy-making incentives, development trajectory and strategic plans of the city. Additionally, quantitative analysis on data from past government reports and administrative statistics will be conducted for the analysis of the city's economic performances and development indexes, while secondary research conducted on existing literature, publications and industry reports on the development of Foshan. The research also shed light on how Foshan strives for a more diverse development, particularly through connecting nearby megacities, industrial transformation and upgrade for the high-end manufacturing sector, expansion of the service sector with an emphasis on industrial design as well as the boom of cultural and tourism industry in recent years.



# STEM

## **Primary Caregivers' Barriers to Research**

*Lisa Abe, Neural Science; Srinidhi Ananth, Psychology  
Sponsor: Professor Natalie Brito, Steinhardt School of Culture, Education and Human Development, Applied Psychology*

In developmental and neuroscience research, many studies are designed to understand disparities of, and differences in, child outcomes among children across different socioeconomic classes. To carry out these studies, researchers must successfully recruit subjects from varying backgrounds. However, a common challenge faced by researchers is recruiting and retaining participants from lower resourced and minority populations. This results in developmental and neuroscience research to be heavily dominated by white, educated, industrialized, rich and democratic (WEIRD) populations. There are several barriers that prevent people from lower socioeconomic backgrounds from participating in research studies that have not been adequately addressed. Examples of these barriers include lack of financial support, child care, transportation and knowledge regarding the study and, therefore, a hesitance to partake in it. Additionally, the emergence of the COVID-19 pandemic has disproportionately affected lower resourced minorities, presenting new barriers to participating in remote research studies which have not been studied over the past year. Thus, our research question asks what the most prevalent barriers, exacerbated by COVID-19, that primary caregivers' face when participating in research studies. Due to the many limitations that are not addressed by studies, this project is designed to understand the multitude of barriers that primary caregivers of infants or young children encounter when engaging in research studies. We anticipate that generating data

regarding the most prevalent barriers caregivers encounter will help us design a future study to uncover efficient solutions that mitigate these barriers and promote inclusivity and accessibility among New York City residents.

## **Design, Synthesis and Testing of Two-Component Organocatalysts for Peptide Bond Synthesis**

*JJ Adler, Chemistry  
Sponsor: Professor Paramjit Arora, Chemistry*

Amide bonds are ubiquitous in nature, specifically as a critical component of the peptide and protein backbone. Solid phase peptide synthesis (SPPS) is the standard peptide synthesis method used in both research and industry. However, it is atom-uneconomical and highly wasteful, requiring up to five equivalents of coupling reagents and amino acids per step. To combat this wastefulness, the Arora group rationally designed a catalyst to couple amino acids on solid phase without requiring excess reagents. The catalyst incorporates stabilizing features similar to the oxyanion hole of proteases and uses selenoesters as reactive electrophiles. A phosphine catalyst was used to generate the selenoester in situ. The accompanying mechanistic studies suggested that the phosphine and diselenide work in tandem to catalyze the formation of peptide bonds. My project is to design a third-generation catalyst which combines the phosphine and diselenide components into a single molecule to improve coupling performance. A library of potential catalysts with the same central structure and varying functional group configurations are tested for efficiency in coupling reactions. An optimized catalyst will allow for convenient and environmentally friendly chemical peptide synthesis with applications in academia and industry.

## **The Involvement of Stress-Related Circuitry in Normal and Disordered Maternal Behavior**

*Ayat Agha, Psychology*

*Sponsors: Chloe Bair-Marshall, NYU School of Medicine, Neuroscience and Physiology; Professor Robert Froemke, NYU School of Medicine, Neuroscience and Physiology*

Postpartum stress and depression are debilitating mental conditions which negatively impact the lives of millions of women and children worldwide every year. Despite the prevalence of these disorders, the biological basis for these conditions remains unknown. Here, we will examine how neural circuits underlying stress and anxiety affect the normal and abnormal expression of maternal care in female mice. Specifically, we will examine an input from the amygdala to the locus coeruleus, two brain areas known to be involved in both social and stress-related behaviors but whose contribution to maternal behavior have not been examined. First, we will infuse drugs into the locus coeruleus to inhibit receptors for corticotropin releasing factor (CRF), a stress-related neurohormone known to be released by central amygdala efferents in locus coeruleus. We will then examine the effects of CRF blockade on maternal care behavior such as pup retrieval. Preliminary results suggest that retrieval behavior is impaired by CRF receptor antagonism, supporting a role for this input in appropriate expression of maternal care. We will then induce stress during the postpartum period and explore the effects on maternal behavior, hypothesizing that postpartum stress will also lead to impairments in maternal behavior. Finally, we will also use quantitative immunohistochemical methods to determine whether increased stress alters CRF levels in locus coeruleus. We hypothesize that postpartum stress will lead to altered CRF levels in locus coeruleus which will correlate with poor performance with maternal care behaviors, approximating postpartum depression in maternal mice. The findings of this study can help us begin to understand the neural circuitry of stress and its effect on postpartum care.

## **To Eat or to Run? The Role of the Excitation/Inhibition Balance of the Medial Prefrontal Cortex on Anorexia-Like Behavior**

*Cenk Akiz, Neural Science*

*Sponsor: Professor Chiye Aoki, Neural Science*

Anorexia Nervosa (AN) is characterized by voluntary food restriction, excessive exercise, severe body weight loss and mortality rate surpassing that of major depression. Activity-based anorexia (ABA) is an animal model that captures all these characteristics of AN, especially during adolescence, thus having the potential to reveal the neurobiology underlying individual differences in AN vulnerability. The prefrontal cortex (PFC) is known to be involved in decision-making. Therefore, to investigate

the brain circuit underlying an individual's decision to run or to eat. Through chemogenetic activation, we investigated the excitation and inhibition balance of the mPFC and the role of one of the largest mPFC interneuron populations, namely that of Parvalbumin (PV) in modulating AN-associated behavior. PV neurons axon-somatically inhibit the neighboring pyramidal neurons which can alter the animal's decision to eat or exercise following ABA induction. Although the effect of the excitatory mPFC pyramidal neuron population on anorexia-like behavior has somewhat been established, the effect of the modulation of neighboring GABAergic interneurons on anorexia-like behavior remains unknown. Here, we demonstrate that the chemogenetic modulation of the PV interneurons in mice can alter the 3 types of anorexia-like behavior present in AN and ABA. Specifically, PV cell-mediated reduction of pyramidal cells' excitability in the mPFC could 1) increase caloric intake during the limited hours of food availability, 2) protect against body weight loss and 3) increase wheel running during hours following food access. Although PV cell-mediated increase in caloric intake and wheel running act against each other; body weight is protected. Activation of PV cells, therefore, is protective against anorexia-like symptoms during ABA. We anticipate that our research to be a start point in establishing the roles of different GABAergic interneuron populations in the mPFC on AN-associated behavior. Different interneuron populations can then be targeted pharmaceutically to reduce symptoms of AN.

## **Cellular Characterization of the Sex Bias in the DDX3X Syndrome**

*Zeynep (Z) Akpinar, Psychology*

*Sponsors: Dr. Silvia De Rubeis, Icahn School of Medicine at Mount Sinai, Psychiatry; Dr. Adele Mossa, Icahn School of Medicine at Mount Sinai, Psychiatry*

Genetic mutations in the X-linked gene DDX3X cause a syndrome characterized by intellectual disability, low muscle tone, movement disorders and brain congenital anomalies primarily in females (Blok, Madsen et al., 2015). DDX3X encodes an RNA helicase that regulates mRNA translation in neurons. However, its mechanism of action and sex-specific role in regulating neuronal development is not known. The goal of this project is to define the role of DDX3X in regulating neuronal development and understanding how sex and sex-specific mutations in DDX3X alter this process using a Cre-Lox strategy applied to primary cortical neurons and introducing sex-specific mutations to female and male patients. This project examined the differences in morphogenesis, synaptogenesis and the proteomics of primary neuronal cultures caused by these mutations. DDX3X manipulations cause sex differences both in prevalence and neuronal morphology. For example, DDX3X loss reduces dendritic arbor-

ization and spine density only in male neurons. In addition, female neurons carrying patient-derived mutations show complete disruption of neuronal morphology, while male neurons exhibit milder phenotypes. There is also a sex-specific difference in the neuronal proteome. These findings shed new light on the sex biases in the prevalence and severity for the DDX3X syndrome in female and male patients. Uncovering such mechanisms will be crucial for the development of personalized therapeutic treatments.

### **Mental Imagery and Psychopathy: Are Psychopaths Missing the Mind's Eye**

*Inki Amu, Psychology; Huidi Yang, Psychology  
Sponsor: Professor Pascal Wallisch, Data Science, Psychology*

One of the hallmarks of psychopathy is the lack of empathy. Empathy might be closely connected with the vividness of mental visual imagery. We hypothesized an inverse relationship between psychopathy, operationalized using the Levenson Self-Report Psychopathy Scale (LSRP), and mental visual imagery vividness, operationalized by the Vividness of Visual Imagery Scale (VVIQ). 2043 participants enrolled in the Intro to Psychology course at New York University from Fall 2020 to Spring 2022 completed both the LSRP and VVIQ. We discovered a negative correlation between one's LSRP and VVIQ scores. Although the magnitude of the Spearman's correlation coefficient is small ( $r = -.11$ ), the result was highly significant ( $p < .01$ ). An effect size analysis revealed a small effect (Cohen's  $q = .11$ ). This study showed an inverse relationship between psychopathy and mental imagery vividness. In other words, higher psychopathic tendency is associated with a less vivid mental imagery ability. However, due to the small effect size, we would only expect to observe this effect on a population level.

### **Did Famous Scientists Have to Overcome Obstacles? Investigating Motivational Messages in Children's Books and Differences by Scientist Gender, Race, Ethnicity and Domain**

*Gabby Applebaum, Psychology  
Sponsor: Professor Jessica Gladstone, Psychology*

There has been a growing call to use role models to help increase student motivation in science, technology, engineering and mathematics (STEM; Levere, 2018). One way to introduce children to STEM role models is through children's biographies of famous scientists. In the fall, I was part of a team that was awarded a DURF grant to 1) explore whether famous scientists in children's books are described as having to overcome obstacles and 2) whether mention of overcoming obstacles differed by scientist race, ethnicity and/or gender. We chose to examine whether there was mention of overcoming obstacles in these books because young people often experience ob-

stacles themselves in their STEM classes and may therefore make the scientist more relatable. As a continuation of this project, I will also 3) explore whether the mention of overcoming obstacles differed by STEM domain (e.g., engineering, physics, etc.). It is possible that entry into some STEM domains is described in a way that indicates one might have to overcome multiple obstacles, which could be demotivating to children. I am currently coding a random subset of 300 books from a list of Amazon's 1,000 most popular children's science biographies and as a continuation, I will code an additional 200 books to ensure diversity in terms of scientist race/ethnicity, gender and domain. The external obstacles I will code for include (1) failure, (2) personal obstacles (e.g., disabilities), (3) social obstacles (e.g., unsupportive parents) and (4) structural obstacles (e.g., sexism).

### **Correlating UE Primitives and Their Failed Counterparts to Individual FMA scores**

*Adriana Bayron, Biology  
Sponsor: Emily Fokas, NYU School of Medicine, Neurology; Professor Heidi Schambra, NYU School of Medicine, Neurology*

Close to 800,000 people suffer from a stroke in the United States yearly and nearly 80% of strokes result in upper extremity (UE) paresis. UE impairment hinders a patient's ability to successfully perform activities of daily living (ADLs). We previously created a taxonomy to break down functional UE movements into their simplest form, primitives. We identified five classes of primitives: reach, transport, reposition, stabilize and idle. Here, we assess the frequency of failed primitives to understand how UE impairment impacts a patient's ability to perform ADLs. Failed primitives are unsuccessful attempts at transporting, stabilizing, or reaching for an object, resulting in another necessary motion attempt. Using ADLs, we can assess the frequency of failed primitives and relationship to impairment. We studied 10 stroke subjects and 10 unimpaired subjects performing three ADLs: toothbrushing, drinking water and donning/doffing glasses. All subjects were evaluated on the UE Fugl Meyer Assessment (FMA), a performance-based impairment index. We sought to identify if the level of UE impairment, determined by FMA score, correlates to the number of failed primitives performed during the ADLs. Our preliminary data shows stroke subjects performed an average of 2.9 failed primitives per task, while healthy subjects performed 0.1 failed primitives per task. This finding suggests a negative relationship between performing primitives successfully and impairment caused by stroke. This will aid in developing new rehabilitation techniques and tailoring treatment specifically to individuals to reduce failed primitive frequency, thus allowing successful ADL completion and an improved quality of life.

## **On the Move toward Word Learning: How Infants' Real-Time Body Position Shapes Their Views during Word Learning**

*Ana Benacerraf, Psychology*

*Sponsor: Professor Karen Adolph, Psychology*

Infants spontaneously transition among body positions—they sit, stand and spend time on all-fours. Does infants' body position influence their opportunities for word learning? Infants' body position influences what babies see. On all-fours, infants' view is dominated by the floor. But, when sitting or standing, the whole room sweeps into view. We propose that infants' body position shapes their view, and consequently different body positions offer different visual input during word learning. We video-recorded 16 infants (half crawlers, half walkers) during play with their caregivers in a toy-filled room. Infants and caregivers wore head-mounted eye-trackers to record their visual attention. We documented caregivers' noun use and infants' body position. Because walkers had greater access to the objects, they heard more nouns ( $M=14.50$ ,  $SD=13.26$ ) than did crawlers ( $M=10.00$ ,  $SD=9.27$ ). Crawlers' body position was unrelated to caregivers' noun use. Crawlers heard similar rates of nouns while upright ( $M=0.65$  nouns/min,  $SD=0.56$ ), in prone ( $M=0.62$  nouns/min,  $SD=0.98$ ) and sitting ( $M=0.54$  nouns/min,  $SD=0.62$ ). Conversely, walkers heard greater rates of nouns while upright ( $M=1.02$  nouns/min,  $SD=0.91$ ) compared to prone ( $M=0.00$  nouns/min,  $SD=0.00$ ) or sitting ( $M=0.34$  nouns/min,  $SD=0.44$ ). We are documenting how prominently the named objects appear in infants' view, and whether infants fixate on the target object. The connection between infants' body position and naming events suggests that walkers have an advantage for language learning. Walkers access a greater variety of objects than crawlers, and consequently elicit more nouns from caregivers. Infants' visual attention to named objects would confer an even greater advantage.

## **Parental Verbal Responsiveness Mediates the Relationship between Parental Stress and Children's Social-Emotional Skills but Not Receptive Language Skills**

*Elif Bengi, Psychology*

*Sponsor: Professor Selcuk Sirin, Steinhardt School of Culture, Education and Human Development, Applied Psychology*

The first three years of life is a critical period in terms of cognitive and social-emotional development. Previous research has highlighted the importance of the early home environment in fostering language acquisition. The current study explores the variation in children's developmental skills (language acquisition and socio-emotional skills) and the effect of certain parental factors that contribute to these skills such as the presence of verbal

responsiveness during the early years of life. To examine this, we explored how verbal responsiveness mediates the relationship between parental stress and children's developmental outcomes through a series of multiple regression analyses (to examine the role that parent stress and responsiveness has in predicting the child's language and socio-emotional skills) and a mediation analysis (to assess if PVR mediates this relationship). 77 mothers and their children ( $M_{age} = 46.32$  months) were recruited from preschools in different low SES districts in Ankara, Turkey through the Turkey Ministry of Education. Contrary to our hypothesis, results indicated that neither parent stress, nor parental verbal responsiveness had a significant effect on children's receptive language outcomes. However, a significant correlation was found between parent stress and children's social emotional skill development, such that, increased parent stress predicted lower social emotional skill acquisition. Finally, this relationship appeared to be fully mediated by parents' verbal responsiveness. These findings are important in addressing the previous gap in the field specific to studies in Turkey that focus on the effect of early caregiving quality on children's development. Implications regarding the necessary steps to utilize parental responsiveness as a buffer against stress and negative child outcomes are discussed.

## **Noise Benchmarking and Error Mitigation of IBM Q Systems**

*Aurelia Meiqi Brook, Mathematics, Physics;*

*Andreas Tsantilas, Mathematics, Physics*

*Sponsors: Professor Javad Shabani, Physics;*

*Professor Dries Sels, Physics*

Recent advancements in quantum algorithms have been significant, yet there is still much to be done in terms of benchmarking noisy quantum computing hardware. Utilizing IBM's Qiskit software development kit and quantum hardware, we have streamlined a novel way of benchmarking and characterizing error on noisy qubits. We tested the noise levels of IBM's quantum hardware by implementing the Kitaev-Webb state preparation algorithm (Kitaev and Webb, 2008) and the Klco-Savage (Klco and Savage, 2019) algorithm to prepare a 1D discrete Gaussian and a symmetric exponential distribution as a pseudo-Gaussian. Error data is then analyzed using KL divergence to quantify disparities between noiseless simulations and experimental runs on IBM Q processors. Such simulations provide insight into dominant sources of noise on quantum chips and were subsequently compared to randomized benchmarking in order to evaluate how they compete with industry standard methods. We then investigate how we can improve the performance of a quantum circuit by exploiting knowledge about the particular noise that affects the qubits. To this end, we use the noisy output of the state-preparation algorithm to identify



the noise on IBM quantum hardware. By identifying the dominant source of error, we reconstruct a noise model of the given hardware. Partial error mitigation is achieved by approximately mapping the noisy channel to a noiseless one.

### **Who is huMAN? Examining Whether Generic Statements Amplify Androcentric Beliefs about Person Typicality**

*Skylar Chau, Psychology*

*Sponsors: Professor Andrei Cimpian, Psychology; Professor April Bailey, Psychology*

Androcentrism describes society's tendency to be centered around men, where males are viewed as more typical of the average human. Although there has been research focused around androcentrism's prevalence, there has yet to be work looking at how language can affect the preservation of androcentric bias. Generics are a unique set of statements that do not rely on numerical values to be perceived as true but rather on specific semantic features of the statement itself. For instance, generics can describe members of a category as a whole and can be used to infer information about a category of people. Given that generics influence beliefs, the current study focuses on how generic statements about people are perceived to be true when they contain either male, female, or neutral trait properties using a mouse tracking method. Contrary to predictions, there was little evidence that people responded to generic statements about male or female trait properties differently.

### **Left-Wing and Right-Wing Clinical Mental Health Counselors' Treatment of Clients with a History of Abortion**

*Archer Chen, Economics, Politics*

*Sponsor: Dr. Aaron Norton, University of South Florida, Rehabilitation and Mental Health Counseling*

In the US today, abortion has become highly politicized. This prompted us to ask whether left-wing counselors differed from right-wing counselors in their treatment of clients with a history of abortion. Survey data were collected from 118 active members of the American Mental Health Counselor Association. Left-wing counselors included independents with liberal political ideology and democrats ( $n = 75$ ); right-wing counselors included independents with conservative ideology and republicans ( $n = 43$ ). Treatment approach was assessed with a vignette depicting the counselor' initial interview with a 28-year woman who had two elective abortions in the past five years. Based on the vignette, the counselor responded to a scale ( $\alpha = .85$ ) with five items: Inquire about circumstances of these abortions; Discuss mental health aspects of abortion; Refer to a physician for discussion of contraception options; Encourage the client not to have future abortions; Refer the client to a peer support group for women who have had abortions (1= Definitely Would Not; 10 = Definitely Would). Regression modeling showed that male counselors and right-wing counselors scored significantly lower than female counselors and left-wing counselors on the average scores of the five approaches. Specifically, on average male counselors scored 0.60 point lower than female counselors while right-wing counselors scored 0.86 lower than left-wing counselors. How seriously the counselors perceived abortion as an

issue and how they generally treated clients were also significant. Overall, our study demonstrated that although mental health counselors are ethically bound to be unbiased, their gender and political position indeed influenced their clinical practice.

**Temporal Localization of *Bacillus subtilis* Protein Kinase A (PrkA) during Spore Coat Formation Uncovers Candidate Phosphorylation Substrates**

*Darlene Cheong, Biology*

*Sponsor: Professor Patrick Eichenberger, Biology*

Bacteria, fungi and protists can form metabolically dormant and environmentally-resistant spores. To develop therapeutic approaches against antimicrobial- and disinfectant- resistant spores produced by pathogens such as *Clostridioides difficile*, it is crucial to study the molecular mechanisms behind sporulation. However, numerous sporulation genes and proteins remain poorly characterized, including protein kinase A (PrkA) in the model organism *Bacillus subtilis*. To identify its role and putative phosphorylation targets, we tracked the localization dynamics of PrkA and discovered that PrkA transiently localizes to the spore coat. This temporal association with the spore coat is inconsistent with a direct structural role, but instead suggests a possible interaction between PrkA and its candidate phosphorylation targets amongst spore coat proteins. We also found considerable deviations in the localization dynamics of PrkA when the transcriptional regulator SpoIID is absent. This observation narrowed down the candidate substrates of PrkA, as similar patterns of subcellular localization were observed for several spore coat proteins. Lastly, through co-localization analyses of PrkA and these spore coat proteins with similar localization dynamics, we show that a group of coat proteins, previously categorized as Class II coat proteins based on their localization dynamics, are candidate phosphorylation substrates of PrkA. Taken together, our results demonstrate how PrkA is expected to function during sporulation: possibly phosphorylating morphogenetic spore coat proteins and participating in a probable novel signaling pathway. We anticipate our findings to be a starting point for further investigations into the role of PrkA in a previously undetermined sporulation-specific kinase signaling pathway.

**Modeling of Hippocampal Phase Precession Rate**

*Logan Chiang, Neural Science, Violin Performance*

*Sponsor: Professor Zhe Chen, NYU School of Medicine, Neuroscience and Physiology*

Under normal conditions, phase precession occurs through a controlled balance of excitation from the entorhinal cortex (EC) and inhibition from the medial septum (MS), converging onto a population of spatially selective

place cells in CA1/CA3 region of the hippocampus. Inhibition is delivered to the place cell population through an interneuron population in the form of an oscillatory pulse called the theta rhythm that ranges from 6~12 Hz. During phase precession, place cells fire at progressively earlier phases of the theta rhythm and can be divided into rate-based and temporal components. The former depends on the spatial location of an animal in its environment and the firing of neurons that have receptive fields corresponding to that spatial location, and the latter depends on the temporal aspects of an animal's exploratory activities, such as how quickly it enters or leaves a specific location. Numerous models for phase precession have been proposed, two of which will be examined here. It has been previously observed that optogenetic stimulation of MS increases the frequency and amplitude of hippocampal neural activity and can enhance spatial memory and learning. Experimental data shows that this phenomenon extends to phase precession, so my hypothesis is that by introducing imbalance to the amount of excitation and inhibition by increasing the frequency or amplitude of the latter, I can reduce the variability that comes with the temporal component. Reducing temporal variability should stabilize the firing activities of place cells and increase correlation of overlapping receptive fields as an animal traverses its environment. Doing so would steepen the slope of phase precession when the phases of the theta rhythm are plotted against times of neuronal firing and would verify recent experimental results that optogenetic stimulation of MS helps accelerate the rate of phase precession.

**Does Suffering Make People Appear More Beautiful?**

*Kelly Chim, Environmental Studies, Psychology*

*Sponsor: Professor Denis Pelli, Psychology*

In the advent of “trauma talk” or “trauma creep” across media and entertainment, the definition of trauma has been stretched and embedded in the social landscape. As a recent study found, people are more inclined to evaluate victims positively and view them as more virtuous than their abusers (Jordan and Kouchaki, 2021). A thematic analysis of narratives on grace also found that beauty often preceded suffering, brokenness or failure (Schellekens et. al., 2020). This is because the narrators often find meaning and redemption in adversity (McAdam et. al., 2013). Meanwhile, Kantian aesthetics and traditional aesthetic moral theories have equated morality with beauty. This study explores whether emphasizing suffering in the victim’s narrative would enhance their moral beauty, thus making them appear more beautiful. Results show that beauty ratings were lower for the condition where the stock photo was accompanied with epithets about suffering than when the stock photo was scored only for its physical beauty. The condition with epithets about moral

beauty scored higher in beauty than physical beauty. Additionally, although there were no significant differences, the beauty scores for the stock photo with epithets combining suffering as well as moral beauty were slightly lower than physical beauty and moral beauty conditions. These findings suggest that while beauty and suffering can coexist, suffering detracts from beauty. Yet, there was still a moderate degree of beauty for the suffering condition. Further studies can investigate why a level of beauty in suffering was retained.

### **Effects of a Critical History Intervention on Partisan Instrumentalization and Support for Puerto Rico Statehood among US Democrats**

*Sophia Claas, Psychology*

*Sponsors: Eduardo Rivera Pichardo, Psychology; Professor Eric Knowles, Psychology*

This study investigates how democrat-identifying US Americans' preferences for Puerto Rico's future political status are affected by a combination of a critical history of the US and Puerto Rico intervention and US partisan framing of the island's political landscape. A Prolific online experiment ( $N = 650$ ) will explore the effects of both hostile instrumentalist and benevolent cooperative framing of the history of the US and Puerto Rico political relationship and partisan framing. The main goal of this study is to use a critical history intervention that frames the US and Puerto Rico relationship as either hostile or benevolent to elucidate the differences in motivation for support of Puerto Rico statehood among pro-egalitarian and neo-colonial democrats. Pro-egalitarians and neo-colonial democrats will be differentiated using historical negation (HN) and symbolic exclusion (SE) measures adapted from Sibley's Dark Duo Ideology experimental work. Pro-egalitarians will exhibit low levels of both HN (the belief that historical injustices experienced by colonial subjects are not relevant in contemporary society) and SE (the belief that colonial subjects' culture is irrelevant in representations of modern national identity), while neo-colonials will exhibit high levels of HN and low levels of SE. We hypothesize that a critical historical intervention will differentiate the two ideological groups through pro-egalitarians continued support for Puerto Rico statehood regardless of partisan framing and neo-colonials support for statehood dropping when the partisan framing of Puerto Rico does not align with their partisan identity. This study provides practical insight through direct experimentation on how the framing of colonialism can impact the political status future of Puerto Rico.

### **Sunflower Superpowers on Governors Island: Soil Bioremediation and the Phenotypic Effects of Heavy Metals on *Helianthus salicifolius***

*Docker Clark, Environmental Studies, French  
Sponsor: Professor Mary Killilea, Biology*

In the post-industrial age, heavy metal soil contamination is a widespread ecological problem which disproportionately affects urban areas, posing health concerns to both people and the environment. The soils on New York City's Governors Island, due to the historic use of leaded paints and fuels, are highly contaminated with lead (Pb), with some soil samples reaching over 2000 ppm Pb (well above the EPA's safe limit of 400ppm). Phytoremediation is a comparatively cheap in situ method of soil remediation, making use of a hyperaccumulator plant species—in this case, the willow-leaf sunflower (*Helianthus salicifolius*)—to extract heavy metals such as Pb from the soil and store them within plant biomass to be disposed of properly. This study: 1) used a sample of 8 willow-leaf sunflowers to evaluate the extent to which they remediate the Pb contamination of Governors Island soils, finding that this specific species is not an ideal candidate due to their low remediation and high root mass allocation, 2) examined how the presence of heavy-metal (Pb) contamination effects the plants' phenotype, finding that the presence of heavy-metal contamination yielded smaller plants in poorer health and finally 3) investigated where within the plant the toxic metal is being stored finding that the plants held Pb in their root tissue. Soil contamination analysis and plant tissue contamination analysis is conducted using portable X-ray fluorescence (pXRF).

### **The Effectiveness of Parent Guides for Preempting the Development of Racial Bias in White Children**

*AJ Crandall, Psychology*

*Sponsors: Professor Marjorie Rhodes, Psychology; Dr. Michael Rizzo, Psychology*

This project looked to identify a mechanism for preempting the development of racial biases in early childhood by testing the effectiveness of a set of parent guides that we created to educate parents about their children's developing beliefs about race and racial bias. Racial biases begin to emerge in early childhood, in children as young as 4–5 years old (Raabe and Beelemann, 2011; Rhodes, 2020). A critical predictor of the emergence of racial biases are children's beliefs about their parents' racial attitudes (Rizzo et al., 2021). Thus, one way to preempt the development of racial bias may be to educate parents on how children begin to form concepts of race and what they can do to ensure their child develops a healthy understanding of race. In the present study, we created and distributed a series of six parent guides to 116 white parents with children between the ages of 4–8 years old using

a waitlist-controlled design. Parents completed pre- and post-test assessments of their understanding of children's developing beliefs about race, and their children completed pre- and post-test assessments of their racial biases. All data has been collected and analyses are ongoing. Broadly, we expect that (H1) parents' will have a deeper understanding of their child's developing beliefs about race after receiving the guides and (H2) parents' understanding of their children's developing beliefs about race will mediate children's developing racial biases. Discussion of the findings will center around how parental education can be a powerful mechanism for reducing racial biases.

### **Modeling and Simulating Bacteria Population Dynamics**

*Amy Dai, Mathematics*

*Sponsor: Professor Eric Vanden-Eijnden, Mathematics*

In statistical mechanics, one central task is to predict the system's behavior macroscopically from the microscopic random behavior of particles. Phase transition is a particular aspect that we look to characterize the macroscopic behavior especially in equilibrium systems. For non-equilibrium system like active matter, since each agent in the system is constantly consuming energy, the system does not conform to the laws of equilibrium thermodynamics. However, active matter systems have their own ways of self-organization and phase transition, for example via mobility-induced phase separation (MIPS). MIPS happens in systems where the speed of the particles

slows down as the local population density increases and a condensate state forms where the particles cluster. Our model of interacting particles simulates such phenomenon. Specifically, the particles diffuse on a one-dimensional line with rate monotonically decreasing as local density increases and duplicate with rate monotonically increasing as the local density decreases. Even though the individual particle behaves randomly, their macroscopic state, uniform or condensate, is predictable and can be characterized by specific parameters of the model. This research project will allow us to study the phase transition of non-equilibrium system from a quantitative perspective. A full understanding of such non-equilibrium systems' phase separation is still lacking, and it would give some insights on many real-world applications, for example the design of man-made self-propelled particles.

### **3-Dimensional Organization and Dynamics of Microsporidian Infection**

*Ari Davydov, Biology, Philosophy*

*Sponsors: Professor Gira Bhabha, NYU School of Medicine, Cell Biology; Dr. Damian Ekiert, NYU School of Medicine, Cell Biology*

Microsporidia are intracellular, single-celled eukaryotic parasites that infect a wide range of hosts, causing fatal infections in immuno-compromised patients and costly agricultural losses. To infect their host, microsporidia transport infective nuclear material through a tightly-coiled invasion apparatus called the polar tube



(PT)—an organelle several times the length of the spore body. In an ultra-fast (millisecond-scale) process called germination, the PT is triggered, fires and penetrates the target cell membrane. Despite microsporidia's role as a disease-causing agent, our understanding of their biology remains rudimentary. This is in part due to a lack of tools available for genetic manipulation of microsporidia spores, demanding an imaging-based approach. 2D transmission electron microscopy (TEM) data suggested that the PT is coiled within a dormant spore, but PT organization and spatial relationship to other organelles cannot be resolved using this technique. My research aims to use high-throughput imaging techniques to provide insights into the question, "What is the mechanism of PT firing?" Using a method called serial block-face scanning electron microscopy (SBF-SEM), I generated 3-dimensional reconstructions of *A. algerae* ungerminated microsporidia spores. My models and analysis led to several key findings: 1) Consistent right-handed chirality of the PT coil, suggesting a bias in the mechanism of PT polymer assembly; 2) Appearance of "tangled" PT ends, suggestive of defective development in some spores; and 3) Close interaction between the PT and posteriorly-localized vacuole, which may be important for the extrusion mechanism of the PT. Moving forward, I will use the SBF-SEM technique to capture intermediate germination states, primarily analyzing features that help inform mechanistic theories of germination (e.g., contraction of the spore wall, formation of structures at the site of PT extrusion).

#### **Artificial Intelligence Could Influence News Bias**

*Mirkelis De Jesus Martinez, Global Public Health/ Anthropology*

*Sponsor: Jeffrey Berg, Psychology*

Artificial intelligence (AI) is a tool that assists people in tasks such as email filtering, search, voice recognition and others. Even though people frequently use machine learning because of its efficiency, it often leads to biased decisions that influence certain groups' access to opportunities and interactions in the community. The increased use of artificial intelligence in the modern world has created questions regarding biased decision-making in these technologies. One of the main problems is that people associate machines with fewer biased decisions than humans. However, human cognitive biases are often present in AI. Although AI is programmed to make neutral decisions, human cognitive bias affect AI through algorithms. The minimization of human cognitive bias in AI is crucial to reducing the amount of bias present on these machines. The aim is to illustrate the ethical problems from bias in AI by increasing awareness of the biases that can be integrated into the design and development of AI.

#### **Defying Gravity: Central Brain Circuits Controlling Orientation to Gravity in *Drosophila***

*Beatriz de la Rea, Neural Science*

*Sponsors: Professor Katherine Nagel, NYU School of Medicine, Neuroscience and Physiology;*

*Dr. Christina May, NYU School of Medicine, Neuroscience and Physiology*

Humans navigate in three dimensions, like when climbing stairs. However, how brain circuits control 3D navigation is not fully understood. Here, we use the model organism *Drosophila melanogaster* to investigate the neural circuit basis of 3D navigation. Specifically, we are using a genetic silencing screen to identify central brain neurons involved in gravitaxis, an innate behavior in which flies prefer to walk uphill. The central complex (CX), which is the navigation center in flies, plays a role in sensorimotor transformations and has been shown to influence gravitaxis. We first developed a behavioral paradigm for measuring gravitaxis in which we quantified fly negative gravitaxis as the average distance from the bottom of the inclined plane in a 0° (flat) condition versus that in a 31° (tilt) condition. In this experiment, we are utilizing the UAS-Gal4 system to drive Kir 2.1, an inwardly rectifying potassium channel, effectively silencing specific populations of CX neurons of female flies to understand their role in negative gravitaxis. We will compare these modified flies' average distance from the bottom of the tilted plane between the flat and tilted conditions. If the inhibited neuron population is involved in gravitational computations, then we expect the difference between the two conditions would decrease. Through this screen, we plan to identify neurons that could underlie negative gravitaxis in flies. Overall, this project will give us a greater understanding of central brain circuits controlling 3D navigation and their gravitational computations.

#### **Who Do You Want to Be Friends With? Examining Children's Gender Affiliative Preferences**

*Alison Yolanda De Leon Escobar, Psychology*

*Sponsors: Professor Marjorie Rhodes, Psychology; Josie Benitez, Psychology*

Social categorization has a salient presence in children's comprehension of the world. One of the earliest emerging dimensions of social categorization is gender: Children use gender category membership to make assumptions about prescriptive gendered behaviors and traits, in addition to also demonstrating a preference for members of their gender in-group. However, it remains unclear whether children's gender in-group preferences are motivated by a preference for other category members, or by a preference for individuals who share gender-linked properties—regardless of category membership. The goal of the present study is to examine these tendencies by test-

ing whether children exhibit a greater tendency to affiliate with individuals who they share the same gender category membership with, or with individuals with shared property preferences. To determine whether in-group preferences are shaped by essentialist or stereotypical beliefs, we will also examine children's endorsement of gender essentialism and stereotypes across multiple measures of social cognition. These findings contribute to our understanding of children's gender in-group biases and social evaluative preferences.

### **Identifying Neural Circuits That Support Effortful Listening**

*Lisa Diez, Neural Science, Psychology*

*Sponsors: Professor Dan Sanes, Neural Science;  
Dr. Kelsey Anbuhl, Neural Science*

Hearing loss (HL) is one of the most common forms of disability (Ford et al., 2018) and can have sensory and cognitive consequences for speech understanding. For example, people with HL must exert additional listening effort, defined as the recruitment of cognitive resources during listening (Pichora-Fuller et al., 2016), to successfully understand speech. Despite its prevalence, the neural mechanisms behind effortful listening have not been uncovered. Therefore, this study was aimed at identifying the cortical pathways that are engaged during effort-based listening. Evidence from human studies suggests that the cingulate cortex (Cg) is recruited during hard listening conditions (Erb et al., 2013) and is altered in people with HL (Luan et al., 2020). Therefore, we hypothesized that the Cg mediates effortful listening. To test this hypothesis, gerbils ( $n=4$ ) were trained and tested on an amplitude modulation (AM) rate discrimination task, where stimulus duration was varied to adjust the difficulty of listening conditions. We implanted Cg1 with bilateral cannulae to infuse saline or an inactivation drug (Muscimol). We predicted that reducing Cg activity would selectively disrupt performance during hard trials. We found that bilateral Cg inactivation with Muscimol resulted in elevated AM rate discrimination thresholds, but only during hard blocks. Taken together, our results suggest that the Cg mediates perceptual performance during difficult listening conditions. Therefore, this is a plausible circuit that is engaged in listening effort and may be altered by HL.

### **Characterizing the Development of Social Behaviors in Healthy and Hearing-Loss Conditions Using Ethological Approaches in Gerbil Families**

*Lisa Diez, Neural Science, Psychology*

*Sponsors: Professor Dan Sanes, Neural Science;  
Dr. Catalin Mitelut, Neural Science*

Social interactions during critical periods of development are pivotal for the emergence of many behaviors.

For example, we learn how to speak from observing and listening to others. Missing out on such opportunities can lead to life-long deficits in learning and social behavior. Much of what we have learned about social behavior and development comes from laboratory studies in which animals are removed from naturalistic social settings and placed in a test environment for minutes to hours. Therefore, to understand the full range of natural social behaviors and how they are impacted by sensory deficits like hearing loss, we must study animals in their home environment and without interruption. Using continuous video recordings gathered over weeks of development (postnatal days P1 to P30) in gerbil family groups (2 adults and 2–4 pups), we investigated pup-pup interactions, such as chasing, approaches and huddling, during critical periods of development. We identified how pup-pup and pup-parent interactions evolve over the course of development. Finally, we investigated the social interactions in cohorts of healthy and hearing-loss pups to quantify the extent to which hearing deficits affect naturally evolving social behaviors.

### **Individual Difference in the Susceptibility of Catching Stranger's Sadness: Looking at Trait Level Empathy and Cardiac Vagal Tone**

*Xinyu Ding, Psychology*

*Sponsor: Professor Tessa West, Psychology*

This study will investigate whether individuals can catch another person's sadness during interactions and examine whether the individual level difference in cardiac vagal tone and trait level empathy plays a role in this process. Emotional contagion is the idea that an individual's emotions can "leak out" and transmit to those around them. According to the theory, people tend to unconsciously mimic others' behaviors during interactions, consequently leading them to "catch" their emotions. Research in social psychology has long been concerned with emotional contagion in close relationships; however, little is known about emotional contagion among strangers. Further, the existing literature has mainly been limited to high-arousal negative emotions, like stress. Therefore, the question of whether people can pick up on a stranger's low-arousal emotion, like sadness, remains insufficiently explored. Furthermore, prior work suggests that cardiac vagal tone and trait level empathy play a role in emotional sensitivity. However, there is no existing study on whether cardiac vagal tone and empathy influence contagion specifically. Therefore, the goals of this project are twofold: (1) can a low-arousal emotion, like sadness, be transmitted from one person to another? (2) Does cardiac vagal tone and dispositional emotional empathy have moderating effects in emotional contagion?

### **Does Insulin Signaling Mediate a Food Signal to the Germline to Promote Stem/Progenitor Cell Proliferation in *C. elegans*?**

*Sanjana Dixit, Psychology*

*Sponsors: Professor Jane Hubbard, NYU School of Medicine, Cell Biology; Dr. Anke Kloock, NYU School of Medicine, Skirball Institute of Biomolecular Medicine*

Diet is necessary to provide an organism with specific nutrients utilized in cellular metabolism. However, signaling pathways are required to help allocate nutrients to different organs in the body. Diet is known to regulate the accumulation of germ cells in several organisms, an accumulation which can be arrested by genetic and environmental changes (Laws, 2017). The insulin/IGF-like signaling pathway (IIS) in *C. elegans* promotes germ cell proliferation (Michaelson et al., 2010). When the activity of the insulin receptor, daf-2, is reduced, the rate of germline proliferation is also reduced, resulting in slower accumulation of germline cells. This effect is dependent on activity of the DAF-16 FOXO transcription factor (Michaelson et al., 2010). The *C. elegans* insulin/IGF-1 signaling pathway links nutrient levels to growth and development (Murphy and Hu, 2013), but how the IIS pathway acts downstream of food perception or ingestion is not completely understood. It is known that quality and quantity of diet affects the expansion of the germline stem/progenitor cell pool in *C. elegans* (Korta et al., 2012; Dalfó et al., 2012; Pekar et al., 2017), however it is not known if it is through insulin signaling. By performing a genetic cross of daf-16 with the eat-2 mutant and the pept-1 mutant, which both genetically act as their own low food conditions, I will be able to assess the number of germ cells in the progenitor pool in low food conditions to test the hypothesis that IIS and daf-16 mediate a food signal to the germline progenitor cells.

### **Albanian-American Women's Relationship Experiences with Their Partners**

*Dea Elezaj, Psychology*

*Sponsor: Professor Anila Duro, CUNY Graduate Center, Social Welfare*

Domestic violence (DV) is a highly taboo topic in immigrant communities (Menjívar and Salcido, 2002) leading to women being left in unsafe situations and without adequate resources to overcome this challenge. It is estimated that approximately one in three women experience partner violence at some point in their life (WHO, 2017). The prevalence and type of abuse Albanian women may experience in the United States (US) is unknown. This study on Albanian women's relationship experiences with their partners examines the frequency of domestic violence and other types of abuse Albanian women may have experienced within the US. The aim of this study is to help immigrant communities build healthy, respectful and co-

hesive relationships and allow immigrant women's voices in American policy discussions about DV prevention. This study uses survey research design and participatory action research (PAR) methods to engage the community. The survey included items from the Checklist of Controlling Behaviors (CCB) measure (Lehmann and Pillai, 2012) and an open-ended question asking participants to share any additional information. Preliminary findings show that life-threatening violence is low in this community, but coercive control is very high (48–80%). Therefore, there is a need to recognize coercive control as a criminal act in all states considering that these types of abuse escalate to deadly violence.

### **Perceiving Criminality: Attention and Eyewitness Identification**

*Meghan Eze, Psychology*

*Sponsor: Professor Emily Balcetis, Psychology*

Racial biases are present in schools, social interactions and especially in our justice system. Black defendants are disproportionately affected by eyewitness misidentifications and disproportionately represented in the incarcerated population. Although African Americans only account for 13% of the US population, they make up 47% of total exonerations. With the advent of DNA testing, over 375 wrongful convictions have been overturned and sixty-nine percent of these eyewitness misidentification (Innocence Project, 2020). Using this data as a model for the criminal justice system, eyewitness identification has a 30% error rate—a chilling statistic when talking about innocent individuals. In this research, we tested the effect of attention on an aspect of racial bias. Participants watched a video of a nonviolent crime and then identified a potential perpetrator in an eyewitness identification task. We tested if instructions to give either natural attention or equal, holistic attention to the video reduced the influence of prejudicial beliefs and decreased reliance on prototypical markers of criminality, specifically skin tone. Participants also answered items about their prejudicial beliefs. Our results indicate that participants high in prejudicial beliefs, who gave natural attention to the video, were more likely to select a person with darker skin, compared to lighter skin, as the more likely criminal. However, we found that shifting participants' attention from natural to holistic for these same individuals, reduced the influences of prejudicial beliefs on the prototypicality of suspects, and participants did not select the person with darker skin.

### **Efficient Coding and Information Capacity**

*Ashley Feng, Neural Science*

*Sponsor: Professor Denis Pelli, Psychology*

The human brain, while capable of many things, does have its limits. However, just how limited our brains are is a contested topic. Miller (1956) utilized Shannon's

communication theory (1948) to analyze an observer's absolute judgements about a single sensory dimension of an object and found that regardless of the sensory dimension, each judgement transmitted 2 to 3 bits, or around 4 to 8 categories. This ceiling in absolute judgements is widely-known, but there is no widely accepted account that explains why perceptual judgement of low-level stimuli is limited to just a few bits. We utilize Wei and Stocker's (2015) Bayesian observer model constrained by efficient coding to test if their hypothesis on manipulating internal noise can also manipulate information capacity. Thus, reducing duration or contrast of the stimulus should reduce the information capacity and vice versa. We utilize their Bayesian observer model constrained by efficient coding to test if their hypothesis on manipulating internal noise can also manipulate information capacity for various single dimensions of hearing and vision. For hearing, we will test tones by varying frequency and duration, and for vision, we will test rectangles by varying orientation and duration. We, like Miller, found that across sensory dimensions, we can lower the information conveyed to observers by manipulating the internal noise in each task ( $p < 0.01$ ). Thus, Wei's (2015) efficient coding hypothesis can partially explain Miller's 2-to-3-bit limit in single-feature perceptual judgment, but more work will need to be done to bridge the juxtaposition between this ceiling and our ability to navigate our everyday lives.

### **Beauty or Brains? Comparative Valuation of Physical Appearance and Intelligence in American Adults**

*Ingrid Friedman, Psychology*

*Sponsors: Dr. April Bailey, Psychology;  
Professor Andrei Cimpian, Psychology*

Appearance-altering products earn companies millions of dollars in profit, indicating that society places a great deal of importance on physical appearance. These products are often marketed more toward women than men, suggesting that physical appearance is especially important for women. However, little is known about how important physical appearance is when put in direct comparison with other highly valued attributes, like intelligence. When given the opportunity to create their ideal self, what trade-offs will adults make between physical appearance and intelligence? How do these personal preferences compare to the trade-offs people believe other people would make on their behalf? We examined how adults value physical appearance and intelligence when these attributes are put in direct comparison with each other. American adults ( $N=301$ ) distributed 100 points between physical appearance and intelligence to create their ideal self, both according to their own preferences and how they think other people want them to be. We found that women prioritized their physical appearance (vs. intelligence) more than men and that, regardless of

gender, people thought others would prioritize their physical appearance (vs. intelligence) more than they personally would. Potential consequences for eating pathology symptoms and self-esteem were also implicated.

### **Hydroxy-L-Proline Functionalized Polymeric Micelles for Aqueous Asymmetric Catalysis**

*Lulu Friedmann, Chemistry*

*Sponsor: Professor Marcus Weck, Chemistry*

Nanostructured materials containing multiple discrete domains within a single structure can be viewed as basic mimics for biological systems, such as eukaryotic cells, where compartmentalization enables chemical reactions to occur with high precision in unfavorable environments. One way to mimic compartmentalization seen in nature is to synthesize polymeric nanoreactors that can self-assemble into multicompartment micelles (MCMs). Just like organelles in cells can provide a favorable environment for certain reactions and sequester reactions away from unfavorable environments, MCMs can shield catalytic functionality from unfavorable conditions to enable catalytic reactions in aqueous media. MCMs self-assemble in aqueous media from bottlebrush block copolymers with distinct hydrophilic, hydrophobic (carbon-rich) and fluorophilic (fluorene-rich) regions. The lipophilic and fluorophilic macromonomers in this thesis are synthesized by the atom-transfer radical polymerization of styrene and pentafluorostyrene, respectively. The hydrophilic macromonomer is obtained by Steglich esterification of a norbornene-based carboxylic acid with monohydroxy-terminated poly(ethylene glycol). A grafting-through approach is used to polymerize the macromonomers to form a bottlebrush copolymer, which self-assembles into micelles with distinct regions when placed in aqueous solution. To demonstrate the catalytic activity of MCMs, a chiral catalyst, hydroxy-L-proline is incorporated into the hydrophobic region of the micelle. The aldol addition reaction between cyclohexanone and 4-nitrobenzaldehyde is used as the model reaction. The impact of micelle morphology on reaction kinetics and selectivity is demonstrated by manipulating the location of the catalyst. This thesis demonstrates that hydroxy-L-proline functionalized bottlebrush block polymers that self-assemble into micelles display catalytic activity in water.

### **Exploring Parent and Child Conversations about Race and Their Impact on Children's Developing Racial Biases**

*Aislyn Gordon, Psychology; Courteney Celestin, Social & Cultural Analysis*

*Sponsors: Professor Marjorie Rhodes, Psychology;  
Dr. Michael Rizzo, Psychology*

This project examined how parent-child conversations about race impact children's developing racial

biases. By studying conversations between parents and children, we explored how messages about race are conveyed through conversations, the inferences children make about racial categories from language and what features of parent-child conversations about race are related to decreasing racial biases over time. The research questions for this study are: How do parents communicate beliefs about race to their children? What features of conversations are developmentally predictive of reduced racial bias? In the present study parents and children ( $N = 124$ ) were given six prompts that related to the topics of race and racial justice. The prompts asked parents and their child to talk about: (1) why people have different skin colors, (2) Black Lives Matter, (3) cultural differences, (4) scenario where Black children were excluded from playing with white children, (5) why US presidents are mostly white men, (6) why some people have more money than others. We coded for parent-child dyad use of color-conscious language (e.g., references to racial inequality and references to different racial groups). We found that families of color use more color-conscious language when discussing race ( $p < 0.05$ ) and that families use more color-conscious language when discussing race with older children ( $p < 0.05$ ). These findings suggest that age and racial background influence how parents discuss race and racial inequality with their children, which in turn may impact a child's understanding of race.

### **Expanding the Gene Regulatory Network of *Arabidopsis* Root Regeneration through Niche Genes Upregulated by Root Damage**

*Brandon Gorodokin, Biology*

*Sponsors: Professor Kenneth Birnbaum, Biology;*

*Dr. Bruno Guillotin, Biology*

The ability for plants to regenerate their root meristem rapidly and efficiently is crucial for their survival against harsh environments. Moreover, the study of plant meristem regeneration can potentially relate to improving animals' abilities to regenerate. Several primary signaling factors have been identified to guide stem cell regeneration in *Arabidopsis*, and over fifty genes of diverse structure and function have been observed to show an upregulation in response to root damage, but their role in regeneration is not clearly understood. This study exists to determine the cut-induced candidate genes necessary for regeneration to occur, along with uncovering the molecular mechanisms behind their role in root regeneration in *Arabidopsis*. Many of these candidate genes are of great interest because their primary roles were not always associated with the root or its development. They were categorized based on the level of transient expression after a cut, and the type of cells to which they were localized. First, to identify T-DNA mutant plants homozygous for mutations in different candidate genes, we performed PCR using custom primers. We assessed various root phenotypes including development of primary, lateral and



adventitious roots. Second, to assay their role in regeneration, we performed excision-based regeneration assays of eleven mutant lines. This analysis revealed that a small fraction of the single mutants produced significant loss in root regeneration rate, with the magnitude of the loss varying between genotypes and zygosity. Third, we characterized the physiology of mutants with and without abiotic stress along with the molecular behavior of potential analog genes which may serve as backup to conserve vital function. We performed this characterization with diverse methods of genetic visualization such as single-cell-RNAseq, quantitative PCR and meristem measurement. Together, the results found in this study suggest that regeneration is a far more expansive process than expected.

#### **More Efficient Models of the Egocentric-Allocentric Transformation Are Possible**

*Jonathan Gould, Computer Science, Neural Science  
Sponsor: Professor Zhe Chen, NYU School of Medicine, Neuroscience and Physiology*

The method by which the brain transforms sensory information from an egocentric reference frame to an allocentric reference frame is poorly understood. Previous firing rate models have proposed a gain-field model, where every possible rotation is represented in the neural architecture. While these models are theoretically complete, we show here that much smaller neural architectures are capable of approximating this transformation.

#### **Hands, Toys and Objects: Infant Mouthing during Everyday Activity**

*Vidisha Goyal, Psychology  
Sponsor: Professor Karen Adolph, Psychology*

“Mouthing” inedible objects such as hands and fingers begins in the fetal period. In fact, mouthing is infants’ earliest and most adept exploratory system for learning about object properties. Some inedible objects are intended for mouthing (e.g., pacifier, spoon), but most are not (e.g., toys, household objects). Thus, mouthing offers rich opportunities for exploration and learning, but it can also pose potential threats from dust ingestion (via dirty hands and objects) and choking (on small object parts). Despite research on mouthing during structured object exploration tasks, researchers know little about the frequency and variety of mouthing during natural everyday activity and whether mouthing changes with infant age and motor skills. We video recorded 56 infants during one hour of natural activity in the home. To test change across age, we compared 13- and 23-month-old walkers; to test change based on motor skill, we compared 13-month-old crawlers and walkers. Preliminary data from 21 infants show that mouthing is equally frequent at both ages ( $M_s=26.4$  and  $27.9$  bouts/hour at 13 and 23 months, respectively) and in both crawlers and walkers ( $M_s=38.3$  and  $26.4$  bouts/

hour for crawlers and walkers, respectively);  $ps>.05$ . Perhaps motor skill was not predictive of mouthing behaviors as half of the mouthing bouts ( $M=55.1\%$ ) occurred while infants were sitting. Mouthed objects included toys ( $M=30.2\%$ ), hands ( $M=26.9\%$ ), food ( $M=24.5\%$ ) and household objects ( $M=20.4\%$ )—often simultaneously—suggesting that mouthing serves exploratory functions. Although  $M=19\%$  of mouthed objects (including hands) had contacted the floor in the 10s prior, only  $6.2\%$  of mouthed objects were small enough to be choking hazards. However, most mouthing bouts were brief (Median=2.5s) suggesting that potential dust ingestion—albeit frequent—is also brief.

#### **The Relationship between Social Media (Influencer Endorsements) and Eating Habits (Junk Food) among Adolescents**

*Wendy Guo, Psychology  
Sponsor: Professor Emily Balceris, Psychology*

The present study aims to investigate the relationship between social media (influencer endorsements) and eating habits (junk food) among adolescents. More specifically, the study examines the effect of gender on susceptibility to influencers, that is, whether girls are more susceptible to influencers endorsing junk food than are boys. Research finds that corporate brands and food industries use peer ambassadors and celebrities to endorse products like junk food on social media. Additionally, social media exposure relates to body image disorders and young adults’ food choices. This experiment utilizes an online survey to examine the impacts of influencer gender and the type of product endorsed (food or non-food objects) on the level of attention paid to the influencer by both adolescent girls and boys. We predict results would indicate that females are more attentive to female influencer ads than male influencer ads, given that females tend to be “relational processors”. Additionally, we predict that males will choose more junk foods when viewing male or female influencers endorsing junk food than non-food items, compared with females. With these findings, healthcare professionals should consider screening adolescents routinely for social media use and current eating habits and educating adolescents, parents and families about health risk. Additionally, implementing legislation and policies may be beneficial in preventing this exposure. I will present my findings at the conference.

#### **The Dissociation between Learning and the Physiological Response to Volatile Environments across Development**

*Hannah Hamling, Psychology  
Sponsor: Professor Catherine Hartley, Psychology*

Volatile environments are characterized by rapid and unpredictable change, and the ability to navigate

these environments is essential for optimal decision making. The goal of this study was to examine differences in learning across stable and volatile environments in adolescents and adults. Healthy adults show faster learning in volatile compared to stable contexts, which is adaptive for decision-making. They also demonstrate different physiological responses during learning in volatile versus stable environments, as their pupils dilate to a greater extent in volatile contexts. However, high levels of anxiety hinder this ability to learn differently across changing environments and diminish the pupillary response to volatility. Despite previous work that has shown differences in learning adaptivity between adolescents and adults, few studies have investigated the relations between learning from volatility, pupil dilation and anxiety in a developmental sample. Here, participants between 12–25 years old completed a volatile and a stable block of an aversive learning task while pupil diameter was measured. Neither adolescents nor adults demonstrated learning rate differences between volatile and stable blocks, but the volatile context elicited greater pupil dilation across age. Anxious adults demonstrated increased pupil dilation in both blocks, but no effect of anxiety was observed in adolescents. The observed age-related differences in physiological responses to volatility reveal developmental change in the role of cognitive arousal systems in learning processes. Moreover, cognitive arousal systems' roles in decision making may be hindered by anxiety to a greater extent during adulthood than adolescence.

### **Children's and Adults' Use of Depth Cues in Drawings of Layouts and Objects**

*Valeria Sofía Hernández Rodríguez, Studio Art*

*Sponsor: Professor Moira Dillon, Psychology*

Drawing is a skill unique to humans, and develops naturally in young children, independent of cultures. However, the ability to accurately translate spatial information into drawings might not be as intuitive as picture making itself and might rely on other existing mechanisms in human's brains (e.g., navigation). Past studies have found that children employ multiple techniques to convey depth in their drawings of objects (Morfoisse et al., 2020). Our current research investigates how humans capture different kinds of spatial information when drawing. Specifically, the use of these pictorial depth cues in both children and adult's depiction of not only objects but layouts as well and how they differ across spatial categories and age groups. We conducted two identical experiments with college-aged adults and 4- to 5-year-old children. In these experiments, 64 children and 64 college-aged adults were randomly assigned into one of two conditions—toy or fort—and asked to draw the scene in front of them. Five different variables were evaluated: number, size, overlap, shape and position. Our results indicated that adults, like

kids, showed differences in their use of depth cues when drawing objects versus layouts. Additionally, adult's drawings are much more accurate representations of the stimuli across conditions. In particular, adults consistently included the correct number of elements, kept the sizes of the elements relatively proportionate and used overlap much more flexibly and accurately than children. Adults have either developed a more schematized approach to drawing, or their sensitivity to depth is more flexible across spatial domains.

### **Interictal EEG and ECG for SUDEP Risk Assessment: A Retrospective Multicenter Cohort Study**

*Aaron Hsieh, Computer Science*

*Sponsor: Professor Zhe Chen, NYU School of Medicine, Neuroscience and Physiology*

Sudden unexpected death in epilepsy (SUDEP) is the leading cause of epilepsy-related mortality. Although lots of effort has been made in identifying clinical risk factors for SUDEP in the literature, there are few validated methods to predict individual SUDEP risk. Prolonged post-ictal EEG suppression (PGES) is a potential SUDEP biomarker, but its occurrence is infrequent and requires epilepsy monitoring unit admission. We use machine learning methods to examine SUDEP risk using interictal EEG and ECG recordings from SUDEP cases and matched living epilepsy controls. This multicenter, retrospective, cohort study examined interictal EEG and ECG recordings from 30 SUDEP cases and 58 age-matched living epilepsy patient controls. We trained machine learning models with interictal EEG and ECG features to predict the retrospective SUDEP risk for each patient. We assessed cross-validated classification accuracy and AUC (area under receiver operating characteristic curve). The logistic regression (LR) classifier produced the overall best performance, outperforming the support vector machine (SVM), random forest (RF) and convolutional neural network (CNN). Among the 30 SUDEP patients (14 female; mean age [SD], 31 [8.47] years) and 58 living epilepsy controls (26 female [43%]; mean age [SD] 31 [8.5] years), the LR model achieved a median AUC of 0.77 (interquartile range [IQR], 0.73-0.80) in 5-fold cross-validation using interictal alpha and low gamma power ratio of the EEG and heart rate variability (HRV) features extracted from the ECG. The LR model achieved a mean AUC of 0.79 in leave-one-center-out prediction. Our results support that machine learning-driven models may quantify SUDEP risk for epilepsy patients, future refinements in our model may help predict individualized SUDEP risk and help clinicians correlate predictive scores with the clinical data. Low-cost and noninvasive interictal biomarkers of SUDEP risk may help clinicians identify high-risk patients and initiate preventive strategies.

## **Characterization of ATP2A3's Role in B Cell Function**

*Kurt Hu, Biochemistry*

*Sponsors: Professor Stefan Feske, NYU School of Medicine, Pathology; Anthony Tao, NYU School of Medicine, Pathology*

LAT1, encoded by the SLC7A5 gene, is a neutral amino acid transporter with reported specificities for leucine, phenylalanine, tryptophan and histidine. SLC7A5-deficient cells exhibit reduced Plasma Cell differentiation, proliferation and Class Switch Recombination in vitro and reduced Plasma cells and Germinal center B cells in vivo. Leucine supplementation does not rescue defects in SLC7A5-deficient cells. mTOR is a critical signaling pathway for B cell activation. mTOR inhibition using Rapamycin does not affect Plasma cell differentiation in SLC7A5-deficient cells.

## **The Effect of Memory Access Patterns on OpenMP Program Performance**

*Andy Huang, Computer Science*

*Sponsor: Professor Mohamed Zahran, Computer Science*

Programs that use OpenMP, a popular framework for parallelizing computational work, to split up work over threads for a speedup can access memory in different ways. Some ways will be less costly in particular scenarios depending on the target platform/system, resulting in a larger speedup. We identify the memory access patterns of various algorithms/programs on various target platforms and use that to predict program performance. This allows us to choose the best algorithm, in terms of efficiency, for the task at hand. Due to limitations in physics, it has been infeasible for single-core processor performance to maintain the historic rates of increase they once enjoyed. One approach is to have multi-core processors, where a processor can take advantage of multiple CPU instruction streams at the same time (i.e., in parallel). Another approach is to have a multi-processor system, where multiple processors are working in parallel. Both approaches have tradeoffs to consider, for example, one issue for multi-processor systems is that OpenMP was not designed with multi-processor systems in mind. In particular, it doesn't take into account cache-coherent Non-Uniform Memory Access (ccNUMA), which makes certain memory accesses more costly due to the memory being further away, on a different processor, in shared memory, etc. To maximize performance, algorithms using OpenMP for large problems often found in scientific computing, HPC, etc. should access memory in a pattern that minimizes these costs. This would boost speedup and allow computing jobs to finish faster in an effort to reduce the cost of running jobs and increasing the throughput of jobs. We look into how we can take advantage of OpenMP on

multi-processor systems by using algorithms with better memory access patterns.

## **The Boundary of Gestalt Psychology and Its Application to Decision Makings**

*Emily Huang, Psychology*

*Sponsor: Professor Minah Jung, Leonard N. Stern School of Business, Marketing*

Gestalt theory, the notion that people tend to group separate objects as an entirety in perception, instead of as parts, has been under criticism due to lack of empirical evidence (Kohler, 1992). According to Yoon and Meyvis (2021), people make forecasting errors as they predict a decreased enjoyment of the attractive items in a set with the addition of unattractive items, while they remain relatively indifferent in actual consumption. The present study proposes to investigate the change of attitude towards the unattractive item when it's presented individually or in a set of attractive items. The results show an insignificant increase of predicted enjoyment score, a significant decrease of willingness-to-pay (WTP) and an insignificant increase of purchase intent of the unattractive stimuli when placed in an attractive set, compared to being placed individually. This potentially implies the limitation of Gestalt perception in consumers' decision making. In a bigger picture, this study advances our understanding of Gestalt theory. More specifically, how strong a role it could play in consumers' purchasing decisions and the extent to which it can be applied to consumer psychology.

## **Updating False Beliefs: The Relationship between Certainty about the Unknowable and Belief Updating**

*Tianshu (Amy) Huang, Economics, Psychology*

*Sponsors: Professor Gabriele Oettingen, Psychology; Dr. Irmak Olcaysoy Okten, Psychology*

Belief updating, the process of updating initial false beliefs to the correct ones after receiving corrective feedback, is pervasive in everyday life. The difference in individuals' reactions after receiving corrective feedback has been largely studied. Previous research mainly concentrated on discovering how individuals' levels of confidence and ideology related to belief updating. However, neither of them incorporated the important role of misplaced certainty when processing information. Thus, our study investigated the relationship between certainty about the unknowable, termed as paradoxical knowing, and belief updating. Paradoxical knowing refers to a mental shortcut by subjectively claiming to know what is in fact unknowable (e.g., whether I will get married is unknowable, but I know I will). We hypothesized that if an individual has a higher tendency to firmly claim that he/she knows what is unknowable, they are less likely to change their minds even after receiving corrective information.

In a survey, participants completed a baseline feedback learning test including general trivia statements followed by correct answers, individual difference measures and a feedback learning re-test containing same questions as the baseline test. Results suggested that paradoxical knowing was negatively correlated with belief updating and can uniquely predict less belief updating over and above other variables related to closed-mindedness (e.g., right-wing authoritarianism, political ideology). Learning about potential factors that relate to individuals' resistance to correct false beliefs will be the first step to producing interventions to reduce such resistance, and thus, increase people's knowledgeability.

### **Identifying Non-Cell-Autonomous Cues That Govern R7 Photoreceptor Axon Targeting during *Drosophila* Development**

*Genie Jang, Psychology*

*Sponsors: Professor Jessica Treisman, NYU School of Medicine, Cell Biology; Dr. Maria Bustillo, NYU School of Medicine, NYU Skirball Institute of Bio Molecular Medicine*

Neurodevelopment in both vertebrates and invertebrates is marked by the formation of neural circuits and the establishment of synapses between specific partner cells. The *Drosophila* visual system is a highly complex neuronal structure that is composed of 800 optical units called ommatidia which are each made up of 8 photoreceptor neurons (named R1-R8). Inner photoreceptors (R7 and R8) detect color and project into the medulla. The specific cues that direct photoreceptor targeting to their specific layers are not fully understood. In investigating how photoreceptors terminate in their correct layers, most previous studies have focused on genes that are required in the photoreceptors. I would like to know which molecular cues in the cellular environment can also direct photoreceptor termination. In this study, I will identify genes required in the medulla environment that could affect R7 photoreceptor targeting and the identification of correct postsynaptic partners. To identify genes that govern R7 targeting, I am carrying out an RNAi screen for non-cell-autonomous cues, focusing on transmembrane and secreted proteins that are expressed in the postsynaptic partners of R7. I am examining adult *Drosophila* medullas using confocal microscopy to identify genes that result in photoreceptor defects. Such defects include abnormal morphology, abnormal tiling of photoreceptor columns, or termination of photoreceptors in incorrect medulla layers. These results will help to elucidate the mechanisms by which neurons identify the correct synaptic partner. Gaining a better understanding of these mechanisms is critical as many neurodevelopmental diseases result from defects in the assembly of neuronal circuits.

### **Updated Mathematical Modeling of Confined Space**

#### **Airborne Virus Transmission**

*Jerry Ji, Computer Science, Mathematics*

*Sponsor: Professor Yury Ustinovskiy, Mathematics*

Since the beginning of the COVID-19 break in Wuhan China, much research has been done in the field of modeling the outbreak on a bigger scale such as cities, states and countries. Many models have been constructed in analyzing spreads over larger communities. However, the environment in which the infection happens can also be an important factor when considering the behavior of transmission, especially in confined spaces such as dormitories, prisons and classrooms. Accurate mathematical models are needed to understand airborne infection in these settings for future epidemiologic studies and improvement in designing building parameters.

### **Curbing Gender Bias in STEM**

*Tianyi Jin, Psychology*

*Sponsor: Jennie Qu-Lee, Psychology*

Females who pursue a career in the STEM workforce remain underrepresented. Since STEM learning environment has historically been perceived as hyper-masculine, females often feel a lack of belongingness or self-efficacy in the field. The "Queen Bee Effect" further captures female leaders' tendency to legitimize the widespread STEM-as-masculine stereotypes, adopt masculine self-presentation and project gender-based stereotypical views on other females. It has been hypothesized that such ingroup policing tendency stems from their prior exposure to gender-based discrimination, such experience in turn prompts female leaders to distance themselves from their gender ingroup members as a coping mechanism. In this study, I assessed whether early-stage female STEM students' identification with their major is negatively associated with their prior exposure to gender-based discrimination, aiming to establish proposed mechanism in early-stage career females. Understanding how the Queen Bee Effect came to be could help combat the negative outcomes on female advancement in male-dominated fields.

### **Influence of Anatomical Variation on Neural Decoding Strategies by Target Regions of the Hippocampus**

*Yingxi Jin, Neural Science*

*Sponsors: Professor György Buzsáki, NYU School of Medicine, Neuroscience and Physiology;*

*Kathryn McClain, NYU School of Medicine, Neuroscience Institute*

The hippocampus plays a vital role in an animal's spatial navigation, where place cells encode positional information through spiking activity. The precise spiking patterns of different place cells vary based on their anatomical position along the septotemporal axis of the

hippocampus. From the septal pole to the temporal pole of the hippocampus, the phase of local theta oscillations shifts one-half cycle as the wave travels along the axis, meanwhile, the size of place fields is reported to increase. Such variation in the anatomical organization may impact the information decoded by downstream readers in distal regions. To investigate where and how such impact occurs, we simulate spiking in populations of place cells with the position-theta-phase (PTP) model. Two types of decoders were built to quantify positional information contained in spiking activity: a canonical Bayesian firing-rate decoder and a novel Bayesian theta-phase decoder. We then compared performance when decoding from place cells with anatomically inspired differences in theta phase and place field width. Results showed that phase code is not only more accurate than rate code, but also more robust when integrating traveling theta waves at ventral regions. Meanwhile, both decoders showed that combining inputs from distributed populations along the axis could achieve higher accuracy compared to that from a single group. These results indicate that downstream regions prefer reading out information with phase code and integrating inputs from widely spread locations along the stream of traveling brain waves. Understanding the decoding strategy of downstream regions may shed important light on the mechanisms for information transfer from the hippocampus that is necessary for spatial navigation and memory consolidation, as well as the fundamental question that what is the purpose of the existence of such anatomical variation and why does it occur during evolution.

### **Origins of Inequality and Individuals' Resource Allocation Behavior**

*Peyton Jolley, Psychology, Sociology*

*Sponsors: Professor Andrei Cimpian, Psychology; Professor Ruth Horowitz, Sociology; Melis Muradoglu, Psychology*

With increased economic inequality and political polarization, partisan explanations of inequality are at odds; while the right justifies the economic system and explains inequality as individual in origin, the left tends to explain inequality as structural in origin. However, both right and left-wing media focus on discrimination as the example of structural inequality, even though structural inequality is far more entrenched in our system than one-off examples of discrimination can express. I argue that explaining structural inequality as hierarchical as opposed to originating from discrimination could be associated with increased receptiveness towards redistribution from highly system-justifying individuals. Using third-person vignettes to reduce influences of self and group-interest, this study explored how individuals' tendency to justify the economic system (ESJ) and the information given to explain inequality are associated with people's fairness

perceptions and attitudes towards redistribution. Participants were 182 NYU psychology undergraduates recruited from the Sona research participation pool. Both high and low ESJ participants found inequalities with structural explanations more unfair than individual inequalities, but high ESJ individuals only slightly more likely to rectify structural inequality described as discrimination than they were to rectify individual inequality. This suggests that high ESJ individuals may oppose redistribution due to the information they are exposed to about inequality rather than different perceptions of fairness. All groups preferred to redistribute when structural inequality was explained as a hierarchical system, suggesting that in order to improve receptiveness toward redistribution, more effort should be made to distinguish discrimination as a symptom of deeper systemic injustice and inherent hierarchy as opposed to an origin of inequality itself.

### **Isolation and Genomic Characterization of the *Gordonia terrae* Bacteriophage Hardial**

*Simi Kang, Global Public Health/Biology*

*Sponsors: Professor Chris Gissendanner, University of Louisiana Monroe, Biology; Todd Spears, University of Louisiana at Monroe, Biology*

Bacteriophages are the most abundant entity on Earth. Found in nature, bacteriophages infect bacteria and can kill them without harming any surrounding animal or plant cells. This ability gives bacteriophages the potential to be used as an alternative to treat bacterial pathogens, and their genetic diversity can provide insights into genome evolution. This project focused on isolating bacteriophages from *Gordonia terrae*, a soil bacterium in the Actinobacteria phylum. Soil samples were collected from Northeast Louisiana and tested for the presence of phage that can infect *Gordonia terrae*, and we successfully isolated the phage now named *Gordonia* phage Hardial. Using plaque assays and controlled phage infections of *Gordonia terrae*, we discovered that Hardial has turbid plaque morphology and low virulence. We generated a high-titer suspension of Hardial and purified its DNA using both the WizardPrep and PCI methods. DNA was quantified by gel electrophoresis and analyzed by restriction enzyme digestion. The restriction pattern indicated that Hardial belonged to the Actinobacteriophage cluster CR, so to confirm cluster assignment and characterize the genome sequence, Hardial was sequenced using the Illumina platform. Analysis and annotation of this sequence data are currently underway, and we expect to perform further study on Hardial to understand how it can be used in phage therapy. This project was performed in association with the SEA-PHAGES program at the University of Louisiana Monroe.

## **Regulation of Neuron Number in the *Drosophila* Visual System**

*Evelyn Keefer, Biology*

*Sponsors: Professor Claude Desplan, Biology;  
Dr. Jennifer Malin, Biology*

During *Drosophila* optic lobe development, neurons of different types are generated with distinct and stereotyped stoichiometry, allowing them to carry out their respective functions. Distal Medulla (Dm) neurons are a subclass of optic lobe neurons that vary in cell number from 5 to 800 cells per optic lobe. Neural stem cells born from a crescent-shaped neuroepithelium called the Outer Proliferation Center (OPC) utilize spatially and temporally regulated factors to pattern the identity of neurons during development. However, these factors are not sufficient to explain the cell number diversity observed in Dm neurons; cells born in similar spatial domains and temporal windows possess vastly different cell numbers. In this study, I investigated additional mechanisms—namely apoptosis and additional OPC spatial patterning—to determine if other processes were able to explain the discrepancy in cell numbers in Dm neurons. While pan-neuronal inhibition of cell death in Dm neurons does cause an increase in cells generated, it does not explain the difference in cell number seen in Dm neurons born in the same spatial/temporal windows. This indicates that apoptosis is not the major regulator of cell number. Next, I used mixture-modeling software developed by the Desplan Lab to identify combinations of genetic markers that could be used to specifically label each type of Dm neuron throughout its development following immunofluorescence and *in situ* hybridization. By following the positions of these Dm neurons during their development, I found that some types of Dm neurons were localized to smaller OPC subregions than were previously observed, suggesting that the OPC may be subdivided into smaller regions delineated by currently unknown factors. My work suggests that, aside from the previously described mechanisms, allocating smaller numbers of stem cells to generate specific neural populations using spatial patterning may be an additional mechanism to regulate cell number.

## **Focusing on the Goal: How Narrow-Focused Visual Attention Affects Aerobic Respiration during Long Distance-Running**

*Jason Kemp, Psychology*

*Sponsor: Professor Emily Balceris, Psychology*

Is there a way to run efficiently and effectively with little concern about injuring yourself through overexertion or loss of concentration? I test whether an attention-based strategy is related to improving physical health and performance while long-distance running. Specifically, I test the relationships between how long runners are able to run

while using aerobic respiration and the use of narrowed and natural visual attention strategies. I hypothesize that runners who are actively engaging in a narrowed attention style will spend more time in aerobic respiration than runners who are attending to their surroundings in a more naturalistic manner. Alternatively, results suggest that runners who are actively attempting to use a narrowed attention style will engage in aerobic respiration for a majority of the time. The further discussion implies that the increased cognitive control during narrowed attention style informs the body's motor control and allows for the runner to run harder, subsequently increasing the likelihood to engage in anaerobic respiration.

## **Uncovering rNase E Mode-of-Action: Impact of Protein-Membrane and Protein-Protein Interactions on RNA Scanning**

*Isabella Kest, Biology*

*Sponsor: Professor Joel Belasco, NYU School of Medicine, Microbiology*

Post-transcriptional regulation by RNA degradation is a major point of control for gene expression in all organisms. Thus, to better understand this control of gene expression, we must study its components and mechanisms. This study aims to elucidate the contribution of the C-terminal domain to scanning by rNase E, a major endonuclease in *E. coli*, which scans RNA molecules for cleavage sites leading to their 3' to 5' degradation. The non-catalytic C-terminal domain of rNase E contains a membrane targeting region, various protein binding sites and contributes to the formation of liquid-liquid, phase separated RNA degrading condensates, known as bacterial-ribonucleoprotein bodies (BR-bodies). This study will analyze the effects of membrane anchoring, protein-protein interactions and phase separation on RNA scanning by rNase E. To understand these effects by the C-terminal domain, we will analyze rNase E's efficiency in strains with various deletions on the C-terminal domain: the membrane targeting sequence (MTS), its site-specific protein binding regions and the C-terminal domain in its entirety. Once these targeted deletions in distinct domains of rNase E are confirmed, we will test its ability to overcome physical obstacles (e.g., proteins bound to RNA) while scanning RNA. To do this, the mutant rNase E strains will be transformed with various plasmids that encode distinct obstacles for rNase E scanning. To quantify the results, RNA will be extracted from log-phase cells and a northern blot analysis will be used to compare the molar ratio of decay intermediates upstream versus downstream of the obstacle in wild-type and mutant cells. By quantifying these ratios, we can shed light on the effect the C-terminal domain has on scanning by rNase E which will ultimately contribute to a better understanding of post-transcriptional regulation in *E. coli*.



### An Empirical Analysis of the Relationship between Wind-Speed Variability and Geographic Location in North America

Sarah Kilpatrick, Data Science, Mathematics

Sponsor: Professor Dimitrios Giannakis, Mathematics

Wind turbine technology has been well-studied and engineered for decades. In the early twentieth century, German physicist Albert Betz published an important finding called the Betz Limit. This limit suggests that the most optimized turbine is, at most, capable of capturing 60% of the surrounding wind energy. While some critics of this research claim this is a simplification of complicated dynamical systems, it is safe to say that the name of the game in advancing the success of wind energy is in the geographical placement of the turbines, in order to maximize the benefits of turbine technology available to us today. Characterizing the atmosphere of the environments these gigantic instruments occupy is of considerable interest to prospective investors in wind energy. Recently it has been shown in a small area of Northern California that wind energy potentials are influenced by a multitude of decision factors, including but not limited to environmental impact, regional compatibility and the impact of wind farms on nearby cities and towns (Rodman, Laura C et al.). In addition, a study of synoptic-scale wind forcings in Europe suggests that near coastlines, the sea dampens local winds and large-scale forcings prevail. Synoptic-scale winds, such as the North American Jet Stream, for example, remain a large part of the puzzle for wind energy collected in the troposphere (Drechsel, Susanne et al.).

### Objects of Inquiry: Intersectional Perspectives on the Objectification of Young Female Targets

Sarah Kim, Biology; Rebecca Stevenson, Psychology

Sponsors: Professor Marjorie Rhodes, Psychology; Rachel Leshin, Psychology

Our research aims to discover how race influences the phenomenon of objectification targeted at children. Objectification refers to the attribution of object-like qualities to non-objects—including people. In addition to literal objectification, or the attribution of object-like properties to human beings, researchers have also studied sexual objectification—objectification for sexual purposes—and depersonalization—the failure to assign mental states to targets. Within the different types of objectifications, women are viewed as objects more often than men. Past research (Leshin and Rhodes, *in preparation*) has recontextualized objectification by studying it among young girls and young boys. The CDSC lab found that both adults and children demonstrated a tendency to mis-categorize boy-toys as kids, suggesting a tendency to humanize young boys, and that when adults were shown a picture of a young girl or boy, they were more likely to refer to girls' appearances and boys' mental states. This same pattern was not found among children's responses. While adults might give object-like qualities to girls more often than boys, children don't. This suggests that the tendency to objectify young girls forms throughout development. Other past research (Lei, Byrnes and Rhodes), found that race influences children's perception of gender. More specifically, children as young as five have been found to marginalize Black women—but not white or Asian wom-

en—within their overall concept of women. Since race affects the categorization of gender, our research investigates objectification within the lens of race and gender simultaneously, with the expectation that different patterns of objectification will indeed emerge across stimuli depicting people of color.

### **The Relationship between Ability, Effort and Obstacles for Scientists Depicted in Children's STEM Biography Books**

*Lexie Kolberg, Psychology, Social & Cultural Analysis  
Sponsors: Professor Andrei Cimpian, Psychology;  
Dr. Jessica Gladstone, Psychology*

Children's STEM biography books are one potential tool to motivate children by giving them a role model to emulate. Research has shown that students who read stories about scientists' struggles throughout their career score higher in science subjects than students who read about scientists' achievements (Lin-Siegler et al., 2016). However, protagonists in books are shown struggling and overcoming obstacles in different ways, which may influence the effectiveness of the stories in motivating students. This study explored whether there are correlations between overcoming certain obstacles and messages about ability or effort for scientists depicted in children's STEM biographies and whether the correlations differ between protagonists of different races and genders. With data from 289 books, we showed that there are several differences in correlations between protagonists of different demographic groups. Namely, concurrent with our hypothesis, female scientists show significantly higher correlations between effort and structural obstacles than white male scientists. However, contrary to our hypothesis, there were very little differences between demographic groups for fixed ability correlations. These results suggest that all scientists are shown as being equally brilliant for most obstacles regardless of gender, but they are shown exerting effort differently depending on the obstacles they face. Future research should look into the causal implications of these differences on students' motivation to pursue a STEM career.

### **Activating Global Citizenship Identity Motivates Pro-Environmentalism**

*Anastasiia Korolevskaia, Psychology  
Sponsor: Dr. Kimberly Doell, Psychology*

Human activity plays a large role in climate change, calling for modifications in people's daily environmentally-relevant behaviors. Prior research has mostly looked at individual-level determinants of sustainable action; however, human beings are highly social creatures, and as such our perceptions, motivations and behaviors are often influenced by the groups we identi-

fy with. This study aimed to harness such group-based processes to encourage people to engage in more pro-environmental behaviors. Data were examined for 250 undergraduate students who either received cues designed to activate their personal/individualistic or global citizenship identities. The participants in the control group did not receive any cues at all. Global citizenship was chosen because it is the most inclusive human ingroup and has been repeatedly linked to sustainability and pro-environmentalism. Compared to the controls, the global citizenship group reported increased future pro-environmental intentions and behaviors, but only in people who were highly self-invested in that identity. These results suggest that messages targeting people highly invested in being global citizens may be an effective behavioral intervention to promote sustainability.

### **How Do Infants Form Scene Categories?**

*Kiran Kottapalli, Psychology  
Sponsors: Professor Moira Dillon, Psychology;  
Dr. Yi Lin, Psychology*

Infants often interact with and learn about people, objects and places in different ways in their everyday life. For example, infants begin manipulating objects earlier than they begin navigating places on their own (Adolph and Franchak, 2017). Furthermore, they frequently hear caregivers label objects (Sandhofer et al., 2010) but may hear labels for places much less frequently. Previous object categorization studies have found that linguistic labeling facilitates infants' categorization of objects (Fulkerson and Waxman, 2007), especially when the objects have the same shape (Graham et al., 2004). In this study, we used the novelty-preference paradigm of Fulkerson and Waxman (2007) to ask if and how infants categorize scenes. In Experiment 1, 12-month-olds first watched a series of videos of either fields or empty rooms, accompanied by labeling sentences that contain a made-up noun (e.g., "Look, a toma"). Then, infants watched a silent test video with two new scenes side-by-side, one from the familiar category and one from the novel category. In Experiment 2, infants viewed scrambled scenes that removed spatial layout information but left intact color and texture. We found that infants looked longer to the novel than the familiar category at test in both experiments. This suggests that 12-month-olds can categorize scenes with characteristic spatial layouts as well as scenes with just color and texture information, when the scenes were accompanied by labeling phrases. We planned three experiments with 6-month-olds to investigate if infants need experience with self-guided navigation, color and texture and language to categorize scenes.

## **Efficient Transfer Learning for Unsupervised Domain Adaptation**

*Yilun Kuang, Computer Science, Mathematics  
Sponsor: Professor He He, Computer Science*

Adapter for UDA.

## **Don't Bury the Importance of Urban Green Spaces: Small Cemeteries Contribute to Avian Biodiversity and Ecosystem Services in New York City**

*Lily Kunkel, Biology  
Sponsors: Professor Mary Killilea, Biology;  
Professor Katie Schneider-Paolantonio, Biology*

Green spaces help urban environments mitigate the growing problems they face due to their inherent characteristics and climate change. Thus, considering the full range of green spaces is critical in maintaining the ecological robustness of our cities. This research aims to investigate the ecological contributions of small cemeteries in New York City as compared to that of small urban parks; in doing so, we seek to establish whether cemeteries should be considered ecologically significant urban green spaces. We examined the impact of environmental factors on avian biodiversity and biodiversity differences between the two aforementioned site types. In order to do this, we conducted avian point counts and measured impervious surface cover, noise levels and air quality in 10 cemeteries and 16 parks across Manhattan and Brooklyn during the Spring and Fall avian migration seasons of 2021. We found that small urban cemeteries supported similar levels of avian biodiversity as small urban parks. Impervious surface cover was greater in parks than in cemeteries, but there was no significant site-type difference in air quality or noise. The only environmental condition that impacted avian biodiversity was site size, which was positively correlated with species richness. These results suggest that cemeteries, even of a small size, merit inclusion in research on urban green spaces as they support biodiversity and provide ecosystem services similarly to parks.

## **Outgroup Animosity on Ukrainian Social Media: A Conceptual Replication of Rathje et al. (2021).**

*Yaroslava Kyrychenko, Mathematics, Psychology  
Sponsor: Professor Andrea Jones-Rooy, Data Science*

With the worldwide adoption of social media, many countries have seen increases in political polarization. However, attempts to determine the effects of social media on polarization have mainly been confined to the United States political landscape. In particular, Rathje et al. (2021) found that outgroup animosity is one of the strongest predictors of engagement on social media, linking social media to increasing polarization. Since the original study was done in the context of US Republican and Democratic news sources and politicians, it is hard to

establish the extent the results generalize beyond the US political climate to social identities overall and social media globally. We investigate how group identity impacts engagement with political content on Ukrainian Facebook and Twitter in a conceptual replication of Rathje et al. (2021). We tested if in- and outgroup identity language predict engagement in the context of pro-Ukrainian versus pro-Russian media and among the five Ukrainian political factions. We found that both in- and outgroup words positively predict online engagement, and outgroup identity language leads to a more significant increase in shares, comments and emotional expressions on Facebook. These results suggest that social media engagement with political content is likely driven by social identity principles, especially outgroup animosity, even across cultures. They also hint at how social media platforms worldwide are implicated in political polarization.

## **Mapping Anatomical Inputs to the Auditory Cortex**

*Nikki Lee, Neural Science  
Sponsors: Dr. Kelsey Anbuhl, Neural Science;  
Professor Dan Sanes, Neural Science*

Developmental hearing loss can induce long-lasting impairments to auditory cortex neurons, which can lead to significant perceptual deficits (Whitton and Polley, 2011). Even when normal hearing is restored (e.g., with cochlear implants, hearing aids), individuals with hearing loss may continue to display cognitive deficits while performing auditory tasks, such as with attention, working memory or decision-making (Moore et al., 2020). These cognitive mechanisms are likely engaged by “listening effort”, along with the sensory processing required to listen accurately. Listening effort is defined as the allocation of cognitive resources during auditory tasks (Pichora-Fuller et al., 2016). Individuals with hearing loss often exhibit elevated listening effort, which can give rise to chronic mental fatigue. The underlying neural mechanisms that contribute to elevated listening effort are uncertain. One candidate region is the cingulate cortex, which is shown to be recruited during effortful listening in human fMRI studies (Peele, 2014) and exhibits dysfunction in those with hearing loss (e.g., Belkhiria et al., 2019). Thus, we hypothesize that the cingulate cortex forms connections with the auditory cortex to mediate listening effort. To test this hypothesis, one must first determine whether there are anatomical connections between the cingulate and auditory cortices in an animal model. Here, retrograde and anterograde viral tracers were injected into the auditory and cingulate cortices, respectively, to examine connectivity in the gerbil. Tracing experiments revealed a strong projection from the cingulate (Cg1 subregion) to dorsal and core auditory cortex. This anatomical projection is a candidate neural circuit that may underlie listening effort.

## **Changes in NR2B-NMDA Receptor Levels in the Prefrontal Cortex and Reductions in Anorexia-Like Behaviors in Adolescent Female Mice Following a Single Dose of Ketamine**

*Jennifer Li, Neural Science*

*Sponsor: Professor Chiye Aoki, Neural Science*

**Objective:** A previous behavioral study showed that ketamine at a dose of 30mg/kg ameliorated anorexia-like symptoms more than 3mg/kg in mice (Chen et al., 2018). The objective of this study was to understand the underlying cellular mechanisms in the prefrontal cortex (PFC) of the same animals and how these mechanisms might relate to behavioral changes observed. This study examined changes in the levels of NR2B-NMDA receptors and the actin-binding protein drebrin at excitatory synapses of postsynaptic dendritic spines of pyramidal neurons and GABAergic interneurons (GABA-INs) in the PFC. **Methods:** 16 female C57BL/6 J mice underwent activity-based anorexia (ABA), which included acclimation to wheels and two cycles of food restriction periods, each followed by a recovery phase. ABA induced anorexia-like behaviors, such as voluntary food restriction, increased wheel-running, decreased body weight and heightened anxiety. Two cohorts of mice, each with a single intraperitoneal dose of 3mg/kg or 30mg/kg ketamine to elicit different extents of ABA amelioration, were compared in terms of levels of subcellular locations of molecules: NR2B subunits of NMDA receptors and drebrin. **Results:** The 30mg/kg group had significantly higher levels of NR2B at the cleft and in the cytoplasm of dendritic spines and drebrin near the PSD of GABA-INs. The levels of postsynaptic NR2B positively correlated with body weight retention and food consumption for the 30mg/kg cohort and negatively correlated with wheel activity. **Discussion:** A proposed mechanism in relation to increased food consumption and body weight retention is that 30mg/kg ketamine increased the levels of postsynaptic NR2B at excitatory synapses of the pyramidal neurons in the PFC that project to the dorsal raphe. 30mg/kg ketamine also induced a decrease in wheel activity by decreasing the levels of postsynaptic NR2B at excitatory synapses of pyramidal neurons in the PFC that project to the dorsal striatum.

## **Does Certainty Turn to Ambiguity When Faced with Opposition? Exploring the Causal Relationship between Discordant Knowing and Ambiguity**

*Jiaxuan Li, Psychology*

*Sponsors: Professor Gabriele Oettingen, Psychology;*

*Dr. Irmak Olcaysoy Okten, Psychology*

Discordant knowing (DK) is defined as feeling highly certain about something that one perceives to be opposed by the majority of others. Certainty on a conviction

that entails opposition has been found to relate to ambiguity, or openness to more than one explanation, in various contexts. The present study examines whether there exists a causal relationship between DK and ambiguity. We induced participants to DK (high certainty level and perception of opposition) or to one of the control states in terms of their abortion view, and then we measured their level of ambiguity in language when they explained their abortion view later on. We then compared the level of ambiguity between participants in different psychological states. We hypothesized that participants induced to DK would become more ambiguous in language than those induced to a control state. However, results from the data analysis did not confirm our hypothesis; participants induced to DK were not the group with the most ambiguous language. We did, however, observe that participants were more ambiguous in language when they perceived opposition (versus affirmation) from others in terms of their abortion view or when they had a low (versus high) certainty level in their abortion view. This study is the first step of a larger project that aims to examine whether people experiencing discordant knowing would engage in ambiguity as a strategy so that they can preserve their knowledge in the face of opposition.

## **Many Ladders and Many Minds: Local and Global Social Status Comparisons Predict Social Working Memory Performance**

*Shannon Li, Psychology*

*Sponsors: Professor Eric Knowles, Psychology;*

*Nicholas Fendinger, Psychology*

Differences between those at the top and bottom of the social hierarchy exist in nearly every consequential life domain, with those at the bottom faring worse than those at the top of the ladder. Although previous research has shown that lower social status predicts worse health outcomes and neurocognitive functioning, lower status is also related to heightened performance on social-cognitive tasks such as identifying emotions from faces and inferring the mental states of others (Adler et al., 2000; Hackman and Farah, 2009; Dietze and Knowles, 2020). To build upon these findings, we investigated how global (comparisons to society as a whole) versus local (comparisons to those in a self-defined community) social status comparisons predict performance on social (e.g., tracking the mental states of others) and nonsocial (e.g., alphabetizing the names of others) working memory performance using the “Orange is the New Black” task developed by Meyer and Collier (2020) amongst an online sample of 190 people. A series of linear regressions revealed that the local social status comparisons did not significantly predict differences in social versus nonsocial working memory performance ( $b=-0.0009$ ,  $p=.392$ ). However,

global social status comparisons predicted greater social (but not nonsocial) working memory performance ( $b=0.02$ ,  $p=.029$ ). In sum, we find that different measures of social status uniquely affect social and nonsocial working memory. Future directions and implications for the measurement of social status will also be discussed.

### Racial Biases in Children's Media

*Jonathan Liles, Psychology; Cas Chum, Psychology;  
Alex Boyd, Psychology; Chrystelle Leveille, Psychology  
Sponsors: Dr. Mike Rizzo, Psychology;  
Professor Marjorie Rhodes, Psychology*

Children consume media regularly and the impact of media on children's representations of the world around them is well documented (Bandura et al., 1961; Skinner et al., 2017; Roberts and Rizzo, 2021). This project aimed to reveal how children's consumption of popular TV shows and movies can contribute to their developing racial biases. Past research on adult media indicates that Black, Indigenous and people of color (BIPOC) are mis- and underrepresented in American media. However, research to date has not examined how this mis- and underrepresentation impacts children's developing attitudes towards different racial groups. In this study, we first conducted a content analysis to identify the quality and quantity of racial representation in popular children's TV shows and movies. This data was then connected to a related longitudinal study that examined data on children's most watched media as well as their attitudes towards Black and white peers. Data for the content analysis has been collected; across 29 shows and movies, we found evidence of significant underrepresentation of BIPOC characters generally ( $p < 0.001$ ), and particularly for BIPOC characters in high status/leadership roles ( $p < 0.001$ ). Analyses assessing the impact of this underrepresentation on 4–8-year-old children's ( $N = 2021$ ) racial biases are ongoing and will be finished before the URC presentation. Results are expected to document how biased media can influence children's beliefs and attitudes towards people of other races and can be used to inform the creation of anti-biased media in the future.

### Spatiotemporal Control of Fgf Signaling for Regulating Mechanical Tension in Tissue Splitting

*Patrycja Lis, Biology  
Sponsors: Professor Holger Knaut, NYU School of Medicine, Cell Biology; Dr. Weiyi Qian, NYU School of Medicine, Cell Biology*

Tissue migration and splitting are essential processes in organ development. Tissue migration is intensely studied, yet the mechanism behind how tissues split remains unclear. The goal of this project is to determine how tissue splitting is regulated by using neuromast deposition from the migrating posterior lateral line primordium (pri-

mordium) in zebrafish as a model. It is known that mechanical forces, generated by cellular actomyosin contractions, control multiple morphogenic events in vivo. However, how such forces are regulated in neuromast deposition is unknown. Previous studies found that the deposition of neuromasts is regulated by Fibroblast Growth Factor (Fgf) signaling, but it is unclear how Fgf signaling controls this process. This project serves to determine how Fgf signaling controls actomyosin contractions for neuromast deposition by spatiotemporally manipulating levels of Fgf signaling in the primordium. In order to increase Fgf signaling, an optogenetic tool is in development that can spatiotemporally initiate the dimerization of fibroblast growth factor receptor 1a (Opto-fgfr1a), thus activating Fgf signaling in the primordium upon illumination. To decrease Fgf signaling, fish lines that express the Fgf signaling inhibitor Sef (similar expression to Fgf genes), or a dominant negative fgfr1a (dn-fgfr1a) in a tissue-specific and inducible manner were produced. Therefore, the effects of Fgf signaling in controlling the actomyosin activities for neuromast deposition will be observed.

### Directional Walk of Influenza A virus: Diffusion with Ligand-Receptor Contacts

*Athena Liu, Mathematics  
Sponsor: Professor Miranda Holmes-Cerfon, Mathematics*

Influenza A Virus (IAV) is a respiratory pathogen that contributes to seasonal flu. IAV envelope carries two kinds of proteins interacting with sialic acid: Hemagglutinin (HA) which binds to a receptor and Neuraminidase (NA) which cleaves a receptor to make it inactive. This research aims to simulate IAV's random walk using a discrete stochastic method and quantify the diffusion coefficient. A particle with ligands binds and unbinds to receptors on a surface. The ligand-receptor contacts cause the particle to diffuse. The research uses the overdamped Langevin equation to calculate the displacement and rotation of IAV and the Gillespie method to determine whether a dynamic happens. The overall rates of reactions meet the requirement of detailed balance so that the long-time probability of the particle's position converges to the Boltzmann distribution. After the particle binds to a receptor, the receptor pulls the particle with spring force. The particle's mean-squared displacement and rotation grow linearly with time over long times. The effective long-time diffusion coefficient is half of the slope. This research examines the effective diffusion coefficient of IAV in all dimensions. Moreover, the distribution of HA and NA on the surface affects the diffusion of IAV. We can use stochastic simulation to quantify and compare the mean-squared displacement and rotation to find the pattern of the distribution's influence.



### **Feasibility Study of Merrill Lynch Investment Clock Theory in Chinese Asset Market**

*Jingxuan Liu, Economics, Mathematics; Jessie Zhao, Mathematics; Annie Kong, Mathematics/Computer Engineering; Tianyi Chen, Economics and Mathematics*  
*Sponsor: Professor Jianfeng Liang, Mathematics*

Since the invention of the Merrill Lynch Investment Clock in 2004, it has been widely used as a systematic investment guide by establishing a mapping relationship between market state (represented by Business cycle) and asset performance. However, its application in the Chinese market has been confirmed ineffective, which has been bothering Chinese investors for a long time. We will first briefly discuss reasons for whether Merrill Lynch Investment Clock Theory is not applicable in the Chinese market based on the differences between the US and Chinese monetary policy, the impact of uncontrolled factors aside from monetary policy and economic fundamentals (such as financial regulation and reform policies on Chinese assets performance), the measurement deviation of inflation and psychological differences between Chinese and American investors.

### **First Offer, Worst Offer? Negotiating with a Moral Violator**

*Ashley Lopez, Psychology*  
*Sponsor: Professor Tessa West, Psychology*

Negotiations require people to work together to achieve a mutually beneficial outcome for both parties. Yet, how people behave when they have to work together with someone who is immoral has not been extensively

investigated. Social interaction literature has shown that when people feel uncomfortable in interactions, they tend to be overly polite and less assertive, and less assertiveness is associated with making the first offer in negotiations. I aimed to research whether these social norms influence how people behave in negotiations with a moral violator. When individuals have to negotiate with an immoral partner, who ends up winning the negotiation and which behaviors influence that result? I conducted an online study in which participants ( $N = 200$ ) engaged in a negotiation with an immoral (or neutral) partner. I predicted that participants paired with a moral violator would be less dominant and make the first offer, thus being less likely to win the negotiation. Contrary to my hypothesis, participants with immoral partners were marginally more likely to make the first offer. They were also significantly less likely to give the first offer. I coded the negotiation chat texts for dominant behaviors to see whether participants paired with immoral partners were more dominant in the negotiation compared to the neutral partners. There was a significant effect of dyad role on objective dominance. This work has important implications for the interpersonal effects of immoral behavior and the influence of moral information on social interactions.

### **The Effect of Gender Stereotypes on Adolescent Perceptions of Leadership**

*Phoebe Lopez, Psychology*  
*Sponsor: Professor Emily Balcetis, Psychology*

Adolescence is hallmark by the search for an identity to hold onto. If, at this age, their idea of an ideal leader does not look like them and instead follows the

white patriarchal stereotype of leadership, it may affect their self-esteem and self-efficacy. With a recent rise in female representation in leadership as well as in-group support of women however, girls today are exposed to much of the inspiration they were not receiving before. In this study, we asked adolescent students to create their ideal leader using an avatar software. These avatars were then rated by adult participants on masculinity levels. We found that girls created avatars significantly less masculine than those of boys. While there is much work to be done to reverse the effects that intrusive systemic hegemony has had on American culture, to see girls envisioning themselves as leaders evokes hope for future generations.

### **Toy Room: Is the Snuz a Toy or a Room?**

*Ice Lou, Psychology*

*Sponsors: Professor Moira Dillon, Psychology;  
Dr. Yi Lin, Psychology*

When asked to draw what they see, children and adults tend to faithfully reproduce the objects but omit the layouts of a scene (e.g., Dillon, 2021), suggesting that we prioritize objects over physical spaces when we use symbols to represent the physical world. Do we have the same bias to favor objects over layouts in another symbolic system, namely language, that we begin to use in early infancy to learn about the world? Using a violation-of-expectation task, we ask whether infants intuitively think novel nouns are more likely to refer to objects or spatial layouts. In an ongoing study, 8.5- to 10.5-month-old infants first watch eight familiarization videos of an ambiguous figure with three connected panels, accompanied by labeling sentences that contain a made-up noun (e.g., “Look, a snuz!”). The ambiguous figure could be interpreted as an object with three parts or a space with three walls. Then, infants watch pairs of silent test videos, one shows a person navigating the space inside the panels (fort video) and one shows a hand moving the panels (toy video). In a control condition, infants watch the same familiarization and test videos but hear sine-wave tones instead of labeling sentences during familiarization. If infants think the novel noun is more likely to refer to an object, they should look longer to the fort video because it is unexpected. If, however, infants think the novel noun is more likely to refer to a space, they should look longer to the toy video.

### **N6-Methyladenosine Modifications in Telomeric-Repeat Containing RNA Maintain Genome Integrity**

*Warren Lu, Global Public Health/Biology*

*Sponsor: Professor Susan Smith, NYU School of Medicine, Pathology*

Error free replication and separation of chromosomes is required for proper aging and development. An essential part of our genome is the telomere region, whose integrity is maintained by a unique set of telomere binding

proteins and accessory factors. Our long-term goal is to understand the mechanisms that regulate telomere ends. Recently, subtelomeric regions adjacent to telomere ends that were previously considered transcriptionally inactive have been shown to be transcribed into telomeric repeat containing RNA (TERRA). Improper TERRA expression and localization has been shown to disrupt genome integrity. The full regulatory mechanisms that influence TERRA transcription and post transcriptional functions have not been fully understood. We hypothesize that TERRA sequences are post-transcriptionally modified through N6-methyladenosine (M6A), the most common RNA modification in mammalian cells. M6A modifications have the potential to influence RNA splicing, export, stabilization and decay. Here we demonstrate through a novel MeRIP-seq analysis that TERRA is M6A modified. We then validate this MeRIP-seq assay through a novel RNA immunoprecipitation and dot blot assay to show that TERRA sequences can be immunoprecipitated using an M6A antibody. In this proposal we outline future steps to take in order to demonstrate the role that M6A modified TERRA has in genome integrity.

### **The effectiveness of Tail Risk Hedging Strategies under the Pandemic**

*Yiqiu Luo, Computer Science, Mathematics*

*Sponsor: Professor Aaron Brown, Mathematics*

This paper analyzes the return and cost of using different tail risk hedging strategies and how applicable they are for the real market scenario. Tail risk is the chance of a loss occurring due to a rare event, as predicted by a probability distribution. In my research, I examined the returns and costs of three tail risk hedging strategies: put buying, multi-asset trend following, Alliance Bernstein’s tail risk parity and 60/40 tail-risk hedging strategies using metrics including annualized return, Sharpe ratio, worst drawdown and information ratio. At the time when these methods were introduced, they were mostly tested on the 2008 economic crisis. In this research, I used the 2020 COVID outbreak to test the effectiveness of these methods, finding any unexpected strengths and weaknesses. I also adjusted parameters of these methods for better results.

### **A Graph-Theoretic Markov Model for Arctic Sea Ice**

*Linkai Ma, Mathematics*

*Sponsor: Dr. Andrew Davis, Mathematics*

Due to the effect of global warming, the Arctic Sea ice has been declining both in terms of the surface area and thickness for the past few decades. This phenomenon could have significant implications on the Earth’s climate cycle. However, the mathematical understanding of the dynamics of Arctic Sea ice is far from complete. We propose a Markov probability model based on a finite

2-dimensional grid to imitate the movement of sea ice in the Arctic Ocean. Our model couples the well-established advection-diffusion operator with a collision operator, assuming constant external wind field and temperature on the ocean.

### Affordances for Language: Infants' Actions with Objects Shape Caregiver Language

Ramya Manikkan, *Psychology, Studio Art*; Anabelle

Rampersaud, *Psychology*

Sponsor: Professor Karen Adolph, *Psychology*

Infants' motor skill attainments often co-occur with advances in communication and language learning. However, prior work cannot determine whether infants' motor behaviors have a direct causal effect on language learning, or whether the timing in development is coincidental. Here, we tested whether experimental manipulation of infants' moment-to-moment motor actions influences caregivers' language input. We observed 30 caregiver-infant dyads (12- to 20-month-olds) in two within-subject experimental toy-play conditions in a laboratory playroom. Dyads played freely with either: (1) locomotor toys designed to get infants to move around, (e.g., pushcart, broom and balls) or (2) manual toys designed for infants to play in a stationary position using their hands (e.g., shape-sorter, stacking bricks and toy xylophone). We documented the frequency and variety of verbs that caregivers spontaneously said in each condition. Caregivers' verbs closely aligned with infants' actions. Caregivers said more whole-body verbs like "come" and "bring" when infants played with locomotor toys ( $M = 11.57$ ,  $SD = 8.05$ ) compared to infants' play with manual toys ( $M = 3.37$ ,  $SD = 3.20$ ). Likewise, caregivers said more manual verbs like "stack", "press" and "open" when infants played with manual toys ( $M = 17.33$ ,  $SD = 12.38$ ) compared to infants' play with locomotor toys ( $M = 9.73$ ,  $SD = 10.08$ ). A repeated measures ANOVA confirmed an interaction between verb type and toy condition  $F(1, 29) = 85.95$ ,  $p < .001$ . Our findings constitute the first experimental evidence that infants' motor actions have immediate consequences for their real-time language learning experiences.

### Profound Effect of Single Residue Mutations on CTCF Binding to DNA: Insights from Molecular Dynamics Simulations

Albert Mao, *Biochemistry*; Carrie Chen, *Biochemistry*

Sponsor: Professor Tamar Schlick, *Chemistry*

In humans and other eukaryotes, DNA is condensed into chromatin fibers that are further wound into chromosomes. This organization allows regulatory elements in the genome that are often distant from each other in linear DNA to interact and facilitate gene expression through regions known as topologically associating domains (TADs). CCCTC-binding factor (CTCF) is one of

the major components of TAD formation and is responsible for stopping its partner protein, cohesin, at the correct locations to prevent improper gene expression within TADs. As such, single residue CTCF mutations have recently been linked to the development of a variety of cancers in humans. To better understand how these mutations affect CTCF structure and its interaction with DNA, we perform all-atom molecular dynamics simulations of a CTCF-DNA complex with wild-type protein and eight different CTCF mutants. We find that whereas the DNA structure remains very stable upon CTCF mutation, CTCF's tertiary structure is profoundly affected by the mutation. In particular, CTCF mutants lose the protein's characteristic coil shape and exhibit changes in binding affinity and binding specificity. Interestingly, mutations in certain fingers direct the unbinding of other fingers, explaining why mere single mutations can critically impair CTCF function. These results shed mechanistic insight into experimental observations and further underscore CTCF's importance in chromatin architecture regulation and gene expression.

### A 3D DNA Crystal pH Sensor

Tiffany Markus, *Chemistry*

Sponsor: Professor Yoel Ohayon, *Chemistry*

DNA is often defined by Watson and Crick's model for double helical DNA as a result of A-T and G-C base pairing and is known for its biological purposes. However, manipulation of base pairing of single stranded, branched DNA molecules can result in the 3D self-assembly of target, complex structures from sticky-end interactions as demonstrated with the tensegrity triangle motif<sup>8</sup>. Here my project modifies an asymmetric two-turn-per-edge tensegrity triangle with the addition of an i-motif on the central strand. The formation of the i-motif under acidic conditions leads to a color change in the crystals between pH 8 to pH 5.

### The Dark Duo of Colonial Ideologies: US Americans and the Puerto Rican Status Dilemma

Diego A. Martínez Ortiz, *Psychology*

Sponsors: Eduardo Rivera Pichardo, *Psychology*;

Professor Eric Knowles, *Psychology*

Among Puerto Ricans, support for statehood has been linked to colonial mentality and system justification. However, no research has explored this question from the US American side of the debate. We analyze the role of the dual colonial ideologies of historical recognition vs. negation (of colonial injustices) and symbolic projection vs. exclusion (of the colonial subjects) in explaining support for Puerto Rico's statehood. We conducted Latent Profile Analyses of a Prolific online sample of US Americans (Total N = 615), uncovering two distinct ideological groups supporting Puerto Rico's Statehood:

a) the “pro-egalitarian” group, committed to culturally symbolic and material-based issues and b) the “neo-colonial” group, concerned with symbolic issues and opposed to material-based ones. Furthermore, looking at US partisan differences among our participants suggested that the “neo-colonial” group emerged only among Democratic-leaning people in our sample. When inspecting our Democratic-leaning (subsample N = 406), our experiment also explored the effects of US partisan framing on support for statehood and self-determination for Puerto Rico. Results revealed a main effect of partisan framing, showing that support for Puerto Rico statehood (and for self-determination) was dependent on the partisan make-up of Puerto Rico among both the “pro-egalitarian” group and “neo-colonial” group. Similar effects were found when inspecting differences for Republican and Democratic-leaning people. Overall results revealed that US partisan instrumentalization and symbolic cultural efforts and strategic, not egalitarian, concerns or commitments to decolonization underlie support for Puerto Rico statehood among some US Americans.

### **Automated Newborn Skull-Stripping Using a Convolutional Neural Network (CNN)**

*Clarissa Marwali, Psychology*

*Sponsors: Professor Moriah Thomason, NYU School of Medicine, Child and Adolescent Psychiatry; Amyn Majbri, NYU School of Medicine, Child and Adolescent Psychiatry; Dr. Lanxin Ji, NYU School of Medicine, Child and Adolescent Psychiatry*

Magnetic resonance imaging (MRI) is a powerful tool that has allowed researchers to study neonatal neuro-development. Image segmentation allows for the separation of the brain from the surrounding tissue (skull-stripping) which can be a time-consuming process when performed manually. Automated skull-stripping tools exist for the adult brain but perform poorly on newborn images due to fundamental differences between newborn and adult brains (Weisenfield and Warfield, 2009). Therefore, manually-drawn masks are necessary for newborn image segmentation. Convolutional neural networks (CNN) are typically utilized in image-oriented supervised learning. Previous researchers have successfully trained CNNs to segment infant and fetal MRI images (Rutherford et al., 2021; Zhang, Li et al., 2015). We divided our library of 20 manual masks and padded T1-weighted images (256 x 256 x 200) into training (n=13), testing (n=4)



and validation ( $n=3$ ) datasets which allowed the training and evaluation of our model. Performance was measured using Sørensen–Dice coefficients, a measure of the similarity of two samples, i.e., how closely the automatically generated masks matched the manually drawn masks. After 3000 iterations, the model achieved a Dice coefficient of 0.9638. The model performed well given the limited set of training data for reasonable masks to be generated in under one second each. As more training data becomes available, we predict that our model will become generalizable and more robust to noise. Our model is significant to the neuroimaging field as it optimizes skull-stripping and the efficiency of fMRI image analysis.

### **Loss of Kmt2d in Ptch1 Mouse Model of SHH-MB Promotes Tumorigenesis**

*Hector Medrano, Neural Science*

*Sponsors: Reeti Sanghrajka, Memorial Sloan Kettering Cancer Center; Dr. Alexandra Joyner, Memorial Sloan Kettering Cancer Center*

Medulloblastoma (MB) is the most common malignant posterior fossa tumor in children and the second most common of all pediatric central nervous system cancers (Dhall, 2009). Although there are several therapeutic approaches to treating MB, each approach contributes to an overall poor quality of life post-treatment (Castellino et al., 2014). Histological classifications of MB, coupled with advances in transcriptional profiling, DNA copy number changes and epigenetic analyses, have divided MB into four groups: WNT-activated, SHH-activated, Group 3 and Group 4 (Cavalli et al., 2018). We are particularly interested in the SHH subgroup of MB (SHH-MB), which accounts for an estimated 30% of all MB cases and is characterized by a loss of function of PTCH1 or SUFU, gain of function of SMO, or TP53 mutations. Past work in the Joyner Laboratory has shown that primary mutations can be insufficient in promoting enough tumorigenesis to form invasive tumors in our animals. To further investigate the role of secondary mutations in tumor formation, we have looked at mutations in Ptch1 in conjunction with mutations in the gene Kmt2d, one of the top ten most frequently mutated genes in SHH-MB (Kawauchi et al., 2012). We used the MASTR model for the deletion of floxed alleles and expression of GFP in mutant cells, generating our wildtype (Ptch1f/f), heterozygous (Ptch1f/f, Kmt2df/-) and homozygous (Ptch1f/f, Kmt2df/f) animals. Upon comparing the animal survival across all genotypes, we found heterozygous and homozygous animals have decreased survival. We also saw that more heterozygous and homozygous animals illustrate anterior vermis area lesions, white matter invasion, brainstem invasion and spinal cord metastasis. These results suggest that loss of Kmt2d in the Ptch1 model of SHH-MB promotes in-

creased tumorigenesis and highlights the potential role secondary mutations may be playing in tumor formation.

### **The Path to Self-Knowledge: Effects of Mindfulness on Choice Blindness1**

*Anjali Ami Ashish Mehta, Philosophy*

*Sponsors: Professor Joshua Aronson, Steinhardt School of Culture, Education and Human Development, Applied Psychology; Dr. Barry Cohen, Steinhardt School of Culture, Education and Human Development, Applied Psychology*

We make choices every day. However, research suggests that not only are we not always aware of our choices, but we will also endorse choices we never made, referring to the concept of choice blindness (Johansson et al., 2005). Eyewitness identification decisions are only one real-life implication of this phenomenon (Sagana et al., 2014); other studies have shown that even moral decision-making, political attitudes, financial decision-making, consumer preferences and more (Merckelbach et al., 2011; Hall et al., 2012) can be affected by our failure to detect mismatches between intended choices and resulting outcomes. Choice blindness refers to the inability to detect discrepancies between decisions and their outcome and to justify choices that were never made (Johansson et al., 2005). A growing body of literature suggests that mindfulness boosts awareness, working memory, executive function (Jha et al., 2007; Tang et al., 2007; Moore et al., 2012) and, over time, can strengthen neural pathways of attention (Fox et al., 2014). Can mindfulness reduce choice blindness? Self-insight is an additional benefit of mindfulness (Nykliček et al., 2020), yet choice blindness remains an untested effect and target for mindfulness. Mindfulness exercises involve monitoring thoughts, which logically should make one less likely to misremember choices. The proposed study asks: do regular meditators detect more mismatches in the choice blindness paradigm than non-meditators or occasional meditators? We hypothesize that regular meditators will be more accurate in detecting mismatches in intended choice and outcome in a choice blindness task as compared to both non-meditators and occasional meditators.

### **Knowing the Other Side: Investigating the Effects of Non-Political Similarity Priming on Partisans' Perceptions of Opposing Partisans' Political Attitudes**

*MeiLiu Merchant, Psychology*

*Sponsors: Professor Eric Knowles, Psychology; Mao Mogami, Psychology*

US society is characterized by its increasing political polarization, which raises the question of whether Democrats actually understand Republicans' beliefs and vice versa. Past studies using the Truth and Bias Model found that partisans judge opposing partisans' political

attitudes using counter-projections, leading to inaccurate perceptions. That is, they project the opposite of their or their own party's views onto out-party members because they assume opposing partisans are dissimilar to themselves. Extending this work, I investigate whether priming non-political similarities between partisans can lead to increased accuracy in judgments of opposing partisans' political attitudes via less use of counter-projections. I first ran two pilot studies to test similarity priming tasks. In the first pilot, Democrats and Republicans were randomly assigned to either: 1) Similar Condition where participants wrote all the ways they might be similar to opposing partisans, or 2) Control Condition where participants described their typical day. Those in the Similar Condition tended to report higher perceptions of similarity to their opposing partisans than those in the Control Condition. In the second pilot, I modified the task to increase participant's engagement. Participants were asked to click on a checklist before they elaborated on similar areas (or typical tasks). As expected, the Similar Condition led to higher perceptions of similarity. Next, I will conduct a main study with the manipulation from the second pilot. Democrats and Republicans will be asked about their attitudes on a variety of political and social topics as well as what they think are the average Democratic and Republican voter's attitudes. I will test if those in the Similar Condition are more accurate in judging opposing partisans' political attitudes via less counter-projections caused by increased perceptions of similarity among partisans. This project has implications for our society which is severely divided along the political line.

### **The NSP14/NSP10 RNA Repair Complex as a Pan-Coronavirus Therapeutic Target**

*Bearach Miwatani-Minter, Biochemistry*

*Sponsor: Professor Michele Pagano, NYU School of Medicine, Biochemistry and Molecular Pharmacology*

Even with the development of new vaccines to combat SARS-CoV-2, the ongoing pandemic remains at large. Additionally, the risk of future coronaviruses demands the development of novel pan-coronavirus antivirals. Remdesivir is an FDA approved chain-terminating ribonucleoside analog. Remdesivir is incorporated into RNA viral genomes during viral replication and subsequently inhibits further RNA replication. Coronaviruses such as SARS-CoV-2 encode the NSP14-NSP10 proofreading exonuclease complex, which efficiently excises incorporated ribonucleoside analogues like Remdesivir. This proofreading exonuclease complex greatly reduces the efficacy of conventional nucleotide analog antivirals. Using a novel assay designed to measure the activity of the NSP14-NSP10 complex and an in-silico model-based screening, here we identify various drug-like candidates that inhibit the activity of SARS-CoV-2, SARS-CoV and

MERS-CoV purified NSP14-NSP10 in vitro. After subsequent counter-screening, our lead compounds synergistically enhance the antiviral effect of Remdesivir, resulting in reduced viral replication when compared to Remdesivir alone. This study serves as a proof of principle for NSP14-NSP10 as a therapeutic target against Coronaviruses.

### **Modeling Stage-Specified Propagation of Bias with COMPAS Data**

*Serene Mo, Computer Science, Mathematics*

*Sponsor: Professor Daniel Neill, Computer Science*

The general goal of the NSF-funded project, "End to End Fairness for Algorithm in the Loop Decision Making in the Public Sector" (PI: Prof. Daniel B. Neill) is to develop tools that assist public sector organizations with fair and equitable targeting of interventions. We identify potential risks underneath the algorithmic decision-making process that, if not carefully addressed, could cause significant societal harms. We study the emergence, aggregation, transformation and correction of potential biases existing in the system by implementing the propagation of bias in a stage-specified pipeline. For this thesis, I implemented a software framework for the end-to-end fairness pipeline, using actual judicial data and automated risk assessments from the COMPAS/ProPublica dataset, and performed simulated experiments of bias injection and detection in the data and prediction stages. This work contributes to the empirical discussion of differential sampling bias that could be injected during the pipeline involving different categories of predictive models utilized. We successfully deliver the realization of the proposed pipeline model and the comparison among results gained from bias injection and prediction simulations. We show that the empirical relationship between the amount of predicted and injected bias corresponds well to the theoretical relationship developed in previous work (Ravishankar, Mo et al., 2022), and we quantify the necessary amount of data bias for bias scan to identify the injected bias during the prediction stage.

### **Racial Representation in Children's Media**

*Megan Moran, Psychology*

*Sponsors: Professor Marjorie Rhodes, Psychology; Dr. Michael Rizzo, Psychology*

American media has a deep history of underrepresenting and misrepresenting characters of color, and these skewed representations may be present in children's media as well. Children watch television shows and movies regularly, though little is known about the effect that children's media has on racial bias. This study identified how characters of color are portrayed in children's media by examining the overall racial representation in 7 popular children's television shows and movies, the racial representation of high-status characters and how these com-

pare to the 2021 United States Census data. We hypothesized that characters of color will be underrepresented in comparison with the US population and will also be underrepresented as “High Status” when compared to the relative racial population within each media. We found significant deviations from the US census across all programs; each show and movie differing uniquely in their over and underrepresentation of certain races. Latinx and Asian characters were most consistently underrepresented, though not in every program. Non-white characters were significantly underrepresented as high status in 4 of 7 total programs. These results indicate that characters of color are often misrepresented by race and in high status positions within children’s television shows and movies. These findings are consequential because racially biased representations in media may contribute to racial biases in young children and call for further research on this topic.

### **Analyzing the Effect of Varying the Breadth of Background Corpora on the Performance of Terminology Extraction Systems**

*Sean Nordquist, Computer Science, Economics  
Sponsor: Professor Adam Meyers, Computer Science*

Terminology extraction is an extremely important problem with a variety of applications. We use terminology extraction systems to generate glossaries, find the most important words from a legal document and find trends in novel technologies from patents. While terminology extraction systems vary in their internal mechanisms, systems usually use a statistical approach which compares words and phrases in the body of text from which you intend to glean terms to another comparison body of text. These are called the foreground corpus and background corpus respectively. The statistic generated asks how frequently the word or phrase observed in the foreground corpus appears in the background corpus, and using the comparison of the frequencies, we can determine a score of how important that word or phrase is to the foreground corpus. In this project, we used patent grants over several topics to investigate how the quality and characteristics of the terminology changed across several background corpuses with different degrees of generality. With this information, we are able to propose new ways to choose and select optimal background corpuses to maximize performance of terminology extraction systems.

### **Exploring the Use of Convolutional Neural Networks in order to Characterize Larval Behavior**

*Amajindi Nwankpa, Neural Science  
Sponsor: Professor Marc Gershow, Physics*

We recently developed a tracking microscope that can record neural activity of freely behaving *Drosophila* larvae. However, relating activity and behavior has been complicated by the difficulty of analyzing video

recordings of larvae crawling underneath the tracking microscope. Because of the geometry and nature of the microscope, these recordings have low contrast, uneven backgrounds, bright artifacts and other features that complicate traditional thresholding-based approaches to determining larval posture. To overcome these challenges, we adapted a convolutional neural network developed to characterize the behavior of adult flies to determine the postures of larvae in the tracking microscope. We found that the network could find key points on the larva’s body and that high accuracy could be achieved with small amounts of manual training for each larva. We used this system to detect body bending, a key element of the larva’s navigational algorithm. Finally, we developed an automated analysis protocol to detect errors made by the network and flag these for manual labeling, decreasing the time it takes to train the network and increasing the overall accuracy of the final labeling.

### **The Role of Cardiolipin in Murine Heart Development**

*Melissa Olivar-Villanueva, Neural Science  
Sponsor: Professor Colin Phoon, NYU School of Medicine, Cardiology*

Mitochondria are the main energy-producing organelles in our bodies. Proper mitochondrial functioning requires a class of phospholipids called cardiolipins. Cardiolipin deficiency underlies Barth syndrome, a rare mitochondrial disorder caused by mutations in TAFAZZIN, the enzyme involved in remodeling nascent cardiolipin to its final mature form. Given the high energy demand of the heart, impairments in TAFAZZIN result in cardiomyopathy, or heart muscle weakness. Knocking out TAFAZZIN in mice results in a similar phenotype. Other mouse models of cardiolipin deficiency include knocking out cardiolipin synthase (CRLS1)—the enzyme involved in the final step of cardiolipin synthesis. To further elucidate the role of cardiolipin in heart development, we generated conditional, heart-specific CRLS1-knockout mouse models using two different cre-drivers to delete CRLS1 at different timepoints. Heart-specific knockout of CRLS1 using a TNNT1-cre driver permitted mouse embryos to survive through to embryonic day (E)16.5. Histology suggested abnormal development of the muscular layer of the left cardiac pumping chamber (left ventricular noncompaction), a known clinical feature of patients with Barth syndrome. Heart-specific knockout of CRLS1 using a MYH6-cre driver allowed survival through to postnatal day (P)16.5. Echocardiography of these CRLS1-knockout hearts showed enlarged hearts with function/contractility greatly reduced. Mass spectrometry confirmed cardiolipin deficiency in both CRLS1(TNNT-cre)-knockout and CRLS1(MYH6-cre)-knockout hearts. Overall, our results ablating CRLS1 at different timepoints in the develop-

ing mouse heart point to a necessary role of cardiolipin in both embryonic and postnatal myocardial development and maturation. Further lipidomic, proteomic and metabolomic time-series analyses will allow us to determine the immediate consequences on other lipids, proteins and metabolites of cardiolipin deficiency and increase our understanding of human Barth syndrome.

### **How Similar is Similar Enough? An Intersectional Approach to Examining Women's Role Model Acceptance**

*Anna Park, English and American Literature, Psychology*

*Sponsor: Professor Madeline Heilman, Psychology*

In this study, we consider the role of perceived similarity (full versus partial similarity) in white and Asian women's choice of role models on the dimensions of race and gender. We predicted that all participants would prefer fully matched role models in terms of gender and race. Moreover, we also hypothesized that Asian women would prefer race-matched role models over gender-matched role models, while white women would prefer gender-matched role models over race-matched role models. We presented research participants with four fictional LinkedIn profiles representing each of our experimental conditions. Female participants were asked to evaluate each profile on measures of level of inspiration/motivation, role model acceptance, perceived similarity and perceived competence. We found that both white and Asian participants rated and ranked women role models as higher on the measures than male role models, regardless of their race, showing a preference for a match on gender over a match on race. Additionally, Asian women ranked Asian male role models higher over white male role models, suggesting that Asian participants preferred a match on race when they were not prioritizing gender. White participants had no preference between white and Asian role models. Our findings support the importance of gender similarity for white women in their acceptance of role models but reveal that the criteria for role model acceptance may be more nuanced for Asian women.

### **Role of Perceptual Feedback in Learning the Designed Actions of Everyday Objects**

*Shivani Parulekar, Individualized Major*

*Sponsors: Professor Karen Adolph, Psychology; Brianna Kaplan, Psychology*

Learning the designed actions of common artifacts is integral to navigating daily life. However, many everyday objects entail "hidden" affordances, where the designed action is not obvious. For adults, twisting open a bottle is second nature. But from visual information alone, it is not obvious that the user must stabilize the bottle in

one hand while using the other hand to repeatedly twist the lid to the left. Prior work with twist-off containers showed that toddler-aged children repeatedly twist back and forth instead of continuously to the left (Rachwani, et al., 2020). Here, we encouraged 72 20- to 60-month-old children to open two containers that provided perceptual feedback (lids that twisted and opened normally or lids that twisted endlessly but never opened) and one container that did not provide perceptual feedback (lids did not twist). To test the generalizability of children's knowledge, half of the children received containers that twisted conventionally to the left, and the other half received containers that twisted to the right. Preliminary results from 29 children show that both older and younger children successfully opened the left-twist container ( $M = 82\%$ ), but only older children successfully opened the unconventional right-twist container ( $M = 53\%$ ). Children persisted longer with twistable lids than with stuck lids,  $t(27) = 2.21$ ,  $p = .04$ , and quickly switched to alternative strategies (e.g., banging) with stuck lids. Findings suggest that older children can use perceptual feedback from the direction the lid twists in to overcome the typical "lefty-loosey, righty-tighty" rule.

### **Do Egalitarians Judge the Same Actions Differently Based on Social Identities of Actors?**

*Kainaz Jamshyd Patravala, Psychology, Public Policy*

*Sponsors: Professor Eric Knowles, Psychology; Mao Mogami, Psychology*

Literature suggests variability among individuals in considering social identities of actors when judging their behavior. This project seeks to further understand this premise—particularly the extent to which people differentiate reactions to the same action when the actor is racially advantaged (vs. disadvantaged). For instance, do people think about a flier for an exclusive Career Day event for white people in the same way as the one for people of color? It is likely that, to varying degrees, people will consider the social status of a person vis-a-vis a given identity dimension when judging the acceptability of these types of actions. I predict that individual differences in egalitarianism (as measured by the SDO scale, Ho et al., 2015) will predict responses to such scenarios. A total of 220 Prolific participants were recruited to test this idea. Participants first completed an SDO questionnaire. Then, they were randomly assigned to 9 out of 18 scenarios in which the identity of actors was manipulated (advantaged vs. disadvantaged) and indicated their responses to the action depicted. Overall, people thought the same action was less acceptable when carried out by an advantaged (vs. disadvantaged) actor. Importantly, and consistent with the prediction, this judgment was more pronounced for those who are more egalitarian than those who are

less egalitarian. These effects remain even after adjusting for gender, race (white vs. POC), SES and age. This may have implications for opportunities and evaluations people receive based on their social identity—both in terms of economic prosperity and healthcare access.

### **Assessing Androgen Levels in People with Polycystic Ovary Syndrome (PCOS) with Varying Exposures to Bisphenol A: A Systematic Review of Literature**

*Cara Peddle, International Relations, Journalism*

*Sponsors: Dr. Frederick Naftolin, e-Bio Corp., New York, NY; Professor Alan Arslan, NYU School of Medicine, Obstetrics and Gynecology*

Polycystic ovary syndrome (PCOS) is a disorder of the female reproductive system characterized by excess androgens, irregular menstruation and/or small cysts on the ovaries. Various evidence demonstrates the possibility of environmental influences on the development of PCOS, especially by industrial chemicals and other endocrine-disrupting chemicals (EDCs). Bisphenol A (BPA) is an EDC found in polycarbonate plastics and epoxy resins and has the ability to disrupt homeostatic systems by acting as a selective estrogen receptor modulator (SERM) and binding to two estrogen receptor (ER) subtypes,  $\text{eRa}$  and  $\text{ER}\beta$ . The aim of this systematic review was to examine the relationship between hyperandrogenism and levels of BPA present in people with PCOS, while assessing the role of BPA's antagonistic actions with ERs and its inhibiting effects on aromatization of androgens to estrogens in the ovary. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used to organize and conduct the systematic review. An advanced database search resulting in 184 records was narrowed to 11 studies included in the synthesis of data. All included studies demonstrated higher levels of BPA in the PCOS groups than in controls, and each study with measurements of total testosterone (TT), DHEA-S, and androstenedione demonstrated higher concentrations in the PCOS group than in controls. Each study with measurements of sex hormone-binding globulin (SHBG) demonstrated higher concentrations in the control group than in the PCOS group, except for one. All included studies found significant ( $p < 0.05$ ) differences between BPA levels in controls and BPA levels in the PCOS group except for two. Many of the studies found correlations between BPA levels and androgen levels. It is possible that a relationship between BPA and androgen levels exists in people with PCOS, but further studies are needed to confirm.

### **Development of a Cas9 Mediated Approach for Inducing Chromosome Specific Aneuploidy in Tumor Cells Enables a Comparative Phenotypic Study of an Isogenic Aneuploid and Euploid Cell Line**

*Ilan Pesselev, Chemistry; Kareem Mohamed, Chemistry; Roni Faitelson, Biology*

*Sponsor: Professor Teresa Davoli, NYU School of Medicine, Institute for Systems Genetics*

Aneuploidy is the condition of having an abnormal number of chromosomes. While detrimental to normal tissue development, aneuploidy is observed in 90% of solid tumors, suggesting that aneuploidy contributes to the malignant phenotype. Unlike normal tissue cells, tumors exhibit chromosome-specific aneuploidy (CSA), in which certain chromosomes are gained or lost at different frequencies in different cancer types. While these recurrent patterns suggest that CSA is selected for in tumor cells, how these patterns drive cancer growth is still unknown. To gain a better understanding as to which specific genes are involved in the selective advantage of tissue specific cancers, we have developed a system (KaryoCreate) for inducing chromosome-specific missegregation during mitosis, to allow for the generation of isogenic cancer cell lines with and without a particular CSA. KaryoCreate utilizes the DNA specific binding of the novel CRISPR Cas9 system to target and disrupt the centromeric attachments of kinetochore microtubule (kMT) proteins onto chromosomes as a mechanism by which we induce the gain or loss of a specific chromosome within the daughter cells of the mitotic division. With KaryoCreate we have been able to demonstrate its efficacy when used to alter the ploidy of chromosomes 7 and 18 in a diploid cell line of immortalized human colonic epithelial cells (HCEC). Further phenotypic screening including proteomics, RNAseq and growth assays of these cells can enable us to map the metabolic pathways altered by a CSA of interest and form hypotheses about how a CSA may contribute to the selective advantage of these tumor cells. Such studies, which we anticipate performing in our future work, would enable the development of small molecule agonists/antagonists that can be used to regulate the altered metabolic or transcriptional pathways in tumor cells.

### **Children’s Understanding of Status at the Intersection of Gender and Race**

*Clara Plutzer, Cinema Studies, Psychology*

*Sponsors: Professor Andrei Cimpian, Psychology; Dr. Jillian Lauer, Psychology*

Status is used as a cue to indicate social power, achievement, intelligence and overall success in a wide range of fields. Research has investigated how children perceive status from a one-dimensional perspective (e.g., looking at gender or race as separate factors), but little is known about whether the intersection of gender and racial

group membership affects who children perceive to be of high and low status. This will allow us to better understand how racial and gender stereotypes develop. Here, we investigated whether children's age, gender and race influences who they perceive to be high and low status. We presented children (ages 5–12) with a novel ladder task in which they categorized neutral faces of adults as high status (at the top of the ladder) or low status (at the bottom). We found a three-way interaction between gender and racial group. Specifically, young children rated Asian women as highest in status, followed by white women and lastly Black women. However, they rated white men higher than both Black and Asian men, indicating that both gender and race are important factors when thinking about status. This finding suggests that both gender and race have intersecting effects on who children perceive to be high versus low status. Understanding how children think about status may influence gender and racial differences in achievement in high and low status fields, as well as the development of gender and racial stereotypes.

### **Status and Perceptions of Group Interactions**

*Quincey Pyatt, Psychology*

*Sponsor: Professor Tessa West, Psychology*

Past research has shown that people with high socioeconomic status (SES) perceive the world around them, and the people in it, differently than those lower in SES do. However, little research has been done to examine the effects of SES on individuals' perceptions of social interactions. In this study, I investigate whether SES predicts how much group members agree in their perception of conflict in a group decision-making task. To test this, 885 participants recruited from Prolific Academic were randomly placed within triads in online chat rooms and were asked to complete a collaborative task. After the task was completed, each participant responded on a scale from 1 (strongly disagree) to 7 (strongly agree) to four statements designed to measure the level of conflict they perceived in their triad during the task. For each participant, a composite "perceived conflict" score was calculated by averaging their responses to these four questions, and the level of disagreement between triad members was determined by calculating the absolute values of the difference between each participant's composite score and each of their partners' composite scores. The Actor Partner Interdependence Model (APIM) was then run to determine the relationship between SES and a participant's disagreement with their interaction partners. I found a main effect of participant's SES and a main effect of their partner's SES. Participants with high SES disagreed more with their partners than those with low SES, and participants with high SES partners also disagreed more with their partners than those with low SES partners.

### **Variability of Visual Areas hV4, VO1 and VO2 in a Large Sample of Humans**

*Brenda Qiu, Psychology*

*Sponsor: Professor Jonathan Winawer, Psychology*

About a quarter of the human cerebral cortex is dedicated to vision (Van Essen, 2003), underscoring the importance and complexity of visual function. These regions are mostly organized into multiple retinotopic maps. Retinotopy is the mapping of images on the retina to neurons in the visual cortex. To understand how visual information is processed and represented in the human visual cortex, we need to know how the many retinotopic maps are organized (DeYoe et al., 1994; Engel et al., 1994; Sereno et al., 1995; Wandell et al., 2007). While researchers have identified more than 20 retinotopic maps, only a small fraction of them, namely V1, V2 and V3, have been hand-labeled with high consistency across raters (Benson et al., 2021, bioRxiv: <https://doi.org/10.1101/2020.12.30.424856>). Maps beyond V1–V3 lack hand-labeled boundaries. In this project, a team of trained students manually labeled hV4, VO1 and VO2 visual areas from 60 subjects in the Human Connectome Project Retinotopy Dataset. Most of the subjects in this dataset belong to twin pairs (either monozygotic or dizygotic). This study has found that: (1) raters are substantially more consistent with labeling visual areas in the left hemisphere than with the right hemisphere and (2) twins appear to have more similar visual area boundaries than non-twins, but a larger sample is needed to assess significance. These findings, together with the hand-labeled contours, will be used to train machine-learning algorithms to label retinotopic boundaries automatically.

### **Narcissism and Pride: How Praise Informs Pride Ratings**

*Jess Qiu, Psychology*

*Sponsor: Professor Lawrence Ian Reed, Psychology*

There have been few empirical studies regarding the emotional mechanisms of psychological personality disorders, particularly those of Narcissistic Personality Disorder. We aim to fill this gap by investigating how individuals with varying trait narcissism experience authentic and hubristic pride in relation to praise. We presented participants with the 40-item Narcissistic Personality Inventory (NPI), instructed them to complete a difficult word search task and measured their performance. Regardless of their performance, participants were then given low or high praise and assessed with the Authentic and Hubristic Pride Scales (AHPS) to measure both their senses of pride. We hypothesized that those high in trait narcissism were more likely to report higher ratings of both authentic and hubristic pride when presented with high praise after completing a task, regardless of how well they actually performed on said task. Overall, we did not find a

significant relationship for the NPI and praise interaction on either type of pride, but we did find a significant effect for the NPI and performance interaction on hubristic pride. While our conclusions do not support our original hypothesis that praise influences how pride develops in more narcissistic individuals, they do show preliminary support for the influence of performance on pride in said populations. This research could lead to a deeper clinical understanding of patients with NPD and could help improve therapeutic alliances with patients with narcissistic traits.

### **Chemical-Genetic Analysis of Non-Genetic Heterogeneity in *Saccharomyces cerevisiae***

*Diego Antonio Quintana Licona, Chemistry, Gender and Sexuality Studies*

*Sponsors: Professor Mark Siegal, Biology;  
Dr. Eugene Plavskin, Biology*

Non-genetic heterogeneity refers to the variability in the response of genetically identical cells to the same conditions. Previous research showed that the conserved Ras/cAMP/Protein Kinase A (PKA) pathway generates non-genetic heterogeneity in growth rate and stress tolerance of the budding yeast *Saccharomyces cerevisiae*. To develop a system for monitoring growth and stress tolerance while precisely manipulating PKA activity, a high-throughput live imaging method was adapted to use analog sensitive (AS) technology—a chemical-genetic

approach to finely regulate kinase activity. This project was subdivided into three phases: (1) experiments testing the relationship between PKA activity and non-genetic heterogeneity of cell growth, (2) experiments testing the alleged fine-tuning regulation capabilities of AS kinase technology and (3) experiments testing the relationship of PKA activity with non-genetic heterogeneity of stress tolerance after acute heat shock. The first set of experiments used three different concentrations of the analog inhibitor 1NM-PP1 in combination with four different analog-sensitive *S. cerevisiae* mutant strains. Tpk1/2/3-as—the mutant strain with the AS version of yeast's PKA homolog—had the most prominent inhibition, indicating that PKA activity plays a unique role in the modulation of non-genetic heterogeneity of cell growth. The second phase of experiments tested Tpk1/2/3-as under different concentrations of 1NM-PP1 that deviated by as little as ~0.07 μM, and the results were consistent with the expectations. Lastly, the third set of experiments incorporated two growth rate phases separated by an acute heat shock phase, allowing measurement of post-heat shock survival. This experiment demonstrated that PKA activity plays a modulating role in the non-genetic heterogeneity of stress response. Yet, the trend for the relationship of proportion of cell survival after heat shock and analog concentration does not follow a linear relationship as it does before heat shock, hinting at the need for further experimentation.



## **Cerebellar Cortical AC Stimulation Alters Purkinje Cell Activity**

*Ramia Rahman, Neural Science*

*Sponsors: Professor Eric Lang, NYU School of Medicine, Neuroscience and Physiology; Dr. Billur Avlar, NYU School of Medicine, Neuroscience Institute*

Cerebellar transcranial electrical stimulation may serve as a useful rehabilitative therapeutic for individuals with Traumatic Brain Injury (TBI) or neurological damage due to other causes. A number of clinical studies suggest that cerebellar stimulation can improve learning, making it a promising tool for facilitating neural repair. However, results across studies are inconsistent, and little is understood about how electrical stimulation affects cerebellar activity to allow for these rehabilitative effects. Stimulation alters Purkinje cell (PC) activity in the cerebellar cortex, which could alter local function, but also would indirectly drive cerebellar nuclei (CN) activity, the output of the cerebellum and thus alter non-cerebellar brain activity. Thus, there are multiple mechanisms by which cerebellar stimulation may act. Here, we aim to clarify changes to PC activity by stimulating the cerebellar cortex and recording extracellularly from anesthetized rats. Previous research has shown that PC Simple Spikes (SS) modulate with stimulation in an in vitro preparation that allowed for a uniform electric field to be present throughout the unfolded turtle cerebellum. In this thesis, we determined how SS modulate with stimulation in a folded, mammalian (rat) brain, where stimulation induces a non-uniform electric field. Secondly, we investigated changes to PC Complex Spike (CS) activity induced by AC stimulation and found consistent changes in CS waveform that are due to both changes in spikelet number and amplitude. The changes in CS waveform may provide a mechanism for the therapeutic effect of cerebellar stimulation, as differences in spikelet number, in particular, affect the plasticity induced by CS activity. In sum, these findings further our understanding of cerebellar stimulation and how it may be optimized in clinical use to alter cerebellar activity for rehabilitation.

## **How do Infants Learn Adjectives? Caregivers Describe the Objects of Infants' Play**

*Anabelle Rampersaud, Psychology*

*Sponsor: Professor Karen Adolph, Psychology*

How do infants learn language? Infants can only learn the words they hear from other speakers. Previous work shows that caregivers' words frequently correspond to infants' moment-to-moment behaviors. Specifically, caregivers' nouns and verbs correspond to infants' actions with objects (e.g., "block" or "stack" as infant stacks blocks). Here, we investigated whether caregivers' adjective use also corresponds to infants' actions with objects. As a case study for adjectives, we documented whether

caregivers' color words correspond to infants' actions with objects. For example, do caregivers say "red" as infants play with a firetruck, or "orange" as infants eat a Cheeto? We collected 2-hour-long recordings of 53 caregiver-infant dyads during natural activity at home (20 13-month-olds, 16 18-month-olds and 16 23-month-olds). We transcribed every color word caregivers said. During the 3 seconds surrounding each color word, we scored the colors of the object's infants touched. Findings show that 40% of caregivers' chromatic color words mapped onto the objects of infants' play, and infants were 3.9 times more likely to be touching the corresponding color than any other color. Next, we will document the temporal ordering of caregivers' utterances relative to infants' object play. That is, we will code whether caregivers' color words commented on infants' ongoing actions, or whether caregivers' color words prompted infants to touch the corresponding color. Ultimately, the correspondence between infants' actions and caregivers' language likely facilitates word learning. Documenting the contexts in which infants hear color words will contribute to researchers' understanding of how infants learn adjectives.

## **Affective Responses to Music in Relation to Depression**

*Jinge Ren, Data Science, Psychology*

*Sponsor: Professor Pascal Wallisch, Data Science, Psychology*

What are musical experiences like in depression? Do people enjoy music less or more, and do they experience music in a different affective way? Anhedonia, characterized as a loss of interest in everyday activities, is a common symptom of depression. Counter-intuitively, a recent study found that people with depression enjoy music no less than those without it. Moreover, although previous research has demonstrated that people with depression have an impaired function in emotion recognition using both visual and auditory stimuli, little study has been done to probe emotion induction in depression. The present study explored such an experience by 1) showing participants 400 5-second music clips, collecting their ratings and affective responses to the music, and 2) measuring participants' level of depression using the Beck Depression Inventory (BDI). Results showed no difference in overall music rating among people with different depression levels. However, depression does associate with distinct patterns of affective responses to music.

## **Dynamics of Ice Cylinders Floating in Water**

*Jayda Robison, Environmental Studies, Physics*

*Sponsor: Professor Leif Ristroph, Mathematics*

Field observation has captured moments of floating icebergs "flipping" and exposing their undersides. This is due to a higher heat conductance of water than air, causing

the submerged portion of the iceberg to melt more quickly than the above-water portion and distorting its shape. The changing shape often becomes gravitationally and inertially unstable and then flips to a stable configuration. This study sought to observe ice flipping phenomena on a smaller and more controlled scale, looking for properties of the shape before the ice flips and determining how often the ice flips. We conducted experiments with cylindrical ice of an approximately 3-inch diameter and 6-inch length in room temperature water, capturing videos of the melting process and creating simulations to compare to the experiments. We found that, in these conditions, the cylinders consistently evolve to have a hexagonal face and flip approximately 8 times before melting completely. Further research will be focused on how these phenomena change with different sizes of cylinders, different ambient temperatures and different water salinity.

### Racial Bias in Children's Understanding of Others' Mental States

Ava Rooney, Psychology

Sponsor: Professor Marjorie Rhodes, Psychology

Children's capacity to understand the thoughts and mental states of others—their “Theory of Mind” (ToM)—plays a critical role in how they interact with people in their daily lives. To assess ToM, researchers developed a series of assessments known as the Theory of Mind Scale (Wellman and Liu, 2004). These assessments evaluate children's understanding of desires, emotions, knowledge and beliefs. Children develop the ability to pass the assessments as they age. It has been documented that group membership can impact children's ToM development. A prior study conducted by McLoughlin and Over (2017) demonstrated that children have an easier time assessing the mental states of those with whom they share social group membership. However, no prior studies have examined racial group membership's effect on children's ToM. For this presentation, we will be changing the race of the protagonist in the various ToM tasks to see if racial group membership impacts children's ToM abilities. We hypothesize that children's responses to the ToM assessments will differ based on the race of the characters in the tasks. We will examine potential ingroup biases and majority status biases in children's ToM performances. Additionally, all prior Theory of Mind studies have been conducted in person. The present study was modified for online administration. Therefore, we will also examine whether or not the steps of acquiring Theory of Mind are replicated in an online study.

### The Role of Eukaryotic Initiation Factor 2 Alpha Phosphorylation in Cognitive and Affective Processes

Karen San Agustin Ruiz, Neural Science

Sponsors: Professor Prerana Shrestha, SUNY

Stony Brook, Neurobiology and Behavior;

Dr. Mauricio Oliveira, Neural Science

Emotional impairments have been shown to play a role in multiple diseases such as PTSD, generalized anxiety disorder and neurodevelopmental disorders. These disorders affect many people and present a social and economic burden to society. Therefore, understanding the basis for these disorders has been a longstanding interest in science. Different brain regions, such as the amygdala and the medial prefrontal cortex, have been implicated in these cognitive and affective processes and protein synthesis dysregulation has been suggested as a possible underlying mechanism for their development. However, the role of protein synthesis in neuronal subpopulations in these brain regions has not been extensively studied. As such, we sought out to investigate how protein synthesis in different neuronal subtypes can impact cognitive and affective disorders. This study will focus on three different neuronal subpopulations: somatostatin-expressing inhibitory interneurons, oxytocin receptor-expressing inhibitory interneurons and calcium/calmodulin kinase II (CamK2α) excitatory principal neurons. Specifically, it will focus on the phosphorylation of eukaryotic initiation factor 2α, one of the rates limiting factors in translation. In order to do so, I will be using chemogenetic mouse models, genetic murine models of diseases associated with deficits in affective processes and behavioral assays that will allow me to observe the disease-associated behavioral phenotypes that can arise from dysregulated protein synthesis in these interneuronal sub-types. These results will help increase our understanding of the different cells, brain regions and molecular pathways involved in cognitive and affective processes and can open avenues for more targeted treatments of these disorders.

### Role of P15-1 Hyaluronan Mimetic Peptide in Apoptosis of Human Articular Chondrocytes

Avni Sanghvi, Global Public Health/Biology

Sponsors: Professor Amparo Ruiz, NYU School of Medicine, Radiology; Professor José Raya, NYU School of Medicine, Radiology

Posttraumatic osteoarthritis (PTOA) is a degenerative joint disease that results from injury and impairs mobility. There are no treatments to prevent the progressive destruction of joints once PTOA is established. It is therefore relevant to investigate methods of slowing the progression of PTOA before the disease reaches advanced stages. Injury-induced cell damage leading to programmed cell death (apoptosis) and perpetuation of an unresolved inflammatory response are the first steps in promoting

joint degradation. P15-1 is a hyaluronan mimetic peptide that binds hyaluronan and modulates its role in the inflammatory response. P15-1 shows anti-inflammatory effects in chondrocytes cultured in inflammatory conditions. This project aims to determine whether P15-1 can modulate deleterious effects of an apoptotic environment on human chondrocytes. We treated cells with staurosporine to mimic apoptosis and incubated cells in the presence or absence of P15-1. We evaluated the effects of P15-1 on apoptotic cells by characterizing two markers of apoptosis: AnnexinV labeling and caspase 3/7 activity. We assessed gene expression of known apoptotic, inflammatory and catabolic markers. Treatment of P15-1 reduced the fraction of apoptotic cells in all concentrations of staurosporine treatment. Apoptotic cells displayed higher accumulation of P15-1 relative to non-apoptotic cells. Apoptotic cells exhibit elevated expression of certain markers and treatment of apoptotic cells with P15-1 reduced the elevated expression of these markers. These results indicate that P15-1 protects cells from apoptosis progression and shows potential as an anti-apoptotic agent in human articular chondrocytes.

### **Big Shoes: How Shoe Size Affects Infant Walking**

*Sylvia Saxonian, Psychology*

*Sponsor: Professor Karen Adolph, Psychology*

Infants learn to walk in vastly different physical and cultural environments, full of varying beliefs about what factors aid or impair infants' motor development, down to the clothes on their body and the shoes on their feet. Previous work showed that wearing stiff shoes, bulky diapers and heavy diapers affect the maturity of infants' walking patterns (Cole, Shin et al., 2021; Cole, Lingeman et al., 2012). My research focuses on how wearing shoes that are too big affects infant walking. Infants commonly learn to walk in shoes that are too large, because parents buy their rapidly growing infants' shoes with "room to grow" or give infants hand-me-downs from older siblings. In my first study, 12- to 20-month-old infants wearing shoes in their current size, one size too big and two sizes too big walked repeatedly over a pressure-sensitive carpet that records standard measures of their walking skill, including step length, step width and speed. I also scored functional disruptions of walking (trips, falls, etc.) from video. Surprisingly, preliminary data show that infants are remarkably unaffected by too-large shoes: Measures of walking skill and gait disruptions are similar across the three conditions. To follow up on this unexpected finding, I am running a second sample of children who will walk in shoes that are their current size, three sizes too big and four sizes too big.

### **How Region Level Gender Stereotypes Moderate Children's Views on Gender Stereotypes about Communal and Helpful Behaviors**

*Alessia Seroff, Psychology*

*Sponsors: Sophie Arnold, Psychology; Professor Andrei Cimpian, Psychology*

Even in 2021, the gender disparities in the workforce persist. One factor shown to contribute to this disparity is an expectation that women must take on tasks that are not individually beneficial for them but helpful and useful for others (Babcock et al., 2017). How do these behavioral differences and expectations develop? Previous research conducted with 6- to 14-year-olds found that boys had lower communal values than girls (Block et al., 2018). Despite evidence surrounding the effect of gender stereotypes on children's and adults' helpful behavior, there is little information about how broader cultural stereotypes affect children's own stereotypes. We aim to understand the effect of regional adult gender stereotypes on children's understanding of communal. This project utilized two data sources: adult survey responses from the General Social Survey to measure traditional gender roles on a regional level and experimental data from 190 5- to 8-year-old children to see their endorsement of helping and communal gender stereotypes. We additionally obtained children's regional locations in the US. In general, older children think that girls are more communal than boys (example measure "Who do you think cares more about always being friendly to other people"). We found gender stereotypes about communal persist across regions, regardless of endorsement of traditional gender roles. With respect to helping, girls generally thought that girls would help more than boys while boys thought that children would be equally likely to help. Here, region-level traditional gender role endorsement did relate to children's expectation of whether girls or boys would be more likely to help in moral situations. Our findings suggest that gender stereotypes about communal and helping are consistent across the United States.

### **Involution Property for the Bernoulli-Exponential First Passage Percolation**

*Lingyun Shao, Mathematics*

*Sponsor: Professor Alejandro Ramirez, Universidad Católica de Chile, Facultad de Matemáticas*

We study an involution property of the Bernoulli-exponential first passage percolation model and relate it to the so-called broken line process which appears when one expresses a similar property to the traditional self-passage percolation model.

## **How Psychological Essentialism Shapes the Acquisition and Transmission of Religious Beliefs across Cultural Contexts**

*Cecilia Shi, Psychology*

*Sponsor: Dr. Yian Xu, Psychology*

Social essentialism refers to the belief that categories are defined by certain fundamental natural characteristics. This project aims to explore the associations between the development of essentialist thinking and religious beliefs amongst children across cultural contexts. As previous literature suggested, when comparing children raised in secular environments versus children raised in religious environments, children differed in their ideas about the stability of social membership and the construction of boundaries between animal species: those with a religious background tended to view these categories as more stable and absolute (Diesendruck and Haber, 2009). To test these hypotheses, we collected data from the USA and China: two societies with varying levels of religious diversity as well as different cultural environments. We recruited children in the age range 3 to 5 years old from the United States (online recruitment through PANDA: Princeton and NYU Discoveries in Action) and China (recruitment through a local kindergarten in Ningbo, China). Participants were assessed for patterns in their essentialist and religious beliefs in various tasks. This study has implications for the early development of essentialist thinking in different cultures, especially pertaining to religious beliefs and categorization.

## **Systematic Analysis of Cell-Type Specific Gene Expression for Generating Genetic Tools Labeling Novel Cell Types in the *Drosophila* Visual System**

*Nathalie Shoji, Global Public Health/Biology*

*Sponsor: Professor Claude Desplan, Biology*

Proper function of the nervous system relies on the interaction between diverse cell types in neuronal circuits. The generation of cell-type specific tools provides an important foundation for investigating the functional role of individual neurons in these circuits. In *Drosophila*, the advancement of single-cell RNA sequencing technology and sophisticated genetic toolkits has allowed significant refinement of the genetic tools to only single cell types. Our lab recently established a single-cell transcriptomic atlas for all optic lobe neurons in the developing *Drosophila* visual system and identified around 250 distinct cell types. However, there are around 100 cell types with unknown identity, even though the neurons in *Drosophila* visual system have been extensively characterized anatomically for decades. In this study, I used single-cell transcriptomic datasets and developed a systematic pipeline for analyzing gene expression in each cell type across various developmental stages. I identified 48 pairs of genes which are expressed together in only one or two uncharacterized cell

types. I aim to use these gene pairs to create split-GAL4 drivers, which restrict expression to cells where the two genes of the split-GAL4 regulator are co-expressed. As a proof-of-principle, I will present one split-GAL4 driver that specifically targets an unknown cell type in *Drosophila* optic lobe. This study will provide valuable tools to uncover novel cell types and their functions. In addition, the analysis pipeline can be applied to other transcriptomic data sets in other systems for generating cell-type specific genetic tools.

## **Anti-*Plasmodium* Serology of Asymptomatic *P. falciparum* Infections in Meghalaya, India**

*Jennifer Stolarczuk, Global Public Health/Biology*

*Sponsors: Professor Jane Carlton, Biology;*

*Dr. Anne Kessler, Biology*

Due to the high rates of malaria in India, we hypothesized that human blood samples collected from individuals residing in Meghalaya, India have detectable levels of antibodies to *Plasmodium falciparum* (endemic to the region) and *Plasmodium vivax*. Dried blood spots and plasma samples from asymptomatic individuals who tested positive for *P. falciparum* collected from field sites in Meghalaya, India in 2019 were used. To determine the presence of prior *Plasmodium* infection and antibody longevity, these samples were processed and assayed for anti-*Plasmodium* antibodies using a high throughput cytometric bead-based assay with the MAGPIX Multiplexing System. Through this approach we detected and quantified the aforementioned antibodies. Further comparative analyses of the antibody profiles were performed to understand the longevity of antibody levels. Plasma samples collected in parallel with blood spots produced more consistent, reliable data, as blood spots were an unreliable and unpredictable source of antibodies for our study. As anticipated, high levels of antibodies to *P. falciparum* were observed and these antibodies persisted over the course of several months. Most individuals also demonstrated evidence of prior *P. vivax* infection having persisting levels of antibodies to *P. vivax*, indicating significant transmission in the region.

## **Heat-Responsive Organic Semiconductor-Polymer Blends for Emerging Optoelectronics**

*Pallavi Sundaram, Chemistry*

*Sponsor: Professor Stephanie Lee, Chemistry*

A major challenge facing the commercialization of organic semiconductors for optoelectronic devices is growing high-quality, large crystalline domains during rapid film processing. Here, we form arrays of triisopropylsilyl ethynyl anthradithiophene (TIPS ADT) single crystals with dimensions on the hundreds of microns scale through melt processing and thermal annealing in the presence of an insulating polymer, polyethylene (PE).



Specifically, blends of TIPS ADT and polyethylene (PE) were melted at 250C and rapidly cooled to room temperature as thin films. During cooling, TIPS ADT and PE crystallized as intertwined banded spherulites in which crystalline lamellae twist in concert as they grow radially from the spherulite center. X-ray diffraction experiments revealed these crystals to adopt a previously unreported metastable polymorph. When these films were subsequently thermally annealed at temperatures near the PE melting point of 110C, large platelike crystals nucleated within the spherulites, growing fastest along the radial direction until no banded structure remained. X-ray diffraction and absorption spectroscopy measurements confirmed that these platelike crystals adopt the thermodynamically stable polymorph observed in solution-grown single crystals. The kinetics of this recrystallization process, a consequence of enhanced molecular mobility near the PE melting point, was measured via time-resolved optical microscopy experiments and found to depend on the banded spherulite morphology. Notably, the average crystal size achieved in this rapid crystallization and thermal annealing process is significantly larger than that obtained via spin coating. This method is a promising strategy to control the size and orientation of organic semiconductor crystals in the active layers of optoelectronic devices such as organic LEDs and photovoltaics.

#### **Analysis of TDP43 Mislocalization in ALS-like Motor Neurons**

*Albert Tan, Biology*

*Sponsors: Professor Esteban Mazzoni, Biology; Dylan Iannitelli, Biology*

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease characterized by gradual muscle atrophy due to motor neuron death. Not all motor neurons in ALS degenerate at the same rate, which raises the question of what mechanisms contribute to the differential susceptibility between various types of motor neurons. In this study, we investigated the mislocalization of the TAR DNA-binding protein 43 (TDP43) out of the nucleus and into the cytoplasm. First, we differentiated human induced pluripotent stem cells (iPSCs) into two types of motor neurons—spinal motor neurons (SpMN) and cranial motor neurons (CrMN)—and then treated them with drugs that induce proteostatic stress. Second, we used fluorescent stains to tag the nuclei, cytoplasm and TDP43 for imaging under a confocal microscope to obtain 3D images of the samples. Because existing software have flaws when it comes to processing these 3D images, we developed an image analysis program to address these flaws to more accurately examine these images. We observed increased TDP43 mislocalization and poor neuronal health in SpMN compared to the CrMNs. These findings suggest that there is a connection between motor neuron death and TDP43 mislocalization. Furthermore, the image analysis program developed here provides a new method to better process certain confocal microscopy images.

## **How Does Twitter Make You Feel? Social Context on the Experience of Moral Outrage Online**

*Rachel Tang, Psychology*

*Sponsor: Professor Jay Van Bavel, Psychology*

When issues arise in society, people react with disbelief and outrage. They turn to the internet to vent their feelings, an opportunity that was not available in the past. Furthermore, the landscape of social media has seemingly evolved to facilitate the spread of such content. There are different costs and benefits that come with expressing outrage online—such as backlash and praise, along with a varying line of risk. We aim to consider outrage as a motivated emotion and investigate how people on the internet calculate these costs and benefits of expressing outrage—and when the possible benefits and passion about an issue override the possible personal costs of expressing it. We then examine how the line of risk varies with who is expressing outrage, specifically pertaining to marginalized groups. We aim to investigate the use of moral outrage in collective action and expand on the literature addressing the dynamics of emotions online.

## **Polar Angle Asymmetries Bypass Cortical Magnification**

*Daniel Tavdy, Psychology*

*Sponsors: Professor Marisa Carrasco, Psychology; Michael Jigo, Psychology*

Contrast sensitivity is higher along the lower than upper vertical meridian at a fixed eccentricity. This asymmetry is exacerbated at high spatial frequencies (SF) and eccentricities. Exogenous and endogenous spatial attention—respectively, involuntary and voluntary selection of spatial locations without eye movements—differentially modulate contrast sensitivity across SF along the horizontal meridian. We investigated whether and how their differential modulation generalizes to the vertical meridian. We measured the effects of exogenous and endogenous attention on contrast sensitivity along the vertical meridian and across SF and eccentricity within the same observers. Observers performed a 2AFC orientation discrimination task. Tilted ( $\pm 45^\circ$ ) gratings were displayed along the vertical meridian above and below a fixation cross. In Valid conditions, peripheral precues manipulated exogenous attention and central precues manipulated endogenous attention. In Neutral conditions, non-informative precues distributed attention across the vertical meridian. Response cues indicated the target. Four gratings were displayed with one of eight SFs (0.5-11 cpd) and simultaneously at two eccentricities ( $2^\circ, 6^\circ$ ). On each trial, gratings had the same SF and their contrasts were fixed (based on initial threshold sessions) such that Neutral performance was titrated to a  $d'$  of 1.5 across SF and eccentricity. Contrast sensitivity was higher along the

lower than upper vertical meridian, bandpass across SF and declined with eccentricity. Neutral performance was equated across SF, eccentricity and meridian location (upper, lower). Exogenous attention preferentially enhanced SFs higher than those intrinsically preferred in the Neutral condition at each eccentricity. In contrast, endogenous attention improved SFs both higher and lower than baseline preferences. Each type of attention operated similarly at lower and upper vertical meridians. Our results provide converging evidence that covert attention differentially shapes spatial frequency sensitivity across and around the visual field, but cannot overcome the asymmetries.

## **Towards Amelioration of Maladaptive Eating Behavior: Individual Differences in the Positive Outcome from Ketamine Treatment in a Mouse-Model of Anorexia Nervosa Involves Drebrin-A, an F-actin Binding Protein at Excitatory Synapses of the Medial Prefrontal Cortex**

*Rose Temizer, Neural Science*

*Sponsor: Professor Chiye Aoki, Neural Science*

Anorexia Nervosa (AN) is a mental illness with the highest rates of mortality and relapse and no approved pharmacological treatment. It is characterized by food restriction and excessive exercise. Previously, Chen, Aoki et al. (2018) showed that 30 mg/kg intraperitoneal injection of ketamine has a long-lasting effect of enhancing food consumption, reducing the maladaptive behavior of excessive running and increasing body weight, when administered during mid-adolescence (P42). We also noticed individual differences in the drug's efficacy. We hypothesized that individual differences in ketamine's ameliorative effects upon ABA involves drebrin-A, an F-actin-binding protein that has been shown to be required for homeostatic synaptic plasticity through activity-dependent trafficking of NMDA receptors (NMDARs) between plasmalemmal versus cytoplasmic locations. To test this hypothesis, we conducted electron microscopic immunocytochemistry to quantify drebrin-A immunoreactivity at excitatory synapses of mice that underwent two cycles of ABA induction and received 30 mg/kg (efficacious) versus 3 mg/kg (non-efficacious) doses of ketamine during the first ABA induction in mid-adolescence. Correlation analyses with behavioral measurements revealed that protection against ABA by the 30 mg/kg ketamine dose is through homeostatic synaptic plasticity by enhancement of glutamatergic and GABAergic tone in PFC layer 1. This was measured by synaptic densities of pyramidal dendritic spines and dendritic shafts of GABA-Interneurons (GABA-IN) receiving glutamatergic input, as well as drebrin-A expression level and location. Our study reveals that individual differences in the efficacy of ketamine is explained, at least in part, through differential expressions of drebrin-A

at excitatory synapses on pyramidal neurons and GABA-INs. Ketamine is a very promising potential treatment for those experiencing AN, seen through clinical trials and animal studies. Further research on ketamine's efficacy is necessary, as these disorders decrease quality of life and have no real treatment as of now, except for drugs that cover up some of the symptoms.

**The Long and Winding Reads: Application of Long-Read Nanopore Sequencing towards the Characterization of Epigenetic Aberrations in the “Dark Genome” of Breast Cancer Metastasis**

*Miles Tran, Biology*

*Sponsors: Akash Sookdeo, Biology;  
Professor Neville Sanjana, Biology*

The primary objective of this project is to answer a simple question—how can the unique advantages of nanopore sequencing be utilized to draw meaningful biological conclusions about the relationship between genomic and epigenomic aberrations and breast cancer metastasis? DNA methylation is a mode of epigenetic modification that has been found to regulate gene expression in mammalian cells. An increased understanding of the relationship between cytosine methylation patterns and gene transcription will help us better understand the molecular mechanisms underlying complex multifactorial disorders like cancer. In this study, we utilize long read nanopore sequencing technology to generate whole genome assemblies of a human breast cancer cell line and a metastatic derivative. Nanopore sequencing enables us to simultaneously record cytosine methylation states across long strands of DNA without the need for another assay. We are also able to resolve patterns of differential methylation across the genome—including repetitive regions that are notoriously difficult to map using conventional sequencing methods. By analyzing the differences in methylation patterns in our tumor-metastatic pair, we were able to identify metastasis-specific hypomethylation associated with increased retrotransposon activity. Further experimentation must be conducted to evaluate the possibility of a causal relationship between retrotransposon hypomethylation and cancer metastasis.

**Spoken Recall for Drug- and Non-Drug-Related Movie Scenes Reveals Impaired Salience Attribution in Heroin Addiction**

*Devarshi Vasa, Psychology*

*Sponsor: Dr. Ahmet Ceceli, Icahn School of Medicine at Mount Sinai, Psychiatry; Dr. Rita Goldstein, Icahn School of Medicine at Mount Sinai, Psychiatry*

Due to the annual increase in opioid-overdose deaths, drug addiction has become a public health emergency. At the basis of drug addiction is impaired salience attribution, a key neuropsychological impairment charac-

terized by placing increased salience on drug cues at the expense of non-drug reinforcers. Exposure to drug-related cues can elicit a motivational response that drives drug craving and drug-seeking behavior—making them key mediators of relapse for those with substance use disorder. Until now, impaired salience attribution has not been studied through means of naturalistic measures. Therefore, we used naturalistic stimuli (i.e., scenes from a movie) to investigate impaired salience attribution of individuals with heroin addiction towards drug-related cues. We investigated whether spoken recall differs between participants with opioid-use disorder (OUD), specifically heroin addiction, and healthy controls (HC). All participants viewed a segment of a movie that contained salient drug and non-drug scenes. Subsequent free recall was encoded for drug and non-drug scenes. We found that mean recall duration was similar for both groups. However, for introspective speech, OUD recall was greater for drug scenes, indicating that OUD had distinct recall patterns from HC. Moreover, for OUD participants, the number of drug scenes recalled negatively correlated with emotion decrease and severity of dependence. Overall, freely spoken recall provides novel and ecologically valid insights into the neurobiology of heroin-use disorder and suggests that speech encoding of movies can be an effective naturalistic measure of studying impaired salience attribution.

**Therapeutic Application of Peptoid Oligomers**

*Harsha Venkatesh, Chemistry*

*Sponsor: Professor Kent Kirshenbaum, Chemistry*

Recent developments in mental health have been keen to focus on the various contributing factors for depression. In recent months, the ongoing Coronavirus pandemic has contributed to an extent in the prevalence of depression, with occupation burnout and fatigue becoming major contributing factors for mental illnesses. Commonly prescribed antidepressants such as selective serotonin reuptake inhibitors act on the body by creating physiological changes between neurons, therefore maintaining serotonin levels in the synapse. Although effective over time, these changes take well over 6 weeks for symptoms to be ameliorated, creating a time-dependent risk for affected individuals. Here, this project investigates the binding mechanism of cocaine-amphetamine regulated transcript (CART) protein, which has previously been shown to have antidepressant effects in mouse models. Using a peptidomimetic approach, the unexplored binding region of the CART peptide is recreated using peptoid monomers. This sequence is then characterized by mass spectroscopy and is then crystallized to determine structural properties. Finally, the isolated product will be applied to neural cell lines to assess binding affinity. Expected results would show high levels of binding, indicating that the hypothetical binding region is effective. Future investigations

would further develop transition state intermediates in the hopes of designing faster acting antidepressants that mimic biological structures.

### **Racial Differences in the Susceptibility of Adolescents to Social Media Advertisements of Junk Food versus Non-Food Advertising**

*Alex Vizents, Psychology*

*Sponsor: Professor Emily Balceris, Psychology*

In 2020, over 3.8 billion people used social media sites such as Instagram and Facebook. This is projected to increase to over 4 billion by 2023 (Kemp, 2020) and is particularly pronounced among adolescents, whose daily social media use currently stands at 82%, an increase from previous years (Fleming-Milici, 2020). This usage poses serious problems, yet little is known about how targeted racial advertising affects the health of minority adolescents. We recruited 848 adolescents who were randomly assigned to one of four conditions and viewed Instagram ads depicting an influence of the same race or different race as themselves and this influencer endorsing junk food or a non-food item. After participants viewed these posts, we measured their visual interest by asking participants how cool, attractive and interesting the person in the post was. Participants then viewed pairs of snacks (health and junk food) and reported which one they would like to eat right now. Minority participants reported the posts were more visually interesting when they saw racially congruent influencers compared to racially incongruent influencers. When posts included junk food, visual interest increased the percent of junk foods selected. However, when posts included non-food products, visual interest did not predict junk food selection. These findings expand our understanding of how junk food ads targeting racial minority adolescents detrimentally affect their food choices and, thus, their overall health.

### **Differentiating Morality and Warmth in Face Perception**

*Amisha Vyas, Psychology*

*Sponsor: Professor Jon Freeman, Columbia University, Psychology*

People make automatic judgments from faces on different trait dimensions, which are consequential for various life outcomes such as electoral success, hiring decisions and mate selection. Two-dimensional models suggest that warmth and competence are the core dimensions of impression formation. However, research from social cognition shows that morality functions alongside warmth and competence as an independent dimension and a better predictor of global impressions. Yet, fundamental models of face evaluation do not examine the distinct role of morality and conflate warmth traits (likeability, extraversion) and moral traits (righteousness, honesty) into a

single dimension. Here, we investigated whether morality and warmth can be differentiated in face perception. In Study 1, we used reverse correlation to compute visual representations of morally good and warm faces for each participant. In Study 2, an independent group of participants categorized the visual representations from Study 1 as morally good or warm in a forced-choice task. A signal detection analysis revealed that participants cannot discriminate between morally good and warm faces, but show a significant bias towards moral categorizations. Overall, though morality and warmth are not differentiated in face perception, our findings indicate a predominant role of morality in face processing and offer new insights for current models of social perception.

### **The Influence of Races on Adolescents' Perceptions of Ideal Leadership**

*Zhuoxuan Wang, Cinema Studies, Psychology*

*Sponsor: Professor Emily Balceris, Psychology*

People from racial and ethnic minority groups are significantly underrepresented in leadership across cultures and domains. Previous research has found that stereotypes about leadership could be discouraging for people from minority groups and lead them to believe that people who look like them do not belong in leadership positions. As adolescence is a critical stage of acquiring new knowledge and developing world views, teenagers are especially prone to influence their perspectives of leadership. This research aims to discover whether adolescents' perceptions of leaders are more diverse if they themselves are members of a racial or ethnic minority group rather than a racial majority. To assess these possibilities, we design survey questions using the Facebook avatar app. We then create digital avatars of adolescents' ideal leadership according to their answers. Adults rate the racial and ethnic prototypicality of these avatars. We find that the avatars created by adolescents who self-recognize as Black are rated to look more prototypically Black than those created by participants who do not. On the other hand, we do not find significant results of adolescents who self-recognize as Hispanic. Our findings indicate that adolescents who self-recognize as Black may have a more diverse perception of leadership. Future research might test what factors bolster and maintain their belief.

### **Principle Component Analysis of Epidermal Growth Factor Receptor Kinase**

*William Wang, Biochemistry*

*Sponsor: Professor Yingkai Zhang, Chemistry*

The epidermal growth factor receptor kinase family is an important protein of interest in the cellular signaling pathways of cancer cells especially those of epithelial tumors. The EGFR family includes EGFR, erbB2/HER-2, erbB3/HER-3 and erbB4/HER-4. EGFR is a receptor ty-

rosine kinase and the phosphorylation of a tyrosine residue on its kinase domain results in conformational changes which activate the protein and prompting expression of pathways downstream of the receptor, primarily cell growth pathways. Cancerous cells often contain overexpression of EGFR which results in abnormal cell growth characteristic of cancer states. Understanding the structure of the EGFR kinase domain as well as the nature of the changes caused by common cancer promoting mutations can aid in future chemotherapeutic drug design or other targeted treatments. Tyrosine kinases are characterized by numerous structural motifs that are highly conserved across different families of proteins. Study of purpose and patterns to these motifs allow for better understanding of the mechanisms of kinases as well as the ability to classify different kinases by the differences in motifs. The research and study of EGFR kinase and other proteins is greatly aided by the use of computational tools in order to better visualize structures as well as calculating distances between residues from a variety of EGFR family proteins in a database in order to find distinguishing residues that separate different groups of kinases from each other: in this example looking at the differences between EGFR, erbB2/HER-2, erbB3/HER-3 and erbB4/HER-4 and the residues that distinguish them from each other.

#### **Breakdowns, Meltdowns and Overload: How to Support Students with Sensory Needs**

*Isaac Wert, Psychology*

*Sponsor: Briana Calcagno-Davi, NYU School of Medicine, Child and Adolescent Psychiatry*

It is estimated that 5–16% of the US population experiences some degree of sensory abnormalities (e.g., hyposensitivity and/or hypersensitivity). Sensory abnormalities can be highly distressing and disruptive, leading to sensory overload, avoidance, seeking and overall exhaustion, which can impact a child's academic, social, community and familial functioning. While sensory abnormalities are common in individuals with Autism Spectrum Disorder (ASD), they can also be features of Attention-Deficit Hyperactive Disorder (ADHD), Obsessive-Compulsive Disorder (OCD), anxiety disorders, etc. and/or a standalone Sensory Processing Disorder (SPD). Given the heterogeneity of sensory abnormalities, it is only natural that certain individuals would find particular stimuli/environments more disruptive than others, thus it would be difficult to create one space that caters to all sensory differences. This presentation aims to outline the basic underpinnings of sensory abnormalities, review sensory differences in the context of various disorders and provide reliable and accessible solutions for designing sensory-friendly spaces, both at home and in school settings.

#### **The Age-Old Question of Aging: How Do Transposable Elements Behave in Relation to Aging in the Jumping Ant, *Harpegnathos saltator***

*Hunter Whitbeck, Environmental Studies*

*Sponsors: Dr. Bogdan Sieriebriennikov, Biology;*

*Professor Claude Desplan, Biology*

Transposable elements (TEs) are mobile pseudogenes that have the ability to move themselves throughout one's genome, sometimes causing edits that disrupt the normal function of genes, a process that has been suggested to contribute to aging. In termite colonies, non-reproductive individuals (NRIs), which are short-lived, express many TEs, while reproductives, which live longer, repress TEs (Elsner, Meusemann et al., 2018). We studied this phenomenon in another species of social insects, *Harpegnathos saltator*, an ant species in which individuals have the ability to extend their lifespan by changing their social status (caste) in adult life. We expected upregulation of TEs in NRIs and down regulation of TEs in reproductives. We set up colonies of *H. saltator* and extracted RNA from individuals' brains from the two castes at different timepoints throughout the NRI to reproductive transition (3 days to 6 months). We chose the brain because it is an important tissue that may be key to understanding somatic aging. We performed differential expression (DE) analysis between the two castes using a likelihood-ratio statistical model that takes into account the time point and caste. When analyzing across timepoints, there were a similar number and pattern of TEs with DE patterns between the castes. When the castes were contrasted, few TEs had DE patterns, but there was oftentimes a stronger correlation between the differentially expressed TEs and the adjacent gene in comparison to all TEs and their adjacent genes. This analysis showed that even though there is differential TE expression in reproductives when compared to NRIs, we do not observe massive repression of TE activity in reproductives; instead, TE expression seems to be driven by the expression of nearby genes.

#### **Identity-Focused Language Hinders Girls' Ability to Recover from Setbacks in Science**

*Ashley Winegarden, Psychology*

*Sponsors: Amanda Cardarelli, Psychology; Professor Marjorie Rhodes, Psychology*

Who can do science? Is it exclusively for people who fit the stereotype of scientists or is it an activity anyone can engage in? These two conceptualizations about who can do science can affect the way someone perceives themselves fitting into the field, especially children. Previous research suggests that children introduced to science with identity-focused language (e.g., "Today we're going

to be scientists") are less likely to persist in science tasks than children introduced with action-focused language (e.g., "Today we're going to do science"). This is because identity-focused language elicits kinds-based representations of science, which invites children to question whether or not they are scientists. What has yet to be investigated is the qualitative responses that moderate children's persistence. The present study examines if the language used to teach science to children predicts their responses to setbacks and how those responses predict their persistence. Children were introduced to science with either action or identity language before experiencing a setback. Children's verbal and nonverbal responses to the setback were coded from the video as positive, negative or no response. There was no main effect of language condition on children's responses, and, across the entire sample, children who exhibited negative responses persisted less than those who did not. However, when looking specifically at gender and condition, only girls who heard identity-focused language were less likely to persist if they exhibited negative responses. This suggests that perhaps identity-focused language makes it more difficult for girls to recover from setbacks.

### **Effect of Helicopter Noise on Bird Song**

*Leila Winn, Biology*

*Sponsor: Professor Katie Schneider-Paolantonio, Biology*

Anthropogenic noise is a pollutant that impacts terrestrial and aquatic species worldwide (Kunc and Schmidt, 2019). Aircraft noise, in particular, has been shown to impact the timing of vocalization (Cruz et al., 2021) and increases stress in birds (Ortega, 2012), however some birds have been shown to habituate to this pollution (Conomy et al., 1998). In large cities such as New York City, there are often multiple sources of pollution occurring at once. Using the unique features of Governors Island, a 174-acre car free green space, this study aims to examine the effect of aircraft noise pollution on migratory and year-round birds. The first part of this study uses passive bio-acoustic monitors and machine learning to gain a better understanding of the auditory landscape and analyze bird calls of six target species at nine locations on the Island. The second part of the study uses community science to survey bird behavior at the nine locations. The goals of this study are to create a wider breadth of knowledge on the differences between how migratory and non-migratory birds are affected by aircraft noise, while examining the role of habitat structural complexity. Additionally, we will foster community by empowering citizen scientists to learn, gain confidence and to grow by completing data collection for this study.

### **Analysis the Condition of Capital Factor Related to Technology from MRW Model**

*Xiaofeng Xiao, Economics and Computer Science, Mathematics*

*Sponsor: Professor Ennio Stacchetti, Economics*

This paper tests the Solow model and its beyond version, MRW (Mankiw-Romer-Weil) model by OLS method, and enhance its adaptability by claiming a new capital factor related to technology, then applying mathematical analysis to prove its existence, continuity, growth and unboundedness.

### **The Impact of SIV on Nonhuman Primates' Immune Response Genes**

*Tammy Xing, Anthropology*

*Sponsor: Professor Scott Williams, Anthropology*

SIV, the virus behind the HIV and AIDS crisis that has plagued the world, has been identified as the source of at least 12 occasions of cross-species transmission from nonhuman primates to humans (Locatelli et al, 2014). There is not a deep understanding of how SIV affects nonhuman primate species, especially why SIV does not lead to AIDS-like disease in host species. Recent studies suggest possible coevolutionary interactions between SIV and nonhuman primate host species. Looking at the differences in the genomes of nonhuman primates (comparative genomics) can lead to an understanding of how the immune system of different species evolved to become more resistant and effective at combating the disease. Examining specific genes involved in host's response to SIV infections and comparing how the genes differ in species that are known to have coevolved with SIV and species that have not been infected can reveal insights on the evolution and function of the genes and the genes' benefits to the host's immune system. The goal of this research is to use comparative genomic analyses of a wide range of genomes of both SIV "host" species and SIV-naive species to identify changes in specific genes important to successful immune response to SIV/HIV. More comprehensive knowledge of the genes involved in response to SIV/HIV can potentially lead to a better understanding of HIV and new approaches to AIDS treatment in humans.

### **Determining the Mechanisms Underlying Fitness Defects in the Synthetic Chromosomes of Sc2.0**

*Sandy Yang, Biology*

*Sponsors: Dr. Yu (Jeremy) Zhao, NYU School of Medicine, Institute for Systems Genetics; Dr. Stephanie Lauer, NYU School of Medicine, Institute for Systems Genetics; Dr. Jef D. Boeke, NYU School of Medicine, Institute for Systems Genetics*

To comprehensively understand the yeast genome, scientists redesigned and synthesized the genome of *S. cerevisiae* from the bottom-up in a project known

as Sc2.0. Sc2.0 is a synthetic yeast genome that features many designer elements, including the insertion of numerous loxPsym sites and the translocation of tRNA genes onto a neochromosome. LoxPsym sites allow for an inducible evolutionary machinery called, SCRaMbLE (Synthetic Chromosome Rearrangement and Modification by LoxPsym-mediated Evolution). The translocation of tRNA genes stabilizes the genome by isolating tRNA-targeted transpositions away from the rest of the chromosomal DNA. Despite the advantages of these designer features, some features may unexpectedly result in fitness defects. We noticed that the yeast strain containing synthetic chromosome II (synII) exhibited a fitness defect on non-fermentable media (YPG) at 37°C. We recovered the fitness of synII by removing two loxPsym sites between the genes SHM1 and YPT10. However, after the repaired synII was consolidated into a single yeast strain with the healthy synthetic chromosome XII (synXII), the resulting synII/synXII strain exhibited a fitness defect at 37°C on both non-fermentable (YPG) and fermentable (YPD) media. We discovered that the synII/synXII strain unexpectedly contained three copies of synII tRNA genes rather than one. Furthermore, we observed that abnormal dosage of synII and synXII tRNA genes resulted in impaired sporulation in synII/synXII. To improve the design of future synthetic genomes, our study sought to document obscure mechanisms involving the roles of tRNA genes and designer elements such as loxPsym sites, on organismal fitness.

### Volume of Nucleolar Droplets Changes during the Cell Cycle

*Yuwei Yang, Physics*

*Sponsor: Professor Alexandra Zidovska, Physics*

The goal of my research project is to study the volume distribution of nucleoli throughout the cell cycle. In eukaryotic cells, the nucleus contains the nucleolus, which is a membraneless organelle important in key cell functions such as ribosome production, cell cycle progression and stress response. Recently, it was discovered by the Zidovska lab that nucleoli behave like liquid droplets: for example, nucleoli coalesce upon contact (Caragine et al., 2018). However, the nucleolar volume distribution is unlike any volume distribution found for systems of passive droplets (Caragine et al., 2019). Although the nucleolar coalescence causes the growth in nucleolar volume, we found that the volume of non-coalescing nucleoli also grows throughout the cell cycle. Since nucleoli are immersed in the chromatin solution, we focus on understanding the interactions between the nucleoli mediated by chromatin. To this end we investigate the time-dependent nucleolar volume during the cell cycle ranging from 3–24 hours after mitosis. We measure changes in nucle-

olar volume over time *in vivo* and compare against the expected growth of the nucleolus using different types of volume estimation methods. We anticipate that our results reveal the physical mechanism behind the nucleolar volume changes during the cell cycle.

### Intronic Noncoding Essential Regions (NERs) in BCL2L1 Modulate Anti-Apoptotic Gene Expression

*Caroline Yu, Biology*

*Sponsor: Professor Neville Sanjana, Biology*

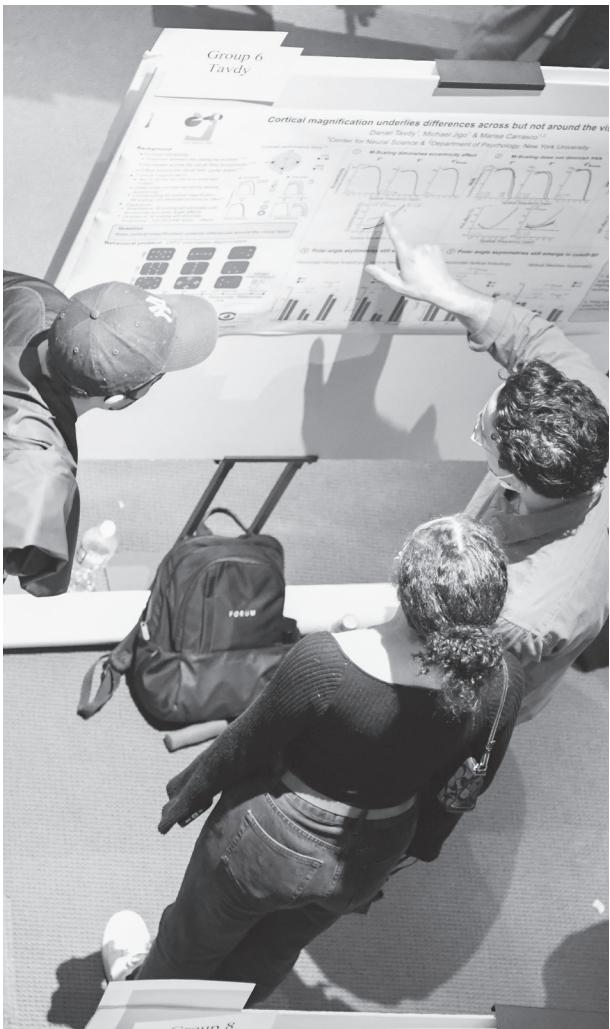
BCL2L1 is an essential gene in the human body, playing a key role in the regulation of cellular apoptosis. BCL2L1 is found on chromosome 20 (human chromosome 20: 31704003 - 31706100) and encodes for splice variants BCL-XL and BCL-Xs that have anti- and pro-apoptotic functions, respectively. While BCL-XL downstream signaling has been well researched, the mechanisms by which upstream regulators of the BCL2L1 gene function are still uncertain. An initial CRISPR screening revealed various intronic, noncoding essential regions (NERs) within the BCL2L1 genome which, when deleted, modulate cellular apoptosis. This study focuses on characterizing the functional elements of select BCL-XL intronic NERs. Mutated BCL-XL constructs were created with a BCL2L1 open reading frame and a doxycycline inducible promoter. After verification, cloning and delivery of mutated lentiviral plasmids into HAP1 cells, a cell competition assay was conducted by co-culturing deletion cells with GFP expressing control HAP1 cells in a 1:1 ratio. A rescue experiment was also conducted using dox inducer to rescue cells from the mutation phenotype. FACS analysis revealed the effect of the specific intronic deletions on cellular viability and analyzed the efficacy of dox induced BCL-XL overexpression to rescue phenotypes. Results showed that some NER mutations resulted in a significant decline in cell viability, while dox induced overexpression was only able to recover a portion of the phenotype. This research can reveal the importance of intronic NERs in upstream gene regulation and help to elucidate potential regulatory mechanisms for BCL-XL.

### Physical Reasoning in an Open World

*Jennifer Zeng, Computer Science*

*Sponsor: Professor Ernest Davis, Computer Science*

Most work on physical reasoning, both in artificial intelligence and in cognitive science, has focused on closed-world reasoning, in which it is assumed that the problem specification specifies all relevant objects and substance, all their relations in an initial situation and all exogenous events. However, in many situations when accessible information is not complete, it is important and necessary to do open-world reasoning; that is, making valid conclusions from very incomplete information. In



this work, we have implemented in Prolog an open-world reasoner that can do frame inference with incomplete information. Furthermore, we have extended the reasoner to do action inference, that is, given the start and end states, infer what actions must have happened between two time points.

#### Dopamine's Role in Execution of Complex and Skilled Movement

Ruoheng Zeng, Neural Science

Sponsor: Professor Nicolas Tritsch, NYU School of Medicine, Neuroscience and Physiology

Dopamine is well-known for its role in motor circuitry. Dopaminergic neurons from the substantia nigra pars compacta (SNC) and ventral tegmental area send substantial projections to medium spiny neurons (MSN) in the striatum. Loss of these dopamine neurons in patients with Parkinson's Disease result in motor dysfunction. Previous studies in mice have demonstrated the importance of SNC dopamine in general locomotion within the

open field setting. This experiment builds on that understanding by examining dopamine's role specifically in complex, self-initiated motor tasks. Water-restricted mice are trained to push a lever at regular intervals to obtain a water reward. After task proficiency is attained, lesion of SNC dopamine neurons is performed using 6-OHDA. The results show that dopamine lesion does have a significant effect on the animal's performance on the lever task. Additionally, intraperitoneal injection of L-DOPA, the clinical gold standard treatment for Parkinson's Disease, restores task proficiency in dopamine lesion animals back to baseline. The results support dopamine's role in the modulation of specific basal ganglia circuitry that mediates complex motor tasks beyond general locomotion. Additionally, the data suggest little difference in movement vigor when comparing the condition to the post-rescue condition. This seems to indicate that dopamine's role in mediating complex motor tasks may be functionally different than what has been proposed based on open-field data. However, more experiments are required before a conclusive understanding can be reached.

#### Manipulating Solid Forms of Crystalline Contact Insecticide, Clothianidin, for Better Infectious Disease Control

Carolyn Zhang, Biology

Sponsors: Professor Bart Kahr, Chemistry; Bryan Erriah, Chemistry

Synthetic contact insecticides are widely used to prevent the spread of malaria and other diseases by controlling the mosquitoes that serve as their vectors. However, the development of widespread resistance to these insecticides by mosquito populations in endemic regions has driven the scientific community to search for ways to increase the efficacy of these compounds in order to mitigate resistance and reduce environmental footprint. Clothianidin is the active ingredient in the only new insecticidal formulations approved by the World Health Organization for malaria control in decades. Previous research has shown that manipulating the solid forms of crystalline contact insecticides can increase their efficacy towards mosquitoes, specifically by increasing their free energy and bioavailability. We show here that the amorphous form of clothianidin is more active compared to its neat crystalline form against both *Drosophila melanogaster* and *Anopheles* mosquito populations. These results provide a promising alternative route for a compound that has already begun to decline in efficacy over just a few years of use in the field. This work has the potential to transform the fight against infectious disease by mitigating resistance development while reducing environmental footprint.

## **Preferential Looking at Own-Race versus Other-Race Faces across Infancy**

*Frances Zhang, Psychology  
Sponsor: Sophie Arnold, Psychology*

Studies have shown that a preference to look longer at own-race faces than other-race faces emerge as early as 3 months of age (Bar-Haim et al., 2006). Oppositely, as infants age (e.g., 9-month-olds), they look longer at other-race faces (Liu et al., 2015). Past studies were, however, limited in scope: they focused mainly on Caucasian and/or African subject groups, Black and/or white facial stimuli and a narrow 3-month-old age range. Expanding upon all these aspects, we are interested in questions such as: In general, do babies look longer at own-race or other-race faces? How can subjects' age and environmental diversity affect such looking patterns? We recruited 141 3- to 14-month-old infants (65.2% whites, 19.1% Multiracial, 8.5% Asian, 4.3% Hispanic, 2.8% Black) across the US through the online recruitment platform PANDA. In the comfort of their homes, infants watched a computer screen as pairs of faces from different racial categories were shown. Infants saw all possible combinations of face pairs from 4 racial groups and both genders (white, Black, Asian, Hispanic, women and men). We coded and measured infants' looking directions, proportions and average times spent looking at different faces. Preliminary analyses suggest that infants looked longer at other-race than own-race faces, regardless of their age and neighborhood diversity. Our study did not find the significant roles played by age nor racial environment. We propose that COVID-19 quarantine restrictions might shift our results unexpectedly. Future researchers should explore other potential factors at play in shaping infants' preferential looking patterns as well as considering the rippling effects of the pandemic.

## **Constraining Estimates of Synaptic Strength Changes from Electrophysiological Spiking Data via in silico Simulation**

*Yunchang Zhang, Mathematics, Neural Science  
Sponsors: Professor György Buzsáki, NYU School of Medicine, Neuroscience and Physiology; Roman Huszar, Neural Science*

Changes in synaptic strength have been postulated to be the neural basis of learning and memory. In intracellular electrophysiological experiments, working definitions of synaptic strengths such as the level of excitatory postsynaptic potentials (EPSPs) have been applied to reveal the significance of synaptic strength in learning and memory. However, in extracellular electrophysiological experiments in which the experimenters can study neuronal activity on a larger scale, a direct readout of synaptic strength is no longer provided. To infer how neuronal connectivity changes from spiking data recorded extracellularly,

new statistical methods and validation works are in need. One way to predict the existence of a monosynaptic connection from spiking data is by calculating the spike transmission probability. Besides, it has been shown that spike transmission probability correlates with intracellularly recorded excitatory postsynaptic potentials (EPSPs), which are thought to reflect synaptic strength. Following the spike transmission probability research, we developed a Lasso generalized linear model (Lasso GLM) to infer temporal changes of spike transmission probability. To provide a ground-truth dataset to test the accuracy of the Lasso GLM, I adapted a leaky integrate-and-fire (LIF) model with tunable synaptic strength and background current input with noise. The Lasso GLM successfully inferred spike transmission probability changing at different time scales from the ground-truth spiking data. In addition, I rediscovered the finding that the spike transmission probability is not only modulated by synaptic strength but also influenced by the background noise level. With the LIF simulations, I validated a tool for neuroscientists to study neuronal connectivity on a large scale in behaving animals. At the same time, I hope to raise a cautionary tale regarding applying statistical tools such as the Lasso GLM to estimate synaptic strength changes.

## **Near or Far: The Effect of Toy Dispersion on Crawling and Walking Infants' Locomotion**

*Alice Zhou, Psychology  
Sponsors: Professor Karen Adolph, Psychology; Christina Hospodar, Psychology*

The transition from crawling to walking dramatically changes infants' experience of the world. The onset of independent walking enables infants to see more, move more and interact more with toys and caregivers. Walking is faster and more efficient than crawling for getting from one place to another. Moreover, an upright posture facilitates richer visual inputs by enlarging the field of view (Adolph and Tamis-LeMonda, 2014). Thus, walkers likely move more than crawlers in part because they can better see interesting destinations in the distance and can move more easily to those destinations. However, it is unclear to what extent the advantages of walking depend on the environment. My project tests age-matched crawling and walking infants (12-month-olds) during free play in two within-subject environmental conditions—toys clustered in one location versus dispersed around the room. I am measuring how much each infant moves in each condition. I predict that infants have more incentive to move when toys are dispersed compared to clustered. Thus, I expect to find that both crawlers and walkers move more in the dispersed condition than in the clustered condition. Based on previous work, I also predict that walkers will move more than crawlers in both conditions. Most critically, I expect an interaction between locomotor status and

condition, such that the effect of toy dispersion is stronger for walkers than crawlers. These predictions, if supported by results, would indicate that the relative advantage of walking over crawling depends on the environment.

**Distribution of Psychopathic Tendencies across NYU's Undergraduate Schools**

*Jonah Zinn, Psychology*

*Sponsor: Professor Pascal Wallisch, Data Science, Psychology*

We are interested in the distribution of psychopathy scores across academic disciplines. To answer this question, we asked a large number of NYU undergraduates in different schools to fill in the LRSP questionnaire—a commonly used screening tool to characterize Psychopathy in non-institutionalized populations. It is known that Psychopaths are overrepresented in some fields (e.g., business). It is an open question as to whether they learn this on the job, or if certain people with psychopathic traits are predisposed to seek out such jobs. If the latter is the case, we should see a differential distribution in different academic disciplines. We found that there is a distribution of psychopathic traits as a function of academic discipline that cannot plausibly be accounted for by chance. We take these findings to mean that “Psychopathy starts early”, in other words it is not something that is imposed late, or on the job. In other words, certain fields attract psychopaths, they don't create them.