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* supported by Dean’s Undergraduate Research Fund † winner of Phi Beta Kappa Albert Borgman Prize for Best Honors Thesis

Photo Disclaimer: Photos throughout this edition depict Dean’s Undergraduate Research Conference activities before March 2020.
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 2021. Like all of us, students’ lives have been deeply impacted by the pandemic. Many projects examine how the pandemic has affected our mental health, revealed and amplified structural inequalities, or brought communities together. CAS students are deeply attuned to the welfare of others, a fact reflected by projects on the BLM movement in the US and abroad, LGBTQ-related issues, immigration, and policing. While some students were able to continue their research in person on campus in labs, others worked remotely analyzing data, pouring over electronic documents, or conducting interviews online. The majority of 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
A New Reading of Steven Hahn’s *From the Nosferatu Ring*
Sawyer Adler, Music
*Sponsor: Professor Gregg August, Steinhardt School of Culture, Education, and Human Development, Music and Performing Arts Professions*

The formation of literary interpretations is often based on research techniques that benefit greatly from a closeness to the author of the work. These techniques traditionally include the examination of the author’s letters and other artifacts, analysis of their sketches or unpublished drafts, and a biographical examination of their life. From my research, I present a novel interpretation of my late grandfather’s poem cycle *From the Nosferatu Ring*, making use of this familial closeness to develop my interpretation more than an unrelated scholar might be able. My research consists of two parts: firstly, a close reading and analysis of the poems, separate from my familial connection; secondly, a development of this interpretation using all of the hereditary and genealogical tools available to me. My work, therefore, is a synthesis of poetry analysis and genealogical and historical research. I examine my grandfather’s notebooks, interview members of my family, and gather letters, manuscripts, and legal documents to assist my interpretation of his poems. These artifacts yield many new discoveries, including the nature of my grandfather’s friendship with Valerie Eliot, and the exact timeline surrounding my grandfather’s and great-grandfather’s internment during the outbreak of the Holocaust and their subsequent escape from Germany. Through this historical and genealogical approach to his work—that makes full use of my position as his grandson rather than shying away from it—I create a new interpretation that puts a powerful biographical exposition at the center, informed by a philosophy of moral skepticism and error theory.

“Pretend I’m Not There, but Remember That I Am”: Medical Interpreters as Members of the Healthcare Team, and the Effects of COVID-19
Hannah Brown, Spanish
*Sponsor: Professor Maria José Zubieta, Spanish and Portuguese*

This study examines the role of professionally-trained medical interpreters from a perspective scarcely seen in the existing literature: that of the interpreters themselves. After an extensive literature review, I identified thematic gaps in our collective understanding of interpreters’ roles, responsibilities, and emotions in the medical setting. I also wanted to explore how COVID-19 did or did not change the experience of medical interpretation. From this, I developed a set of questions aimed at medical interpreters with the purpose of closing these epistemological lacunae. I used this questionnaire as a guide in the individual, hour-long interviews I conducted with Spanish/English medical interpreters across the United States. I ultimately interviewed 21 interpreters hailing from 9 different states. A main theme that arose from these interviews is that interpreters are essential members of the medical team but are often not treated as such by their colleagues and are not adequately trained to be healthcare workers. The interpreters noted, however, that COVID-19 has given them more recognition as team members and clinical workers. Further, cultural brokerage is an essential aspect of medical interpretation, and the interpreters described the importance of understanding a patient’s cultural values and advocating for them when necessary. They also drew at-
tention to the efficacy of virtual interpretation services and the use of interpreters during critical medical emergencies. This study provides much-needed insight into the ways in which interpreters are not emotionless translation machines but rather human, integral participants in healthcare encounters. Further, language discordances prove to be a huge barrier to healthcare for Latinx patients in general, though this was exacerbated as COVID-19 disproportionately affected Latinx people. My research highlights the extraordinary work that medical interpreters have done during the pandemic, even beyond direct language interpretation, to ensure Spanish-speaking patients receive the quality of care they deserve.

Progressive Deaccessioning: A Step Towards Museum Parity
Sasha Carnes, Art History, Data Science
Sponsor: Professor Edward Sullivan, Art History

In the last three years, several American art museums have turned to the practice of deaccessioning as a method of increasing the diversity of their collections, responding to a growing awareness of the systemic inequities within the traditional canon of art history alongside those more directly perpetrated within artistic institutions. As a result of their actions, however, the deaccessioned pieces risk disappearing from public view forever, drawing severe criticism and resistance from many across the art world. But, despite this onslaught of controversy, these few instances of “progressive deaccessioning” have largely been carried out within the purview of industry norms and have allowed institutions to acquire significantly more work than what was originally sold. These resulting acquisitions, mostly authored by women and people of color, have meaningfully expanded the museums’ abilities to offer visitors a more complete and equitable narrative of art history. Diversity and equity-oriented initiatives have become increasingly relevant in the wake of racial reckonings across the US and within the museum industry. This, coupled with a recent loosening of industry restrictions around deaccessioning, suggests that the practice of progressive deaccessioning will persist throughout the years to come. In my presentation, I will examine four case studies of “progressive deaccessioning” to argue the merit of selling artwork into private hands to increase institutional diversity.

Gender, Fan Politics, Real Person Fiction, and Censorship: A Study on “AO3 Incident” in China
Ruolan Chen, East Asian Studies
Sponsor: Professor Daniel Johnson, East Asian Studies

In late February 2020, the fans of Xiao Zhan, an idol in China who gained much popularity in 2019, allegedly reported a website Archive of Our Own (AO3) to Chinese authorities, which led to the banning of the website in China and then fierce opposition against Xiao Zhan and his fans among Chinese net users. The paradox was that Xiao Zhan rose to fame after starring in The Untamed, a TV drama adapted from a Boys Love novel, while his fans reported AO3 for one of the fanfictions published on it depicting Xiao Zhan as a man encountering problems with gender identity. This is a unique and complicated case that reflects some of the most vital clashes and most fierce debates in Chinese contemporary cyberspace: report mechanism and censorship, borderless spectatorship and fandom politics, ethical and legal lines of Real Person Fiction, as well as conflicts between heteronormativity and sexual minorities and LGBT+ fictions. Discussing the incident in the context of the creative industry in China, this research project analyzes how heteronormativity worked as a universal mechanism in Chinese society that led to self-censorship and self-surveillance among not only the idols and the fans but also the media industry and society and culture in general.

Jeremy Crocker, History
Sponsor: Professor Zachary Lockman, Middle Eastern and Islamic Studies; Professor Sara Pursley, Middle Eastern and Islamic Studies

This thesis examines the governmental policies, political messaging, and cultural attitudes surrounding the Huleh valley during the period of British Mandate Palestine (1920–1947). For centuries, the marshland surrounding Lake Huleh provided sustenance for the local Arab population, who were mostly members of the Ghawarneh people, a group of Palestinian Arabs of African descent. The Arab population of the Huleh maintained a lifestyle in concert with the natural environment. I argue that during the British Mandate period, a combination of three major forces utilized messaging, policy, and intervention in the name of environmental transformation and public health in order to dispossess the Huleh inhabitants. The first was the British Mandatory government, which imposed a colonial regime guided by support for developmentalism, Zionism, and imperialism which prevented the people of the Huleh from exercising any meaningful autonomy over their lands. The second was the Syro-Ottoman Agricultural Company, led by Beirut businessman and politician Salim Ali Salam, whose business interests in the Huleh Concession repeatedly neglected the interests of the local inhabitants. The third and most important force was the Zionist project, which sought to recreate the land of the Huleh in a way that was only conducive to one group at the expense of its local inhabitants. While these forces sought to actualize their visions of development, profit, and conquest onto the Huleh, the interests of the local inhabitants were left behind. I used sources in both English and Arabic from the United Kingdom National Archives, the Israeli State...
female leadership in francist spain: national-catholic restrictions and female solidarity in the sección femenina’s y revista de la mujer

morgan davis, english and american literature
sponsor: professor jordana mendelsohn, spanish and portuguese

under the national-catholic regime of francisco franco, women in spain experienced a drastic change in lifestyle and in the expectations of femininity. the francist project was deliberate in its treatment of women with the redefinition of the “ideal spanish woman”, but some contradictions become obvious when examining the female leadership of the sección femenina (sf) of the falange. the sf, especially through the utilization of its press and propaganda division and various magazines for women that were heavily circulated, both perpetuated the rigid and normative ideals for women that were first espoused by male leadership while also creating spaces for subversion of those ideals. this thesis will examine both the compliance to as well as the subversion of these ideals through analysis of the magazine y. revista de la mujer.

“do not be a pawn of the olympians”: how imperialist aesthetics are constructed and/or challenged in the lightning thief and harry potter and the sorcerer’s stone

lara drzik, english and american literature
sponsors: professor pacharee sudhinaraset, english and american literature; professor dara regaignon, english and american literature

scholars have studied the connection between children’s literature and imperialism for a long time, but how do modern children’s fantasy authors reckon with this connection when they want to encourage their readers to challenge imperial systems of power (rose, 1993; kutzer, 2000; mendlesohn, 2008)? this thesis explores how the lightning thief by rick riordan (2005) and harry potter and the sorcerer’s stone by j.k. rowling (1998) use imperial power structures that are coded as morally “good” to shape the fantasy worlds in their novels and how the novels’ main characters, percy jackson and harry potter, respond to them. it argues that each main character’s ability to challenge the “good” imperial power structure he inhabits is shaped by the degree to which each text relies on two major concepts that the children’s fantasy genre has used for a long time: victorian assumptions about who a child is and how they should be raised, and the moralization of each fantasy world’s magic system through the use or disuse of portals and the fairy tale form (rose, 1993; jones, 1995; wuenschlager, 1996; sánchez-eppler, 2005; mendlesohn, 2008; crain, 2016). “good” imperial systems in each text attempt to impose these concepts on their child subjects through various means in order to shape the children under their control into ideal subjects, but they will only be successful if the text structures itself in a way which endorses a traditional view of the concepts. because of this, this thesis concludes that percy jackson is able to take a stronger stance against imperialist power structures than harry potter is because the lightning thief diverges from traditional uses of these concepts to shape its narrative.

the concept of the animal soul in classical antiquity

heather dupire-nelson, classical civilization, classics
sponsors: professor laura videbaurn, classics; professor michael peachin, classics

my senior honors thesis in classics involves an examination of the concept of the animal soul in classical antiquity. a good deal of modern animal rights theory has its conceptual origins in ideas that were first set forth in classical antiquity, especially in the writings of plutarch and porphyry. however, relatively little scholarly attention has been devoted to ancient greek and roman views as to whether animals possess souls, what elements characterize those souls, and what that suggests as to how animals should be treated. in my thesis, i examine ancient greek and roman conceptions of the soul and the afterlife and the extent to which animals enter into that (including through the concept of transmigration of souls). i also examine the various classical conceptions of “the soul”, in particular, as delineated by plato, aristotle, plotinus, and porphyry as well as elsewhere in classical literature. i then examine how these varying conceptions of the soul classify animals and how this relates to prevailing views as to the nature of animals and the rights to be accorded them.

éamon de valera and the american west: how the social and political circumstances of the western states impacted and informed the irish president’s tour, 1919–1920

kiera eriksen-mcauliffe, history, politics
sponsors: professor marion casey, history; professor rebecca goetz, history

the social and political world of the american west during irish revolutionary president éamon de valera’s 1919–1920 tour of the us was both distinct from that of the east and important in informing public opinion of him and how he approached western audiences. this project seeks to understand the specific conditions of the western us at the time of de valera’s arrival and to weigh how they impacted public opinion. these conditions include the historical status of irish-americans in the west and political phenomena of the period including the aftermath of world
War II, the labor movement with which many Irish-Americans were involved, and prohibition. Analysis of newspaper articles shows that the West saw greater opposition to de Valera than the East because of these conditions. Groups like the American Legion touted that de Valera was anti-American because the party of Irish Independence, Sinn Féin, had supported Germany during the war. This, in combination with the labor agitation of which many Irish Americans were leaders, led to a sort of Red Scare-type fear of de Valera’s influence in the US, along with fears of what his message of Irish independence might mean on the international political stage. On the other hand, de Valera countered these claims by asserting that Irish independence was in line with both American and Allied Power values of self-determination and liberty for small nations. He remained mostly firm in his message throughout his time in the US and across regions but made small adjustments in the West to account for sensitivities about the Irish role in the World War.

Identity and Subjectivity in Incendies
Renee Firth, Comparative Literature
Sponsor: Professor Gabriela Basterra, Comparative Literature

My project will examine how themes of identity, subjectivity, and kinship interact in the film Incendies, directed by Denis Villeneuve, revealing the relationship between state power and kinship. Incendies presents two narratives: one of a mother, Nawal, searching for her stolen child in the midst of a civil war, and another of her two adult twins many years later who are required by Nawal’s posthumous will to return to her homeland in order to uncover her past, find the brother they never knew they had, and the father they thought was dead. In navigating these familial relationships, both Nawal and the twins must contend with a political apparatus and civil uprising, that in their violence, violate norms of kinship and generate lasting trauma. Nawal and her family are forced to confront their own identities and roles in the uprising, demonstrating how political power and subjectivity are contingent on kinship. My research is specifically invested in using Incendies to discover how power reconstitutes itself through the people, how people are constituted through power, and how uprising alters the interpersonal and spiritual makeup of society as a reflection of ongoing complications in one’s sense of self. In answering this question, I will interrogate theory and criticism by writers including Michel Foucault, Judith Butler, and Elaine Scarry which aid my analysis in how the state interferes with its populace, whether its actions are through physical, generational, or cultural violence.

Authoring Female Subjectivity: Motherhood in Sylvia Plath’s The Bell Jar and Carol Shields’ The Stone Diaries
Anastasia Foley, Economics, English and American Literature
Sponsor: Professor Crystal Parikh, English and American Literature

Literary critic Gayle Greene (1990) claims that in the late-twentieth-century, second-wave feminists asserted agency over motherhood by redefining it in their own terms. At the same time that the second-wave feminist movement found political and social power in the figure of the mother, it rejected patriarchal norms of marriage and motherhood that had suppressed women’s liberation in the past. This complex ambivalence towards motherhood that characterizes second-wave feminism makes the late twentieth century a critical moment in which to consider literary representations of pregnancy and childbirth. This thesis offers an analysis of Sylvia Plath’s The Bell Jar (1963) and Carol Shields’ The Stone Diaries (1993) as exemplary novels in which a feminist treatment of maternity seems to inform the narrative and structural elements of the texts. I argue that these two novels take a feminist approach to representations of pregnancy and childbirth by both rejecting normative expectations of motherhood and embracing the generative possibilities for female subjectivity that exist within these narratives. Plath and Shields each utilize a subversion of typical narrative forms, a re-imagina- nation of the pregnant body, and an intimate exploration of childbirth in order to write against traditional conceptions of motherhood. In doing so, these authors open up space for future discursive forms to fully embrace the mother’s subjectivity.

“Risen from the Ruins”: The Politics and Culture of Jewish Anti-fascism in the German Democratic Republic (1949–1989)
Ethan Fraenkel, Comparative Literature, History
Sponsor: Professor Rossen Djagalov, Russian

This project critically examines the cultural and political legacies of German Jews who chose to live in East Germany after the devastation of the Holocaust in order to help establish the German Democratic Republic (GDR). This interdisciplinary study draws on a diversity of artistic and archival sources in its analysis of how leading Jewish figures in the GDR had a complex and often contradictory relationship to the state and the anti-fascist narrative which constituted its raison d’être in the post-war era. While many Jewish politicians and artists initially contributed to the rhetoric of the GDR’s supposed moral and political superiority over the Federal Republic of Germany (FRG) in the West, artists such as Stefan Heym and Wolf Biermann began to voice their critique of the gap between the ideals and reality of their government through their respective novels.
and folk music. Even figures more ostensibly loyal to the
government such as the novelist Anna Seghers imbued
her writing with a subtle critique of state-sanctioned, an-
ti-imperialist discourse by highlighting the often-silent (or
silenced) anti-colonial resistance of women in the Global
South. On the other hand, Holocaust-survivors-turned-pol-
ticians such as Klaus Gysi and Hermann Axen occupied a
far more ambiguous role, simultaneously assisting Jewish
communities in preserving historical memory while lever-
gaging the issue of Holocaust reparations as a geopolitical
bargaining chip with Israel and the US. By studying these
individuals’ biographies and work, a portrait of a rich
Jewish anti-fascist legacy emerges. At its best, this outlook
was characterized by a synthesis, not subordination, of
reinvented Jewish traditions and socialist politics together
with a commitment to build a more just future from the
ashes of genocidal fascism.

Public Participation in Urban Redevelopment: A Case
Study of the Ford Site in Saint Paul, Minnesota
Willa Giegelman, Sociology, Urban Design and
Architecture Studies
Sponsor: Professor Jon Ritter, Urban Design &
Architecture Studies
In this project, I investigate the ways the public
shapes and is shaped by conversations surrounding urban
design decisions in cities today. Research and analysis are
focused on the role of public participation and the priorities
inherent in planning and decisions as seen through a case
study of redevelopment at the site of the former Ford Twin
Cities Assembly Plant in St. Paul, Minnesota. Urban de-

design is an interdisciplinary field concerned with the design
of the built environment, physical development, and land
use. Urban planners consider the physical layout, architec-
tural form, efficiency, sanitation, transportation, use and
protection of the environment, effects on social and eco-
nomic activity, and the welfare of the public when making
development decisions. Public participation is a valuable
resource for planners because nobody knows more about
an area than those who live and work in it. Planners there-
fore often consult the public and consider policy recom-
mandations that emerge from meetings, forums, and public
hearings. This research evaluates the public process and
design evolution of redevelopment at the site of a former
Ford plant in St. Paul, which offers an opportunity to track
new development on an existing site in a mature city. This
case study also incorporates analysis of urban sustainabil-
ity issues, given the project’s stated goals to be one of the
first net-zero communities in the US.

Teaching Nationality: Mirash Ivanaj and Young
Albania’s Educational Reconstruction, 1933–34
Era Gjonbalaj, History
Sponsors: Professor Larry Wolff, History; Professor
Rebecca Goetz, History
I examine the year 1934, when Albania’s Minister
of Education, Dr. Mirash Ivanaj, instituted an exhaustive
reconstruction of the Albanian school system, making
elementary education obligatory for five years, opening
secondary and technical education institutions, and closing
all foreign-run schools. Albania’s interwar generation was
the first to read and write the Albanian language’s newly
standardized alphabet following centuries of Turkish lan-
guage domination. Albania, a small country that today bor-
ders Greece on the south and the Adriatic on the west, had
declared independence from the Ottomans in November
1912. Just four years prior, the Albanian language had been
standardized for the first time at the Congress of Monastir.
Still, literacy rates remained exceedingly low and schools
were scarce until the establishment of a national govern-
ment in 1920, after which elementary schools began to be
opened in cities and some smaller towns. During World
War I, foreign schools were opened by occupying pow-
ers, and French, Italian, and American schools remained
during the interwar period up through 1934. I argue that
while Ivanaj’s institution of the 1934 law was an attempt by
Albania to reduce Italian fascist propaganda and growing
influence, it was also an effort to assert autonomy against
other Western powers who had their own desire to shape
politics in post-Ottoman southeastern Europe. Most impor-
tantly, however, Ivanaj’s reforms were a crucial piece of
the Albanian nationalization effort that had begun in 1908
at Monastir but still lacked the enthusiasm of the general
public.

From Pasolini’s Decameron to Smut: A Discussion
on the Reappropriation of Boccaccio’s Decameron in
1970’s Italy
Kristyn Graves, Medieval and Renaissance Studies
Sponsors: Professor David Forgacs, Italian; Professor
Alison Cornish, Italian
Released in 1971, Pier Paolo Pasolini’s The Decam-
eron was a box office hit. Based on the Medieval work by
Boccaccio, Pasolini tells nine of the one hundred stories
present in Boccaccio’s work, focusing on those with sexual
and comedic premises. Following its release, over thirty
films would be released, later to be categorized as decamer-
onica. These films utilize the setting and scenery provid-
ed by Boccaccio’s Decameron and use it as a backdrop in
which comedic sexual stories can be told. However, they
pull very little from the narrative of Boccaccio’s work and
create their own stories within the same world. Films such
as this are still created today, for example the 2017 film
The Little Hours. I will discuss these films and how they
choose to utilize Boccaccio’s *Decameron*, explaining the differences between these films and Boccaccio’s work in an attempt to see how the Medieval text is twisted to fit the needs of a modern audience.

*Never One of the Crowd: Trauma Theory and the Need for Superiority in “William Wilson” and The Picture of Dorian Gray*
*Trisha Gupta, English and American Literature*
*Sponsor: Professor Josephine Hendin, English and American Literature*

This thesis employs contemporary trauma theory as a lens through which a larger dimension of late-Gothic texts such as Edgar Allan Poe’s “William Wilson” and Oscar Wilde’s *The Picture of Dorian Gray* can be appreciated. Using the concept of endemic societal trauma, as defined by Laurie Vickroy and Stef Craps, this thesis demonstrates that the protagonists of both Gothic texts combat societal trauma by striving to assert superiority, and explores to what extent such exertions are viable. The Introduction shows how the Gothic and trauma theory are relevant to the analysis. Chapter 1 examines assertions of power in “William Wilson” and establishes a model in which the narrator, faced with someone who shares his name and features, fears commonality and is driven to achieve superiority over others. Chapter 2 applies this model to Dorian Gray and suggests that Dorian associates commonality with aging, embraces the immortality of art, and attempts to become the ultimate masterpiece by evading aging. Chapter 3 highlights the curative prospects of trauma theory, which advocate accepting commonality and sharing with other victims as a route to healing from endemic societal trauma. The Conclusion addresses the question of whether the Gothic protagonist can experience character growth and healing in a similar manner. The thesis concludes by suggesting that texts such as “William Wilson” and *The Picture of Dorian Gray* offer glimpses into the human condition as perceived by the Gothic and proposes a connection between the condition of the Gothic protagonist and that of the twenty-first-century human.

*Penetrating, Piercing, and Androgenizing: The Linguistic Defining, Redefining, and Blurring of Gender in the Beowulf Manuscript and the Madrid Skylitzes*
*Trisha Gupta, English and American Literature*
*Sponsor: Professor Haruko Momma, English and American Literature*

Through exploring the language surrounding the actions and self-expression of women in medieval literary narratives and art in the *Beowulf* Manuscript and the *Madrid Skylitzes*, this paper argues that Old English literature equips female characters with transferable markers of masculinity such as beards, penetrative swords, and hair that afford these individuals power through fluid gender expression and androgyny. The Introduction explores how both manuscripts, though from different periods and locations, demonstrate how the Eastern world was imagined and interpreted. Section I, entitled “Women and Beards”, considers a woman in “The Wonders of the East” who demonstrates the juxtaposition of femininity and masculinity both in her body and lifestyle. Section II, entitled “Women and Swords”, examines the scene from *Beowulf* in which Grendel’s mother attempts to pierce Beowulf and, by doing so, embodies androgyny in her motherly revenge, heroic fighting, and masculinized attempts to penetrate. This section also meditates on the penetrative act of a Thracesian woman in the *Madrid Skylitzes* who kills her would-be attacker with her husband’s sword. Section III, entitled “Hair and Swords”, analyzes the ramifications of hair—known to have symbolized dominance and nobility for men in early medieval English society—being pulled in *Beowulf* and in the Old English poem *Judith*. The Conclusion addresses the question of why reading women as passive victims in early medieval literature is perhaps an incomplete reading after taking historical context and the aforementioned analysis into consideration. The paper concludes by suggesting that the evasion of exclusively binary gender classification in the *Beowulf* Manuscript and *Madrid Skylitzes* reinforces that self-expression itself can be fluid and that there is a certain power in blurring the lines and reveling in different hybrid identities—whether in the Middle Ages or the twenty-first century.

*Gender Identities, Gender Relations, and Sexuality in the Middle Ages: Evidence of the Thirteenth-century Parisian Moralized Bibles*
*Lucia Iglesias, Art History*
*Sponsor: Professor Kathryn Smith, Art History*

At the surface, a medieval person’s identity could be threatened if they deviated from their expected sexual role. Females and males were expected to remain within and fulfill the demands associated with their respective groups in society. The female and male spheres were so separate, and there was such strict control over interactions between the two groups that the only reasons for their overlap were marriage and procreation. It is typically thought that since religion was the primary enforcer of gender roles and heterosexual activity in the Middle Ages, it would prevent concepts of gender fluidity and homoeroticism from penetrating society and the religious sphere. However, there are several examples that show this is simply not the case. Evidence in the thirteenth-century Parisian Moralized Bibles points to the existence of relevant conversations surrounding the exploration of sexuality and shows how perceptions of different sexual identities changed within the century. I would like to contribute to the fields of gender studies and art history with my own research on illuminations within
the Parisian Moralized Bibles that explicitly show remarkable images of same-sex couples and hopefully demystify some of what is so wonderfully convoluted in this period of sexual exploration.

Wrestling with the God Who Weeps: Joseph Smith, Fyodor Dostoevsky, and the Problem of Evil
Spencer Judd, Business, Philosophy
Sponsors: Professor Richard Bushman, Columbia University, History; Professor Terryl Givens, Brigham Young University, Maxwell Institute

   My research juxtaposes contributions from two major nineteenth-century thinkers to the philosophical discussion of theodicy and the problem of evil. The problem of evil is the problem of reconciling the claim of an all-good, all-powerful deity with the extreme unnecessary suffering that occurs in the world. The first nineteenth-century document I examine is The Brothers Karamazov by Fyodor Dostoevsky, specifically looking at Ivan Karamazov’s argument against the claim that God is good. The second body of work I examine is the religious philosophy that emerged from texts and discourses by Joseph Smith. My paper includes reviewing atrocities of human history, the influence of Neo-Platonism on early Christianity, the problematic consequences of such an influence resulting in an insufficient Christian theodicy, and the intellectual movements that allowed for novel critiques and conceptions of God to emerge and respond to that insufficient theodicy. It also analyzes Smith’s revolutionary conception of 1) God, in naturalistic terms, 2) Mankind, as eternally existent, free, and perfectible selves, and 3) Mortality, as an educative gymnasium for moral development. Dostoevsky’s Ivan Karamazov demonstrates why the classical Christian conception of God cannot be reconciled with the abundance of unnecessary evil found in the world and, as a result, is unworthy of worship. Joseph Smith’s religious philosophy implicitly allows for a meaningful compatibility of a metaphysical God with the existence of evil, in part, by not holding, and thus not being bound by, classical Christian axiomatic positions. In November 2019, my work was published in the “International Journal of Philosophy, Theology, and Science” (for the full essay: https://ijtps.com/gallery/no.5-year3-2019-ijtps-judd.pdf).

Judging Lolita by Her Covers: A Visual Introduction and Critical Commentary
Lucia Leighton Kassela, Media, Culture, and Communication, Psychology
Sponsor: Professor Karen Karbiener, Global Liberal Studies

   As a well-known topic of moral controversy, Vladimir Nabokov’s 1955 novel Lolita rose to fame most notably for its unreliable narrator, Humbert Humbert, a man who becomes sexually involved with a 12-year-old girl by the name of Dolores Haze. As a result of Humbert’s solipsism, we are unable to construct Lolita as a fully formed character, instead, we look to Humbert’s biased recollection to piece together an understanding of the girl Lolita might have been. Not only does this present its challenges when analyzing the reading as a whole, but makes it unbelievably difficult to create cover art for a novel whose namesake is obscured by the depraved musings of her captor. This presentation will provide an introduction to and commentary on the cover art for the novel from its understated 1955 Olympia Press debut to its 1997 Random House edition in an effort to call attention to how both Nabokov and his notoriously unreliable narrator continue to problematize the ways in which the world sees Lolita. This research will include six examples of Lolita cover art produced over 50 years, and include annotated diagrams dissecting the artistic choices of each. As time passes, the cover art strays further from the original conditions outlined by Nabokov, and gives in to the mainstream desire to see attempted depictions of Lolita in print. Unfortunately, Nabokov and his problematic protagonist make this a hopeless task, forever confounding the artist, and disgusting the reader.

“This Silent and Forgotten Country”: Orhan Pamuk, Kazuo Ishiguro, and the Ambient Metaphor of Postmemory
Hanna Khosravi, English and American Literature, History
Sponsor: Professor Patrick Deer, English and American Literature

   In his 2017 Nobel Prize Address, novelist Kazuo Ishiguro asked whether “stable, free nations really be built on foundations of willful amnesia and frustrated justice?” (Ishiguro, 2017). What Ishiguro is exploring is, in essence, the phenomenon of “postmemory”, defined by scholar Marianne Hirsch as “the relationship that the ‘generation after’ bears to the personal, collective, and cultural trauma of those who came before” (Hirsch, 2012). Ishiguro’s 2015 novel The Buried Giant is premised on this precise investigation, utilizing the setting of mythical, post-Arthurian Britain to examine the troubling questions of why societies turn to “willful amnesia” in the wake of collective trauma. Ishiguro’s concepts of “the buried giant” and “the mist of forgetfulness” will serve as the contextual framework for this project’s analysis of Turkish novelist Orhan Pamuk’s 2002 work, Snow. I will analyze how Pamuk, a writer and political dissident, utilizes the ambient metaphor of snowfall to describe the unsettling amnesia inflicted upon a population by an oppressive governmental regime. In reading the novels of Pamuk and Ishiguro in tandem with Iranian New Wave neorealist films in post-Revolutionary Iran, I will read how the role of authors, or directors, in these works serves as a means of post-conflict narratological distortion. The paramount goal of this project is to study
how works of literature become vessels of history and human rights by excavating the truths that have been buried by deliberate generational silences. Through this project, I will uncover how certain works are not simply “historical” but rather serve as history themselves.

A Real Lolita in Tehran: A Novel Call to Action Regarding Non-consensual Unions in the Middle East
Daria Hope Kowalski, Politics, Psychology
Sponsor: Professor Karen Karbiener, Global Liberal Studies

The devastating effects of sexual relationships between adults and children, explored and exploited in Vladimir Nabokov’s novel Lolita, are realized in the real-life story of my grandmother, Pouran-dokht Noudoshani (1937–2008), an Iranian-born woman who married her twenty-three-year-old relative at fourteen. By comparing Noudoshani’s and Lolita’s narratives, this project will depict how such relationships have a lifelong impact on both fictional and real-life survivors. Azar Nafisi has written about the relevance of Lolita in Iran, but Reading Lolita in Tehran focuses primarily on Lolita’s lack of autonomy and its relation to the status of women’s rights in the Islamic Republic. I will instead examine how the prevalence of child marriage in Iran further complicates the ways in which Iranians consider and judge Lolita, who is twelve when she is first raped by her stepfather Humbert Humbert. I posit that Nabokov’s fiction was a reality for Noudoshani and many other Iranian girls: in fact, news reports tally between 500,000 and 600,000 child marriages yearly in Iran. Girls are forced into adult roles, such as managing a household and finances and cannot pursue higher education or establish a sense of identity. I will present my grandmother’s story, draw comparisons between it and Nabokov’s account of Lolita, and discuss how both stories can be used as calls to action in Iran and many other countries that continue to practice non-consensual unions between girls and men.

Found Treasure: A Story of Looted Nineteenth-century Korean Battle Flags
Anna Leckie, Art History
Sponsor: Professor Michele Matteini, Art History

During restoration work to the Naval Academy’s Mahan Hall, where captured standards and flags are displayed, three perfectly preserved Korean battle flags were found behind display cases in 2017. Taken as loot during a chain of events caused by the General Sherman incident, they were sent to Annapolis as part of President Polk’s 1849 decree. Another flag in the Naval Academy’s collection from the same incident, a Korean standard flag which has similar significance to the Korean people as “Old Glory or the Liberty Bell” has to the American people, was given to Korea on the basis of a 10-year loan. Most countries are bound by UNESCO and other codes to cooperate with art restitution, especially when it is as clear cut as wartime looting. Yet these frameworks were only established at the turn of the twentieth century and therefore do not apply to incidents that occurred prior. This project explores first-hand research on these looted objects and on ways to restitute looted works of art. By researching the flags and their art historical significance, and comparing their differing fates in the context of legal methods for repatriation we can understand inherent vices situated within cultural repatriation and ways to remedy that.

Chi più ha giudizio, più ne adoperi: An Empirical Examination of Economic Growth within Italian Banking Foundations
Aidan Levi-Minzi, Economics, Italian
Sponsor: Professor David Forgacs, Italian

In August of 2019, Business Roundtable—a non-profit organization with a large sphere of influence over business practices within large public US companies—decided to implement stakeholder capitalism, a system in which companies work towards improving their profits, while at the same time providing aid for the economic development of their local communities (Dimon, 2019). Although stakeholder capitalism was recently adopted within the US, it has existed since the early Renaissance period within two of Italy’s largest banks: Monte dei Paschi di Siena (MPS) and Intesa Sanpaolo (ISP) in the form of Banking Foundations (Bilotta, 2017). Following the banking reforms implemented by the Italian government in the 1990s, each bank chose a different strategy to change the structure of their Foundation (Carletti, Hakenes et al., 2005). The goal of this study is to examine and compare the economic impact of these reforms on each Foundation through the application of Solow’s Growth Model. In addition, the perspectives of economists Milton Friedman and Joseph Stiglitz are considered in order to answer the question of what is more important for society as a whole: a successful regional bank, or a local corporation willing to give back to the community.

Cyclops and Exile: An Exilic Reading of James Joyce’s Ulysses
John Madonna, English and American Literature
Sponsor: Professor John Waters, Irish Studies

This paper explores the “Cyclops” chapter of James Joyce’s Ulysses through the lens of exile. In so doing, I aim to challenge the traditional readings of the chapter, which have been almost universally pervaded by strong, anti-nationalist feelings. In my first chapter, I seek to establish a suitable framework within which to affect an exile reading. Furthermore, I seek to demonstrate that Joyce can be read as an exile author. My first chapter is thus in three parts: 1) an examination of the critical conception of exile in liter-
Science versus Culture: The Father of Neuroscience’s Non-scientific Work
Sarah Marbach, Neural Science, Spanish
Sponsor: Dr. Tess Rankin, Spanish and Portuguese

My thesis centers around the question: Is science separate from culture, or rather a part of it? And to what extent do science and culture mix? Nowadays, we tend to keep the sciences and the humanities very separate from one another, and, even within science, there is a separatist approach to research: biologists, chemists, and physicists usually stick to their respective fields. In my research, I aim to show how science, as represented by neuroscience, and the humanities, as represented by literature and philosophy, both work towards exploring the giant question mark that is the human condition. I argue that not only do they work towards answering the same question, but, in fact, they use related methodological frameworks in this exploration. I will be using Spaniard Santiago Ramón y Cajal, the father of modern neuroscience, as my case study to investigate this topic. Studying his non-scientific work (philosophical ponderings, science fiction, and an autobiographical book) will draw out parallels between these writings and his scientific studies in order to find how both disciplines deploy similar techniques to analyze humanity.

Dialogue in Rhythm: An Ethnomusicological Comparison between North American Hip Hop and Funk Carioca
Milo Narushchen, Spanish
Sponsor: Professor Michele Nascimento-Kettner, Spanish and Portuguese

Heavily influenced by North American funk and soul, Brazilian baile funk shares many characteristics with hip hop from the US. Now ingrained in the music industry, the cut/splice, DJ based production style of rap and hip hop was a historical breakthrough for music production as a whole. These alternative forms of music production were relatively easy to access and provided artists within marginalized spaces the means to articulate their experiences and views concerning systemic racism, police oppression, and gender relations. Understanding the strategies incorporated by these artists is fundamental for examining the ways music continues to amplify public consciousness of the various colonial frameworks constraining the minds of most individuals. The artists examined in this thesis such as N.W.A., Cidinho e Doça, Salt N Pepa, Tati Quebra Barraco, and MC Carol use music as a form of dialogue, interacting with municipal/political policy, other artists, and widely held, racist/heterosexist public opinions. The nature of this dialogic functionality provides the sonic spaces for artists to challenge each other in grand debates of representation. This thesis analyses the strategic use of lyrical violence, sampling techniques and role reversal within Brazilian baile funk and North American hip hop.
through theoretical frameworks provided by authors such as Mikhail Bakhtin (1970), Roberto da Matta (1979), Tricia Rose (1994, 2008), Hermano Vianna (1988), bell hooks (1984, 1994), and Audre Lorde (1984) to address modern strategies of cultural production that challenge colonialist ideologies such as white supremacy and sexism.

Listening and Witnessing in Lost Children Archive
Mary Oliver, Spanish
Sponsor: Professor Lourdes Dávila, Spanish and Portuguese

Lost Children Archive by Valeria Luiselli is a novel of echoes. Luiselli uses the archive as a literary device to create physical archive-installations that match the textual archives traveling with the family in the novel. As a result of her process, the novel is an aesthetic archive and an echo of the archives with which Luiselli interacted during the process of creation. At the textual level, the characters’ experiences juxtapose with their habits of recording and documenting. When the characters bring their experiences into the archives they’ve built, an echo of the stories they’ve been listening to and retelling returns. The tension between experiencing and documenting crescendos in an interaction between listening and witnessing: the sonic regime (listening) and the scopic regime (witnessing) confront each other and merge when the boy narrator finally sees evidence of the children he’s previously known only through stories. Beyond the stories that the novel narrates, Lost Children Archive is a reflection about the structures and politics of perception and their relationship to power.

Sketching the Fin-de-Siècle Self: Embodied Identity in the Self-portraiture of Albrecht Dürer and Egon Schiele
Mari Otsu, Art History, Psychology
Sponsor: Professor Dennis Geronimus, Art History

What might we learn about emerging concepts of the self and identity in turn-of-the-century Europe (1500s Germany and 1900s Vienna, respectively) by putting the self-portraits of Albrecht Dürer and Egon Schiele in conversation with one another? How might these concepts of the self differ from how identity is defined in the twenty-first century? What is the role of self-portraiture today? The aim of my scholarship is trifold: 1) to visually compare the output of two artists separated by four centuries, 2) to shed light on the evolving definition of self-concept during the eras of Dürer and Schiele, and 3) to enrich our understanding of self-portraiture in general by integrating contemporary social psychological theories of the self and identity into art historical literature. Although the self-portraits of Dürer and Schiele have individually been the subjects of much scholarship, they have not yet been written about in conversation with one another or through the lens of contemporary psychological research. Their self-portraits are fruitful comparisons not only because both Dürer and Schiele break from artistic conventions of their respective eras but also because the portraits reveal the historical and psychological backdrops against which the artists’ outputs were configured and received. Europe at the turn of the 16th and 20th centuries is especially fertile ground for exploration of this topic because large, documented shifts were taking place in the perception of the self/artist in relation to the world.

Images in Marguerite Duras’ “Asian” Novels
Qianjun Peng, Romance Languages
Sponsor: Professor Judith Miller, French

In this project, I intend to analyze the Asian images in two of Marguerite Duras’ autobiographical novels: Un barrage contre le Pacifique and L’Amant. I intend to show that those images are the carrier of inner emotions and that by rearranging those images, Duras shows two versions of the same memory. By finding the differences and similarities between these two novels, I want to show that this process of memory-editing is Duras’ struggle of fighting against an ongoing childhood trauma caused by her dysfunctional mother, her absent father, and her ambivalent identity as a poor, female colonist in French Indochina. What’s more, I will reevaluate the value of Duras’ novels as a Francophone-Vietnamese narration: different from the stereotypical Asia created by colonial literature, Duras’ Asia is highly personal, without any collective imagination. That is to say, it is a real Asia made up of tears and blood.

Rethinking Nietzschean Constitutivism: An Ethics of Value
Julian Perilla, Philosophy
Sponsor: Professor John Richardson, Philosophy

Values pervade our world and, more importantly, our life. Certainly, Nietzsche was well aware of this fact about human nature, which time and again became central to his philosophical inquiries. But then the question arises, why is it that we value in the first place? Nietzsche takes up this question in much of his writing and, in doing so, I believe he unlocks the critical relation that exists between our valuing and our need to find life meaningful. In this essay, I offer a particular reading of Nietzsche’s metaethics that builds on and attempts to account for the relation between our need for meaning and our human valuing. As I shall argue, Nietzsche seems to have uncovered in our need for meaning the very reason that upholds our valuing, and, with this as my premise, I shall offer a sketch of an argument in favor of a constitutivist theory of values inspired by Nietzsche. If our valuing must aim at making our lives meaningful, there is something to be said about what valuing well is and the principles such valuing must
follow. The hope is, of course, that this particular way of reading Nietzsche will help us learn something not only about Nietzsche’s central concepts—nihilism, meaning, and power—but also about what it means to value as a human being.

Cómo llegamos / Cómo nos quedamos: The Bridges and Barriers to Latinas in the Legal Profession
Maríalejandra Portal, Politics, Spanish
Sponsor: Professor Licia Fiol-Matta, Spanish and Portuguese

Compared to their overall presence in the US, Latinas make up the lowest representation of any racial or ethnic group in the legal profession. In 2009, the Hispanic National Bar Association Commission on Latinas in the Profession published their seminal study on the status of Latinas in the Legal profession entitled Few and Far Between. While this was the first study of its kind, providing a profile of Latinas in the field, examining critical success factors, and highlighting the challenges faced, it only scratched the surface. Few and Far Between offered insight into a formerly under-researched topic, covering many issues but failed to thoroughly explain the points they raise. This examination aims to perform a deep delve into a few of the key motivating factors, or bridges, for Latinas entering the Legal profession and the barriers they face once in the field.

Indivisibility: France’s Discriminatory Response to Radical Islamic Terrorism?
Julia-Françoise Raith, French, International Relations
Sponsor: Professor Lucien Nouis, French

The sentiment of “la République indivisible” (“the indivisible republic”) is distinctively France’s principal response to radical Islamic terrorist attacks. Indivisibility serves as a protection that is essential in the comprehension of France’s response to internal and external threats. France’s entire political class, regardless of party affiliation, sees radical Islam as a separatist movement—a force that seeks to divide the nation and create a rift between its citizens—when dealing with this new constant threat of terrorism. My qualitative project analyzes the fragmented elements of an intrinsically anti-separatist response of the political class, this paper illuminates controversial French policy that has been passed in the name of indivisibility with a focus on policy marginalizing Muslim women in France. The purpose of the qualitative side of this project is: What is the effect of triggering the memory of French citizens of the 2015 Charlie Hebdo terrorist attack on the culturally-present notion of “indivisibility”? I conducted a survey experiment with 210 French citizens, with respondents answering a variety of question such as demographic, reading comprehension, indivisibility, and firsthand experience questions. The main results yielded from this study show that exposure to the 2015 Charlie Hebdo attack by the means of a descriptive article shows no effect on levels of indivisibility. Some interesting findings discovered include Christians’ being indivisible yet after being exposed to the treatment being less indivisible; younger people tended to be less indivisible than the reference group, or 70+ years old; the more educated, the less indivisible; the “better” the employment, the less indivisible; the richer, the less indivisible; and those who experienced terrorism firsthand were more indivisible.

Opaque Identities: The Fragmented Elements of Caribbean Identity Expressed by Suzanne Césaire and Maryse Condé
Nate Rodriguez, Comparative Literature
Sponsor: Professor Manthia Diawara, Comparative Literature

My project analyzes the fragmented elements of Caribbean identity expressed by Suzanne Césaire and Maryse Condé. In order to examine the complex notions of identity expressed by these authors, I will contextualize their arguments with those of Édouard Glissant, a philosopher who uses the Caribbean as a point of departure for his theoretical arguments in his Poetics of Relation and Caribbean Discourse. The foundation of my project is the analyses of Suzanne Césaire’s collection of essays The Great Camouflage: Writings of Dissent, and Maryse Condé’s The Journey of a Caribbean Writer. Suzanne Césaire, who writes amid a colonial-occupied Martinique during World War II, relates the Caribbean as an environment in need of representational agency to combat the oppressiveness of colonial rule. In order to show a more contemporary analysis of Caribbean identity, I will explore Maryse Condé’s The Journey of a Caribbean Writer which shows the transformation of identity in a globalized world. The goal of my project is to explore the distinct elements of an intrinsically chaotic Caribbean identity that Western identity frameworks fail to encapsulate. Consequently, I will argue the need to reorient engagements with Caribbean literature in a manner that accentuates the individuality of each Caribbean writer without framing them in generalized lenses that confuse individual expression.
An Imperfect Science: Translating Pain and Identifying Comfort in Illness Narratives

Angelique Simeone, English and American Literature
Sponsors: Professor Dara Regaignon, English and American Literature; Professor Perri Klass, Journalism; Professor Nicholas Boggs, English and American Literature

My thesis explores the medical narrative as an instance where authenticity and legibility in nonfiction works are fundamentally incompatible with one another. I propose that the most successful narratives in this genre are structurally complex, non-reductionist works. While Dr. Rita Charon claims that in the doctor-patient relationship, language is insufficient for the patient to relay information, I argue that in the context of illness narratives, the written word provides the patient with both an outlet and a sense of agency in framing an understanding of their condition. I will analyze several contemporary works within the genre of “medical narrative” including those written by Oliver Sacks, Annie Janvier, Paul Kalanithi, Leslie Jamison, and Abby Norman. The first chapter weighs the benefits and the drawbacks of two distinct forms within the genre of medical narratives: the linear narrative and the fragmented experimental form. I then transition to a chapter that analyzes the challenges that arise for the patient’s emotional well-being when using tools to translate pain and suffering. Finally, I compare the concept of comfort as it pertains to writers in distinct roles facing distinct prognoses—first, the role of comfort for the mother of a patient with an uncertain fate, and then the significance of consolation for a patient with a terminal diagnosis. Throughout the thesis, I challenge whether or not several components of the medical narrative seem to impact the legibility or accessibility of the patient story. Ultimately, I advocate for a more complete reading of illness that considers the many influences on how the patient perceives his or her experience. I demonstrate that the more fragmented and complex texts are more representative of the emotional experience of the writer.

Achieving the Impossible: Electoral Stability in Italy
Matthew Spaargaren, Economics and Mathematics, Italian
Sponsor: Professor David Forgacs, Italian

Italian politics is often stereotyped as a bureaucratic nightmare—a confusing spectacle where nobody wins. Since Italy became a republic, government coalitions that were being formed were falling apart very quickly. In fact, over the last seventy years, around sixty different government coalitions have collapsed, at a rate of almost one per year. In the last thirty years, the Italian government has attempted to improve its electoral system, changing it four different times, but there are still stability issues. In this project, I will be documenting and determining the reasons for this political instability.

Ambivalent Archives: A Study of the Historical Amnesia Surrounding the Coerced Sterilization of Puerto Rican Women
Olivia Sun, Spanish
Sponsor: Professor Zeb Tortorici, Spanish and Portuguese

Between the 1930s and the 1970s, the US launched a series of “family planning” campaigns in Puerto Rico, resulting in the irreversible sterilization of nearly thirty-seven percent of the female population. Both the US and Puerto Rican governments also allowed scientists to test experimental contraceptive drugs on Puerto Rican women, only to be distributed in the US. There is little official documentation about what occurred during those years and what does exist remains scattered. My project attempts to locate and resurrect archival materials regarding the sterilizations and to examine the way they intersect with gender- and race-based discourses on Puerto Rico. The documents bring to light concepts of consent, reproductive freedom, colonialism, and eugenics. I also explore how historical archives and the manner in which things are archived can both harm and cultivate Puerto Rican subjectivity. From various contraceptive advertisements to unmarked photographs, all of these fragmented materials represent the complexity of historical memory. How are we to remember and reconcile lost stories? More importantly, the project serves to point out the paradox of knowledge and how it’s constructed, namely, that it’s both extremely fragile and still able to create and contribute to difficult realities for its subjects.

Abjection and Identity in the Works of Ana Mendieta and Kara Walker
Katie Svensson, Anthropology, Art History
Sponsor: Professor Meredith Martin, Art History

Abjection can be understood as what we, as subjects, thrust aside and out of ourselves to constitute our identity. Visually this often translates to images of excrement, menstrual blood, decaying corpses, mutilated bodies, absent bodies, monstrous figures, and a myriad of other images that produce contradictory feelings of repulsion and desire in the viewer. However, these reactions are dependent upon one’s specific cultural and historical perception of what constitutes the grotesque. Significantly, the abject, defined in this thesis as the contemporary expression of the grotesque, has been mobilized by many women artists, largely to contest the oppression experienced by marginalized groups of people and to subvert the white patriarchal gaze. As I argue, this mobilization of abjection can open up liminal spaces for artists to express their own identities and contest the ways that dominant discourses have
categorized them. This thesis analyzes the works of Ana Mendieta (1948–1985) and Kara Walker (b. 1996) through the lens of the abject to examine how their works seek to protest sexism and racism and create art outside of patriarchal restrictions. Furthermore, by analyzing the reception of their art, I will consider how identity politics has limited interpretations of their work and explore the limitations of abjection itself as a tool for cultural change.

Being Black in the Métropole: Conversations with the Nardal Sisters
Safina Theard-Lewis, French
Sponsor: Professor Cécile Bishop, French

My thesis aims to answer the following question: Was there an alternative dialogue in which key women of the Négritude movement took part outside of the male dominated congress of 1956? While this ephemeral movement was essential to uplifting the Black male individual, it is important for us to acknowledge the women fundamental to the movement’s inspiration such as the Nardal sisters, Jane and Paulette Nardal. In searching for answers to that question, I want to show how these omitted women impacted the movement as a whole. One of the ways these women were able to convene and share ideas was through the time they spent at the Clamart salon. In my field, scholars such as Sharpley-Whiting and Bonner have made references to these women’s importance to the Négritude movement, but none have shown the parallels between the Clamart Salon and the Congress of 1956 which I intend to do. I believe that the Clamart salon was the female equivalent of the male dominated Congress of 1956 because, like the Congress, it represented a place of expression that women of the Négritude frequented to influence the monde noir and evolve as intellectuals. Through my analysis of past feminist perspectives as well as the various meeting places, discussions, and letters of the women who took part in the Négritude movement, I intend to uncover the successful contributions of their ideas on the movement and in the greater Diaspora.

Catullus 45 and Horace Odes III. 9: Where Poetic Ambiguity Meets Skillful Intention
Rafael Torre de Silva, Classics
Sponsor: Professor Matthew Santirocco, Classics

Hidden behind his highly sophisticated verses, Horace shows an unacknowledged Catullan influence. Many are the instances where the Horatian reader is reminded of Catullan symbols, themes, and narratives, and his Odes III. 9 and its close relation with Catullus’ Carmen 45 is one of the clearest examples. The poetic ambiguity of Carmen 45, in fact, allows for a masterful and creative reaction on Horace’s part. Not only is the Augustan poet aware of Catullus’ earlier poem, but he also goes as far as to transform it structurally and thematically. Horace both uses Catullus consciously through a concrete interpretation and changes him with a precise intention. This paper examines in depth the way Carmen 45 is open to multiple readings and how Horace’s nuanced reaction moves far beyond imitation and ultimately criticizes the naïve and idealistic understanding of the subjective erotic lyric that Catullus creates in his poetry. Through a contextual analysis of the placement of both poems in their broader work, this investigation shows how Odes III. 9 parodies Catullus through hyperbolic expressions and ironically depicts the impossibility of a sincere love relationship. As a resigned middle-ager, Horace interprets Catullus in an unromantic way and displays a more distant, moderate, dispassionate—perhaps even cynical—view on love. The relevance of their contrast goes beyond a mere accidental poetic game, but rather it gets to the roots of authorship and literary skill. Even though Catullus and Horace show different types of self-expression, they both stand as paradigms of the Hellenistic revolution in the Roman world of literature: they develop highly sophisticated poetic styles that successfully incarnate the Callimachian principles into the Latin language.

The Unfulfilled Potential of the Brooklyn-Queens Connector and the Future of Light Rail Infrastructure in New York City
Joe Tuano, German, Urban Design and Architecture Studies
Sponsor: Professor Mosette Broderick, Urban Design & Architecture Studies

The early 2000s saw a resurgence in the popularity of light-rail transit across North America with successful examples in cities like Portland, Oregon and Toronto, Canada. Seeking to revitalize the city’s aging transportation infrastructure and connect growing neighborhoods to transit options, New York City saw an opportunity to introduce the Brooklyn-Queens Connecter (BQX) light rail project. Announced in early 2016, the streetcar would connect the neighborhoods of Astoria, Queens and Red Hook, Brooklyn via a 16-mile track—bypassing the cumbersome subway routes that require a detour to Manhattan. Connecting the two boroughs along the East River waterfront, the BQX sought to reduce travel times between the two boroughs, connecting underserved communities to employment opportunities, and collaborate with private developers to spur economic development in the neighborhoods traversed by the proposed route. Though the overall goals of the project were popular amongst Brooklyn and Queens residents, the dream of the BQX sputtered in the year following its announcement. Concerns over the project’s financing, gentrification of poorer neighborhoods, and a lack of a solid plan raised skepticism, eventually overcoming the early excitement surrounding the project. The groundbreaking date in 2019 passed by without any progress on the project, with
the COVID-19 Pandemic dealing one of the final blows to the project. With public transit options struggling to stay afloat during the pandemic, New Yorkers have shifted their priorities away from the creation of more mass transit.

**Madonna nor the Whore: Examining Transgressors of Golden Age Patriarchy in Castile**
*Jill Valdes, History*
*Sponsor: Professor Karl Appuhn, History*

The Council of Trent (1545–63) marked the beginning of a marriage revolution. The sixteenth century saw the establishment of marriage as a sacrament thus bringing it under the jurisdiction of clerics and parish priests unlike ever before. Cohabitation, notably, was traditionally considered a matter of the home, and the link between the domestic sphere and the lives of women cannot be overstated. Now, confronted with a spiritual rival, Castile had to reinforce its greatest defense against Protestantism: sheer numbers. If governments could almost guarantee their subjects’ procreation, in emphasizing cohabitation, they would have secured some substantial line of defense against the heretics with this next generation of Catholics. In the wake of Trent, women’s behaviors, thoughts, and even their very nature were of great interest for Church authorities as they began their campaign to secure a wholly devout, righteous following in an assertion of Catholic dominance. Looking to the Bible, the story of Adam and Eve proved to be the ideal theological justification for the immense threat women posed. As a result, Eve’s original sin would become all the justification the Catholic Church needed to unceasingly punish and lock away women for the good of the faith and its continued political and religious dominance. The lives and work of Maria de Zayas y Sotomayor and Luisa de Carvajal y Mendoza, however, demonstrate cracks in this patriarchal display. I argue that their elite social status and robust social network saved them from persecution of any kind. Both hailing from some semblance of wealth, I argue that they are, by virtue of their affluence, afforded some flexibility and mobility within the confines of strict gender regulations.

**Our World, between the Lines: Historical Satire and the Satiric Sublime**
*Anna Walewski, Comparative Literature*
*Sponsor: Professor Andrea Gadberry, Comparative Literature*

Historical satire has been an integral part of political critique in times of turmoil. My paper builds upon literature such as Wayne C. Booth’s *A Rhetoric of Irony* and Longinus’ *On the Sublime* to create the concept of the Satiric Sublime and investigates the application of this concept in different historical satires, including creators such as Swift and Chaplin. The satiric sublime describes the magnified usage of satiric elements in political contexts to create a separate space (the sublime) in which serious subjects can be more safely and more easily ridiculed as if they exist in a world separate from our own. To then successfully apply these critiques back to the subjects they represent, the satiric sublime employs a characteristic “double flip” in which the safety of the sublime is burst and the gravity of the situation—including the seriousness of the critique—is revealed. Overall, the satiric sublime is important because it allows for the safer examination of serious topics, some of which otherwise are not appropriate to be criticized in a “comedic” manner. The satiric sublime not only allows the audience the space to healthily process the ideas implemented in the satire but also for the initial displacement of fear and punishment in situations where proposing such kinds of critique would be prohibited. To gain the most insight into the conditions that went into each implementation of the satiric sublime, I also analyze the historical precedents that provoked the creation of each piece and the contemporary reactions to publication. For future research, in its theory, the satiric sublime is an influential concept that can be easily built upon, and in practice, the satiric sublime can be implemented to create healthy and productive discussion of future critical historic events.

**A Computational Approach to the Study of Poetry Translation**
*Kristen Weatherley, English and American Literature*
*Sponsor: Professor David Hoover, English and American Literature*

In this thesis, I explore the mechanics of poetry translation, what separates poetry from prose, and the unique role of poets as translators of poetry. I use the methods of computational stylistics, which analyze corpuses of texts based on their word frequencies. This approach allows us to uncover patterns that may not be feasibly studied using close reading alone. In the first section, I build on the work of David Hoover, who found that translators of novels are effectively “invisible”—that is, despite the fact that every word in the text has been replaced by each translator, the original author’s style prevails. I test a corpus of English translations of Italian epics and find that this result holds at the level of the author but not text identity, suggesting that the translator’s style is more visible in poetry. In the second section, I build on the work of John Burrows, who found that some poet-translators are more likely than others to inject their own style into their translations. I use the poetry and translations of Ezra Pound, a controversial translator, and A.S. Kline, a prolific translator writing partly in opposition to Pound, as case studies of poet-translators. I find that A.S. Kline’s poetry is consistently very different from his translations, suggesting that he has different voices as a poet and as a translator, while Pound shows no such division, suggesting that his “translations” are effectively authored by him. These results uncover differences between
poetry and prose translation and between poet-translators, raising interesting questions about the desirability of the invisible translator, the effect of narrative elements and form restrictions on the similarity of translations, and whether poet-translators have distinct voices as poets and as translators.

Re/Imagining South-North Korean Relationship through South Korean Film and TV
Soyoung Elizabeth Yun, Cinema Studies
Sponsor: Professor Yoon Jeong Oh, East Asian Studies

South Korean cinema has been deeply dependent on the South-North cross-border narrative since the turn of the century. In the “South-North films”, the national physical and ideological division is channeled through the South and North Korean characters’ relationship. My project investigates how South Korean film and TV content reflects and inflects the political situations in and outside the Peninsula through its characters and narratives. The change of administrations and their policies regarding the North also have had an impact on the content-making. Focusing on the South film and TV content released or aired from 2017 onward, my project examines the recreations of the Korean sociopolitical identities manifested through the fictional characters and stories. As a cross-border narrative told through a South Korean production, each content describes the South-North relationship in a pro-South, pro-capitalist, and pro-democratic way envisioned in the characters’ ideological reconciliation through heterosexual love or homosocial friendship. While I rely on the language of binary gender characteristics, I suggest that the fluidity and interplay of masculinity and femininity performed by the characters (and actors) critique the oppositional conception of the South and North Korean identities. Through a close study of the plots, character relationships, and audience receptions, I further argue that the characters (and actors behind them) serve as incarnations/translators of the contemporary Korean identities, circulated and distributed trans/nationally.
The Evolution of Observational Technology in Physical Oceanography
Isay Acenas, Environmental Studies
Sponsors: Professor Anne Rademacher, Anthropology; Professor Dale Jamieson, Environmental Studies

Although technology is commonly known to create solutions, it also serves as research tools to help us better understand problems. In observing the present state of long-term environmental degradation, utilizing and purposely advancing technology helps scientists articulate biophysical systems and, in turn, specific components of climate change. Our understanding of the complexities of the natural environment is greatly influenced by the research tools we have available. Oceanography in particular has benefited from technological developments which have allowed scientists to gather data in difficult to reach places and over periods of time that are not sustainable for in-person data collection. In this project, the development of ocean research models and technology is documented to better understand how our knowledge of the ocean has been shaped by these tools, what issues have been addressed by these advancements, and how new forms of data collection beyond traditional technology are being utilized in ocean research. The sociopolitical contexts of such innovations are also discussed, highlighting the importance of funding schemes and cultural relevance in our knowledge of the biophysical world.

Islam and Feminism Today: A Study on the Effect of Islam on Women’s Welfare and Political Opinions in Egypt
Sumaiya Alam, International Relations
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics

After 9/11, many Americans developed a fear of the Muslim community, leading to misinterpretation and misinformation about the religion including the idea that women are oppressed or less than men. This research examines how religion in Egypt impacts women’s welfare and political opinions by measuring several outcomes such as healthcare, employment, education level, and trust in government among Muslim men and women and Christian men and women. The study determines if Muslim women are oppressed at a similar level as Christian women. This study uses a difference-in-differences design with fixed effects in order to better understand if the gap between Muslim women and Muslim men is greater or less than the gap between Christian men and Christian women as Islamic law applies to each group at various degrees. I find the gap between Muslim men and women is similar than that observed between Christian men and women for most outcomes. There is an exception for employment in which women and Muslims are less likely to be employed compared to men and Christians. These findings indicate that Muslim women do not lag behind to Muslim men compared to Christian women and Christian men. The goal of this paper is to add to existing Islamic-feminist literature.
Interaction of Motherhood with Gender-based Violence in Peru
Netanya Alvarez, Anthropology
Sponsor: Professor Pam Crabtree, Anthropology

In 2016, Solsiret Rodriguez disappeared and her dismembered body was found four years later in 2020. Since she was part of the feminist community in Peru, her disappearance and death outraged feminists all over the country. Although many people assumed that she had been taken due to her connection with the feminist movement, the fact that her brother-in-law was involved makes this story seem improbable. Given how long she went missing it is shocking that police took so long to start an investigation. This is because her husband accused her of abandoning the family home. Here is where my research begins. Her perceived failure as both a mom and wife led police to ignore her parents when they claimed that her disappearance required an investigation. Given the circumstances of the Rodriguez case, this project examines the interactions of motherhood with gender-based violence. Keeping in mind how broad the term gender-based violence is, I will only be examining femicide and domestic violence in Peru. This project seeks to critique how ideologies of motherhood allow for women to be ostracized and even abused if their goodness as mothers is ever in question. While mothers are expected to protect their children with their lives, they get reprimanded for trying to leave abusive boyfriends or husbands. In order to examine this confusing paradox, this project examines how these ideologies of motherhood are created and maintained in the home, religious spaces like the Catholic Church, and aspects of Peruvian law.

The Resource Curse in the Twenty-first Century
Aditya Anmol, Economics
Sponsors: Professor Viplav Saini, Economics; Professor Jess Benhabib, Economics

The natural resources of a country have a potentially beneficial impact on its economic well-being, giving the expectation of a high economic growth rate. In contrast, the research conducted during the last quarter of the twentieth century revealed a negative correlation of natural resources with GDP growth rate. These studies also showed that natural resources increase corruption, retard investment, reduce the openness of the economy, and stagnate human growth. These effects act as transmission channels through which natural resources negatively influence GDP growth. This research explores if the resource curse continues to plague countries in the twenty-first century. It studies if the resource abundance indirectly effects the country’s economic performance by influencing its technological innovation levels, which affects its economic growth. It also takes into consideration the other transmission channels of resource curse (human capital, investment, openness, and corruption). It also explores the effect of a country’s time of independence and democratic setup. It uses panel data of 45 countries for the period 1996 to 2017 and finds a negative relationship between natural resource abundance with control of corruption, education, investment, openness, and innovation. GDP per capita has a positive correlation with control of corruption, education, investment, openness, and innovation. The model indicates that improvement in the education index has the maximum impact on GDP per capita while corruption, openness, and innovation are the other important factors effecting it.

Constructions and (Re)Negotiations of Gender Identity through Language for Non-binary Spanish and English Speakers
Sarah Bacio, Global Public Health/Sociology
Sponsors: Professor Ruth Horowitz, Sociology; Professor Iddo Tavory, Sociology

The gender binary bases gender on biological sex and categorizes people exclusively as male or female, excluding those whose gender identities (or lack thereof) do not align within these categories. For many non-binary, gender non-conforming (GNC), and transgender folks, feelings of visibility and acceptance are often linked to gender affirming language practices. While barriers to using gender neutral language in English are present, the Spanish language is heavily gendered with masculine and feminine determiners, pronouns, articles, and adjectives and it lacks existing “official” gender neutral structures (e.g., “they” pronouns in English). The different gender structures of English and Spanish complicate how non-binary individuals navigate code-switching between both languages. Therefore, this thesis explores the question, how do non-binary bilingual Spanish and English speakers who participated in this study negotiate linguistic gender identity in the different contexts that they navigate? This study captures the experiences of 18 Latinx/Hispanic bilingual speakers who identify themselves outside of the cisgender male and female binary. Despite varied personal experiences with gender identity and language practices, participants experienced similar conceptual categories of inarticulation of their gender identity that were informed by their language proficiencies and feelings of authority over gender-neutralizing Spanish. Furthermore, participants’ multiple subject positions as non-binary Latinx subjects led to feelings of disconnection between their gender and cultural identity, which can be examined through their (re)negotiations of linguistic gender within the discursive spaces of the family, (queer) friendships, and cyberspace. I argue that in their articulations of this disconnection, the non-binary Latinx individuals who participated in this study are (re)configuring their multiple identities within their specific sociohistorical and geopolitical contexts and narrating their processes of becoming.
Familiar Faces: Impact of Co-national Presence on Present-day Refugee Integration in Germany
Jasmine Balderas, International Relations
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics

Through a secondary analysis of data provided by the IAB-BAMF-SOEP Survey of Refugees, this research project investigates the relationship between the presence of co-national migrant communities and their impact upon the quality of integration experienced by refugees shortly after their arrival in a new host country. Specifically, this project seeks to understand the relationship between an arriving refugee’s access to co-national migrant social capital and its impact upon the quality of their subsequent integration. This research question is studied within the context of Germany, which fielded a great majority of the asylum applications filed during the European migrant crisis of 2015. This paper advances existing literature by narrowing its focus upon the short-run impact of co-national migrant communities in particular, which are hypothesized to offer incoming refugees the cultural sensitivity, assistance, and connection to vital resources during the early phases of integration. The empirical strategy utilized in this study demonstrates that although a higher presence of co-nationals in a refugee’s environment may help a refugee feel less isolated, left out, and less worried about hostility, job loss, and their financial situation, there also seems to be a negative effect on economic integration as measured by earnings and work situation satisfaction. In conclusion, this study advances the contexts within which this research question has been addressed and encourages further statistical analysis of the topic at hand.

Relative Clause Production in Children: Comparing Two Elicitation Contexts
Elizabeth Barbier, Communicative Sciences and Disorders
Sponsor: Professor Christina Reuterskiold, Steinhardt School of Culture, Education, and Human Development, Communicative Sciences and Disorders

Knowledge about language production in typically-developing children supports the design of assessment and intervention procedures for children with developmental language disorder. This online study investigated children’s production of relative clauses, as this grammatical structure is both semantically and syntactically complex and challenging for children to produce. The experimental study included 15 children ranging in age from 4.5 to 8.9 years old. All participants were presented with the same set of 144 stimuli pictures over the course of two experimental tasks that differed in degree of contextual support: a structural priming task and a referential communication task involving priming. Children’s productions of relative clauses were measured in each task. The primary research questions set out to find if children’s production of relative clauses differed as a function of task type, clause type, or age. It was observed that children produced more relative clauses as a function of relative clause type. No difference in children’s productions of relative clause was observed as a function of task type and there was no correlation found between relative clause production and age. The information gained from this study adds to the literature on relative clause production and elicitation contexts and contributes to the wider literature on child language production.

The Arthropocene: An Introduction to Invertebrates Informing Ecosystem Health and Ecological Restoration in Freshkills Park, SI
Audrey Becker, Environmental Biology, Environmental Studies
Sponsors: Professor Anne Rademacher, Anthropology; Professor Kimberly Carlson, Environmental Studies

As a result of industrialization and urban development, New York City’s soils have been anthropogenically altered—through soil inputs and pollution—since its inception. Landfills make up nearly 20% of New York City’s land area, making them an integral part of the urban patchwork ecosystem. Freshkills Park, a landfill-turned-park on Staten Island and the last landfill to be closed by the New York City Department of Sanitation, comprises four different “mounds”, together creating Fresh Kills Landfill. As the impacts of landfills were poorly studied throughout history, and thus poorly understood, the Fresh Kills Landfill, due in part to its unique location and ecology, resulted in significant negative impacts on its surrounding environment. Each of the Fresh Kills Landfill’s mounds have been or will be ecologically restored through innovative technologies to reduce output of landfill pollution and to build a landscape capable of providing greater ecological integrity to Staten Island. Soil invertebrates are demonstrably dependable indicators of pollution and other ecological consequences and can thus be monitored to predict and identify ecological effects of environmental change, serving as a proxy for soil quality and ecosystem resilience. Through soil invertebrate analysis, soil samples of the North, South, and East mounds are collected and the invertebrates extracted by way of Tullgren Funnels. Using these samples, the baseline knowledge of soil invertebrate species that make up these local communities in anthropogenically altered and restored soils is established. As soil science continues to advance and further realize the environmental importance of healthy soils, the biotic communities found in such soils can thus inform the ecological successional abilities of man-made restoration.
Election Gender Quotas, Women’s Health, and Refugees

A high proportion of refugee countries and changes to annual refugee ceilings. There is also no significant relationship between income levels of individuals from high proportion refugee countries and changes to annual refugee ceilings. However, no significant relationship is found between the employment status of individuals from high proportion refugee countries and changes to annual refugee ceilings. Additionally, immigrants from high proportion refugee countries are less likely to receive public assistance at lower ceiling levels. Furthermore, immigrants from high proportion refugee countries are likely to receive lower amounts of public assistance at lower ceiling levels. However, this relationship is found between income levels of individuals from high proportion refugee countries and changes to annual refugee ceilings. There is also no significant relationship found between the employment status of individuals from high proportion refugee countries and changes to annual refugee ceilings.

Electoral Gender Quotas, Women’s Health, and Transparency

Sarika Bhattacharjee, International Relations
Sponsor: Professor Alastair Smith, Politics

Globally, only 25% of all seats in national legislatures are held by women (UN Women, 2021). To remedy this underrepresentation, countries have implemented Electoral Gender Quotas. These measures mandate or suggest that a certain proportion of seats within a political body be held by women, whether it be within a parliament or on a candidate list. Since the association between a nation maintaining a Gender Quota and a nation performing on substantive concerns has not been studied extensively, this thesis aims to explore how nations with Gender Quotas manage women’s health issues. This thesis finds that nations with Gender Quotas are better than nations without Gender Quotas in managing women’s health issues on balance. This thesis also studies the relationship between having a Gender Quota and reporting timely data on women’s issues, since there is a historical legacy of underreporting on gender-related statistics. The results suggest that nations with Gender Quotas are no more likely than nations without them to be transparent on women’s issues.

Deforestation and Migration in Colombia
Victoria Bianco, International Relations, Spanish
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics

This paper seeks to determine how deforestation influences out-migration in Colombia. The Amazon Rainforest is known as the “lungs of the earth” because its vast forest coverage filters a significant amount of carbon dioxide, one of the main greenhouse gases that contribute to climate change. Considering this, deforestation accelerates and exacerbates the adverse effects of climate change that can influence economic and social life. Hence, this paper looks at population changes as an outcome of deforestation. To examine this relationship, I analyze population changes across 950 municipalities in Colombia from the years 2002 to 2017. I find that there is an overall positive relationship between deforestation and population across the board, especially in the urban centers of municipalities. Thus, deforestation causes the population to rise in cities through migration from rural to urban areas. Furthermore, this paper explores the theory behind this relationship and finds more nuanced results pertaining to areas with high concentrations of deforestation or high indigenous population density. Deforestation clearly has a noteworthy effect on the lives of Colombians that will only escalate over time.

Unique and Critical Healthcare; The Callen-Lorde Community Health Center NYC
Alison Biedron, Gender and Sexuality Studies
Sponsor: Professor Thuy Linh Tu, Social & Cultural Analysis

With over 500,000 dead from COVID19, disproportionately in Black and Brown low-income communities, many have turned to the history of health in attempts to discover a roadmap to a better, safer, more equitable future. This project aims to provide a historical roadmap about the history of healthcare for Black, transgender
Using the PHQ-9 Form to Study the Effects of the COVID-19 Pandemic on the Mental Health of Adolescents Aged 12–17
Emilio Blair, Anthropology
Sponsor: Professor Erika Tullberg, NYU School of Medicine, Child and Adolescent Psychiatry

The 2020 COVID-19 pandemic shifted the world into an unprecedented year of sterility and social distancing. With the closing of schools, children and adolescents were especially affected. This project analyzed de-identified Patient Health Questionnaire-9 (PHQ-9) responses from Children’s Physicians (a pediatric clinic in Florida) in order to quantify the severity of depression symptoms in a sample of 12- to 17-year-old pediatric patients during the 2020 COVID-19 pandemic. The PHQ-9 form is commonly administered to assess general mental health of patients and to assist clinicians in screening for depression. The form quantifies symptom severity based on the patient’s self-assessed total numeric score, with higher scores indicating higher severity. Children’s Physicians administers a PHQ-9 to patients aged 12–17 as part of their yearly physical examination. This study collected de-identified data from PHQ-9 forms administered between March 9 and June 12 of 2020. In order to further evaluate the effects of the pandemic, a patient’s 2020 score also was compared to their own 2019 score (provided that the 2019 response date was within 4 months of the 2020 response). It was found that of the 288 responses received in 2020, 29.86% reported mild to severe depression. Of those reporting mild to severe depression, it was found that 65% were females. Of the 160 responses that also had 2019 scores, it was found that there was no statistically significant difference between average 2019 and 2020 total scores. The 160 responses from 2019 reported a 23.75% incidence of mild to severe depression. The high incidence of mild to severe depression found in this adolescent sample is certainly alarming and indicates that there is a need for further study when it comes to the mental health of young people. These findings create an important reference baseline for the incidence of depression in adolescents.

Social Context of Disability Identity in Chronic Invisible Illnesses
Lex Bolshakov, Sociology
Sponsors: Professor Iddo Tavory, Sociology; Professor Alex Barnard, Sociology

Previous interview studies reveal that disability identity is typically an experience of changing self-perception, social isolation, and change in perceived life trajectory, especially in western cultures that have a high emphasis on individuality and agency (Charmaz 1983; Bury 1982; Crooks 2008). Chronic invisible illnesses are characterized by persistent symptoms that are not noticeable to those around the sufferer. Yet the internalized identity of disability in people with chronic invisible illness may be highly influenced by social support, medical interaction, and previous exposure to others who identify as disabled. This research examines the context in which people with Postural Orthostatic Tachycardia Syndrome (POTS) come to identify, or not, as disabled. Relying on 30 (29 female, age 18–49) semi-structured interviews conducted over Zoom between November 2020 and February 2021, and 30 corresponding demographic surveys completed by the same participants, this research suggests that there are distinct and predictable combinations of perceived social support or isolation, the difficulty of diagnosis journey, and perceived disruptiveness or visibility of symptoms, that predict the ease in which people come to identify as disabled.

Compassionate Violence? The Weaponization and Absence of Environmental Discourse in News Media and a Portland, Oregon Government Plan to End Homelessness
Zoie Brauser, Environmental Studies
Sponsor: Professor Anne Rademacher, Anthropology

In Portland, Oregon, an estimated 4,000 people experience houselessness on any given night. The government has been trying to “end homelessness” since the 1980s by employing things such as 10-year plans to end homelessness, building housing, enacting camp sweeps, and placing houseless people in jails. Despite varied efforts by the government, the number of people living unsheltered remains largely unchanged. News media and housed people frequently figure unhoused people as nuisances that must be removed and hidden to increase the city’s livability. My research adds to a small, but growing, literature that
situates homelessness as an environmental justice issue. People living unsheltered are more vulnerable to environmental hazards, lack critical sanitation infrastructure, and are routinely described as dirty, unsanitary, or otherwise unhygienic. By conducting a literature review to reconceptualize the problem of homelessness and by performing a content analysis on a Portland county’s spending plan for tax dollars earmarked for homeless services, I build an understanding of the differences between news media and official government discourses on homelessness. I found that official government discourses do not weaponize environmental discourses against unhoused people as many news articles do. But, the absence of environmental discourse implies a power imbalance: the government doesn’t need to situate unhoused people as “dirty” because they already control the material infrastructure of homeless services. From my findings, I argue that Portland’s persistent securitarian responses to homelessness—at odds with their discourse in official plans—perpetuate constructions of homelessness that are rooted in racialized criminality and that position poor people as waste in a capitalist society.

When Citizens of Authoritarian Regimes and Declining Democracies Turn to the Internet Anonymity Software, Tor
Sydney Brinker, Journalism, Politics
Sponsor: Professor Robert Boynton, Journalism

Combining user metrics, provided by the nonprofit, Tor Project, and the 2016–2020 Democracy Indexes, published by the Economist Intelligence Unit (EIU), this paper seeks to provide insight into the question, when do citizens in authoritarian regimes use Tor? In other words, is there an observed correlation between the number of Tor users in one country and the scores for each of the five democratic indicators—electoral process and pluralism, the functioning of government, political participation, political culture, and civil liberties—given to that country by the EIU? The answers to these questions will not only touch upon the concepts of privacy, internet censorship, and freedom of speech and information but also may tell of broader implications regarding the actions of authoritarian rulers: does the increase or decrease of a certain indicator have a stronger correlation with the number of Tor users than the others? Previous studies have found that Tor use is highest overall in countries with the strongest democracies and strongest authoritarian regimes. Citizens of countries in the middle are not granted enough freedom to be comfortable using the software but also do not face enough persecution to make the risk of use worth it. As the most prominent internet anonymity software, use of Tor can also be a sign of people seeking out privacy in general. As Tor becomes a haven for citizens living under authoritarianism, it is important to understand when people are most likely to turn to the software. This way the Tor Project and their volunteers may prepare for the increased traffic and possible use of special circumvention tools, especially if they know the target country is actively working to block their website where Tor is downloaded.

The Analysis of Prevailing Resistances Presented by Female Athletes in the US
Angelica Burac, Global Public Health/Anthropology
Sponsors: Professor Melissa Maldonado-Salcedo, Anthropology; Professor Rayna Rapp, Anthropology

Applying disciplinary theory, this project explores gender ideologies and the establishment of the sports-industrial complex: a system that prioritizes profit over the mental and physical well-being of athletes in the US. I do this in order to contextualize specific forms of resistance female athletes have used to combat various forms of systemic oppression. This oppression has been sourced by the initial implementation of sports in the US’ colonial and post-colonial eras, and its preference for white, male, and patriotic athletes. Naomi Osaka, the US women’s national soccer team (USWNT), and women’s wrestlers in the World Wrestling Entertainment company (WWE) have been chosen as case studies due to their highly-publicized experiences with political backlash, unequal pay and hypersexualization, respectively. Through careful analysis of these case studies, we are presented with three different forms of resistance: Osaka’s reinforcement of her personal identity as a Black woman in a predominantly white sport, the USWNT’s legislative battles, and the transference of power from the audience to the WWE’s women’s wrestlers. What emerges from these examples is a better understanding of how female athletes are restricted under the social, political, and economic conditions of the sports industrial complex, and how these restrictions have undoubtedly affected their ability to assert their individual identities as complex women rather than idle, working bodies. Despite the fact that sports were never made to include women, female athletes are currently doing everything in their power to assert their existence in sports as enduring and valuable.

Neocolonialism along the Mexican-American Border
Sean Carr, Global Public Health/Anthropology
Sponsor: Professor Melissa Maldonado-Salcedo, Anthropology

The border between the US-Mexico remains a place of hope and also hopelessness. It presents a path towards opportunity, but because of economic exploitation, machismo, and racism, the border can also prove deadly. This project is an exploration into the impact of neocolonialism along the US-Mexico border. I argue that the vestiges of colonialism, specifically violence against women and children, have deleterious effects upon those of Latinx heritage through new means. I will paint the landscape for these realities through the lenses of history, gender studies, con-
flict theory, and critical race theory. This paper challenges the perception and failures of injustices that take place in regions starkly divided by the international border. I will highlight how moral outcry is often contingent upon the victims’ nationality and skin tone. Finally, through the use of vignettes, I will bring to life the stories of those who are all too often overlooked and provide for these individuals a platform upon which their stories can be heard and serve as a call to action for social justice and the improvement of human rights.

**Effect of Chinese Infrastructure on Pakistan’s Elections**

*Jamin Chen, International Relations*

*Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics*

The goal of my research is to measure the effect of infrastructure projects belonging to the China-Pakistan Economic Corridor (CPEC) on the vote share of incumbent candidates and parties during the 2018 Pakistani general election. The research involved running an ordinary least squares regression to estimate the effect of projects completed before the election and projects that were not complete before the election on incumbent vote shares at the constituency level as well as a difference-in-discontinuities regression that estimates the effect of CPEC projects on the vote share of the PML-N, the ruling party, in constituencies where the PML-N was the incumbent. I find that the presence of CPEC projects in a constituency does not have a noticeable effect on incumbent vote share: no effect is picked up either when projects are analyzed according to their completion time relative to the election or to their type. But, by interacting the effects of CPEC project presence and Pakistan Muslim League-Nawaz (PML-N) incumbency, I find evidence that PML-N incumbents, whose vote shares decreased nationally in 2018, lost a smaller share of the vote when their constituency hosted a CPEC project. The results as a whole do not support the theory that infrastructure projects improve the performance of incumbents in elections, but they do lend weight to the theory that infrastructure is useful for politicians in another way: by reducing their incumbency disadvantage.

**After the Four-decade Restoration of the Discipline: Chinese Anthropologists Talk about Anthropology in China**

*Mazirong (Coco) Chen, Anthropology*

*Sponsor: Professor Angela Zito, Anthropology*

Anthropology in China went through a revival in the late 1980s after stagnating along with the other social sciences during the Cultural Revolution from 1966 to 1976. This study aims to understand some of the terms of that revival through interviews with a range of anthropologists working in China today. By examining their attitudes, this research not only presents the development of anthropology in China but also provides an approach to examine the anthropologists’ identity. The key message that runs through the thesis is the complexity of Chinese anthropologists’ identity. Factors including the hierarchy within academic institutions and the intricate relationship between state policy and scholarly work impact the positioning of the discipline and Chinese anthropologists. A generational difference also emerges in my research. Participants born in the 1960s and 1970s feel obliged to make the discipline thrive with a strong sense of mission, while the younger participants born in the 1980s and 1990s distance themselves from the conversation about “nativization” (*ben-tuhua*). While anthropologists feel their academic discussion should be placed in a big context of Chinese society, they have a complicated and even contradictory feeling towards the nation-building discourse.

**Preserving Chinatown: Community Issues and Organizing during the COVID-19 Global Pandemic**

*Kimberly Cheung, Metropolitan Studies*

*Sponsor: Professor Dean Saranillio, Social & Cultural Analysis*

Send Chinatown Love (SCL) is a volunteer-led grassroots organization founded as a response to the disparate impact the COVID-19 pandemic has had on the Chinatown neighborhoods in New York City. Through my experience working with SCL, the organization’s story brings to light the different urban issues that are present and constantly changing in the ethnic enclave such as Asian American identity, gentrification, and economic development.

**King Leopold II Is Rolling in His Grave: Belgium Is Finally Dealing with Its Racial Inequality**

*Justine Creteur, Journalism, Politics*

*Sponsor: Professor Robert Boynton, Journalism*

Belgium has struggled to reconcile its colonial past. Though Belgium is now famous for its waffles and fries, its prestige in the 19th and 20th centuries was built around its colonization of the Congo, Rwanda, and Burundi. King Leopold II, King of Belgium from 1865 to 1909 and private owner of the Congo Free State from 1885 to 1908, was notorious for his ambition in expanding the territory of the small nation, a territory roughly 76 times the size of Belgium. The Congo Free State was marked by suffering, famine, and racial segregation. During the two decades that the King owned the Congo Free State, an estimate of 10 million Congolese people died. As the protests erupted throughout the European Union last summer, most statues of King Leopold II were destroyed. Students are still taught of the wonders of colonialism in history textbooks, and there are no memorials, pardons, or stories of remembrance that mark the suffering prevalent
in the nation. In 2007, Congolese campaigner Bienvenu Mbuto Mondondo launched legal proceedings to get Tintin in the Congo—the infamous comic read by all children in the nation—banned. In 2012, the Belgian Court ruled that the book did not breach racism laws and was not intended to incite racial hatred. Can Belgium overcome its past and create an effective strategy in tackling racial divisions in the country? The protests against racial injustice in the US and Europe highlighted the need for action. The European Commission’s State of the Union Address in 2020 came out in September with a new Anti-Racism Action Plan for the next five years, aimed at addressing systemic and institutional racism in Member States. Analyzing the complexity of the European Union’s bureaucracy and cooperation, how effective can this action plan be in Belgium?

Ecological Design: An Option for Beaver (Castor canadensis) Management in New York
Alexandra Daley, Environmental Studies
Sponsor: Professor Matthew Hayek, Environmental Studies

The North American Beaver (Castor canadensis) is returning to New York City. Beavers have been spotted swimming in the Hudson and the Bronx rivers. In 2017, four beavers built a dam and lodge on Staten Island, which upset homeowners nearby. Conflicts between humans and beavers have been a topic for many researchers across the US, Canada, and Europe. Beavers have been known to flood roads, damage property, and even interrupt cell signals. However, beavers are integral to the ecosystem health of landscapes across North America. They create wetlands through the damming of streams throughout a watershed. These wetlands attract a wide range of species and replenish aquifers. The beaver’s function as a keystone species is still overlooked by citizens due to the conflicts listed above. The research conducted for this project aims to answer why beavers are considered a nuisance to humans and how they can be better integrated into the urban fabric to increase the health of urban wetland ecosystems. This was accomplished through a two-part analysis. First, New York Department of Environmental Conservation (DEC) data on beaver populations was analyzed. Next, common habitat characteristics related to beaver were mapped and analyzed in ArcMap 10.7.1. The results from this analysis led to recommendations in the form of ecological design.

Conservation and Indigenous Rights in the Midst of Political Instability: A Case Study in Chatthin Wildlife Sanctuary, Myanmar
Sabrina Davis, Environmental Studies
Sponsors: Professor Anne Rademacher, Anthropology; Professor Ritwick Ghosh, Environmental Studies

Traditionally, conservation efforts have ignored the needs of the indigenous communities in favor of roping off segments of land with an all-or-nothing approach to preservation. This can create contentious relationships between the area management and the communities at the best of times, but, in the context of political volatility, the infringement on human rights can be exacerbated. The objective of this study is to examine the way that these actors have played out on the stage that is the Chatthin Wildlife Sanctuary (CWS) in Myanmar. CWS contains some of the last tropical dry forest in Southeast Asia and is home to over half of the remaining population of the endangered Eld’s deer. Therefore, it is critically important to conservation efforts. However, it is also home to over a dozen villages that depend on the forest for their fuel, food, and livelihoods. Finally, Myanmar’s government has changed hands and winds many times over the last century, and, in the last decade, with the advent of democracy there, it has been particularly vulnerable to outside influence. These three factors make the CWS a perfect candidate for understanding the ways that conservation, human rights, and government interact.

Oyster Farmers and Nantucket Sound
Catherine Devine, Journalism, Psychology
Sponsor: Professor Jason Samuels, Journalism

Due to a combination of over-harvesting, not returning suitable substrate (oyster shell) back to the water, habitat loss, sedimentation, disease, and poor water quality, the oyster populations off the Massachusetts coast have dwindled to less than 6 percent of their original population (Zu Ermgassen et al., 2012). Ed and Kosta are oyster farmers who are artificially bringing Oysters back to Nantucket Sound. Ed, an ex-Wall Street banker, and Kosta, a lifelong Cape Cod resident, are part of a program that issues grants to oystermen to incentivize artificially growing oyster habitats in Nantucket Sound. Reviving the Sound’s oyster population benefits both humans and aquatic species alike. Oysters are a great natural water filter, their natural shell offers a sound habitat for many organisms, and, for the people, Massachusetts residents love both their oysters and their beaches. The process is arduous and time consuming, but ultimately helps mitigate some of the damage done to our oceans.

Exploitation of Poultry Employees and Broiler Chickens: How Mutual Oppression Necessitates Mutual Liberation
Sarah Eldridge, Environmental Studies
Sponsor: Professor Anne Rademacher, Anthropology

Factory farm chicken production in the US is a hyper-efficient industry. Nine billion chickens are killed annually in the US alone. In some factories, this corresponds to 140 chickens every minute. Our relationship to meat consumption is distant, so we are removed from the cruel horrors of this industry. But those employed in these chick-
en plants do not have the luxury of distancing themselves from the mass scale slaughter that occurs by the minute. The chicken industry is built on the exploitation of animals who are unable to defend themselves, a species for which we normalize this large-scale killing, because we socially see them as unintelligent or otherwise undeserving of life. The industry not only has a history of exploiting these unlucky birds but also those who are tasked with killing them. This paper explores the relationship between these birds and workers, seeking a path for reform. Often, factory farming is seen as either an environmental or ethical dilemma, while the humanitarian component is ignored. The chicken industry counts on this, continually recruiting their factory workers from marginalized groups who do not have the social, economic, or political capital to fight against an industry that does not protect them. Since the growth of chicken production in the 1920s, and the boom of the industry post-World War II when chickens began to be farmed indoors, the industry has exploited employees. As chicken production became more automated, the farming of these animals became more inhumane and the abuse of laborers increased. There is a history of mutual exploitation of chickens and employees, the two are concurrently silenced. And, there will be no liberation unless these two marginalized groups are jointly liberated, because part of the exploitation of each is dependent on the exploitation of the other.

The Miseducation of the Public on Climate Change and Climate Action: A Beyond Petroleum Case Study
Jamie Epstein, Environmental Studies
Sponsors: Professor Christopher Schlottmann, Environmental Studies; Professor Anne Rademacher, Anthropology

In the late 1990s to early 2000s, oil and gas corporations Beyond Petroleum launched a deceptive, $200 million public relations campaign to repair their relationship with the public and their unfavorable reputation. This campaign focused on a new scientific term, the carbon footprint, twisting the definition in order to confuse its consumers and benefit itself. The success of this campaign was powerful, causing the “carbon footprint” term to take over environmental discourse. This research paper considers the techniques historically operationalized by propagandists and public relations teams to expose the effective manipulation of BP’s campaign. An original analytical tool was created for this study, which asks if core features of propaganda and public relations are present in BP’s campaign. These features are sowing excessive uncertainty or doubt, unnecessarily questioning the messenger, greenwashing, highlighting individualization of responsibility, and diverting the attention of the public with distraction by disproportionately emphasizing climate issues. The tool reveals that greenwashing, individualization, and diversion are present in BP’s carbon footprint campaign. This study suggests that the environmental studies community must take the focus off of carbon footprints and concentrate on the responsibility of industrial actors for climate change.

The Effect of Expanding Access to Substance Abuse Treatment Centers on Sexual Violence
Isha Fazili, Politics
Sponsors: Professor Anna Harvey, Politics; Professor Christopher Dawes, Politics

My research question is: does expanding access to substance-abuse treatment centers have a statistically significant effect on decreasing sexual violence? Significant attention has been paid to the ways in which greater access to substance abuse treatment facilities may reduce local violence at large. Little has been done, however, to determine what effect, if any, the presence of more facilities has specifically on lowering sexual violence in all its forms. This gap in substance abuse treatment literature is glaring, especially when considering the fact that women are overwhelmingly victims of sexual assault. Using data ranging between 1998 to 2012 from the US Census Bureau’s County Business Patterns (CBP), Federal Bureau of Investigation’s National Incident-Based Reporting System (NIBRS), the Bureau of Labor Statistics (BLS), and the US Census Bureau, I employ a difference-in-differences design analyzing substance-abuse-treatment facilities openings and closings at the county level. Treated counties are defined as counties which experience a fifty percent or greater increase in substance-abuse treatment facilities from the previous year and outcome is defined as the number of sexual violence offenses, both forcible and nonforcible, per thousand residents in the current year. I conclude that, in line with my expectations, substance-abuse treatment facilities may reduce incidents of sexual violence per thousand residents and could be worthwhile investments that more communities should consider to combat the serious, and often overlooked, issue of sexual violence.
ical recognition is an impossible reality. Failing to fit into the constructed categories of “male” and “female”, trans people have always lived as political outcasts and economic exiles, excluded from participating in the systems that define contemporary life. While the American societal machine continually exploits through the 9–5 workday, upholds colonialist cultural norms, and desecrates stolen Indigenous land, the trans community has never fit within its turning cogs. Unlike the precedent set by gay, lesbian, and bisexual activists, trans people cannot seek political recognition, because the machine denies their very existence. Instead, trans communities have survived—and thrived—outside of the machine, crowdfunding their way through a system in which they are invisible. Trans liberation has never been about a vote, or a bill, or collecting capital, but rather the day-to-day triumphs of mutual aid and solidarity against a faceless oppressor. From the Street Transgender Action Revolutionaries to #BlackTransCrowdfund, trans communities don’t demand their freedom, they invent it.

**ACAB, LRAD, and MARCH: The Relationship between the Police State and Noise**  
*Cam Franklin, Recorded Music, Social and Cultural Analysis*  
*Sponsor: Professor Michael Ralph, Social & Cultural Analysis*

The history of noise is the history of policing. In showcasing the relationship between police power and noise, this thesis opens giving a brief history on policing in America. Specifically, I discuss how unlimited police power was purposefully crafted in US law in response to perceived threats involving fugitives in the same context in which jazz was conceived. In exploring the relationship between state violence and difference, I suggest that blackness, queerness, and noise are synthetic with implications for the way people are policed and subjected to violence. This thesis then proceeds by demonstrating how police use noise as a method of punishment and control. After discussing how law enforcement officials deploy Long Range Acoustic Devices (LRADs) and pop music as forms of sonic torture, I will discuss New York City’s history of suppressing music, sex, and dance through legislation known as The Cabaret Laws. Finally, I show how policing, race, and geography intersect in the indiscriminate use of 311 quality-of-life complaints to police noise in gentrifying neighborhoods.

**Schwarze Leben Zählen: How the Murder of George Floyd Sparked a New Discussion on Racism and Minority Rights in Austria**  
*Amina Frassl, Journalism, Politics*  
*Sponsor: Professor Robert Boynton, Journalism*

After the murder of George Floyd, a wave of anti-racism protests swept across the globe. In Vienna, 50,000 people gathered, marking the largest protest against the murder in Europe and the country’s third-largest demonstration in 20 years. But the protestors were not just standing in solidarity with the black community in the US. In Austria, Afro-Austrians and Muslims are fighting their own battle. A quarter of Austria’s 9 million people have foreign roots, most of which are Serbs and Turks who face discrimination due to their appearance or religious beliefs. Public discussions of racism are rare in Austria, the result of the country’s half-hearted efforts to deal with its Nazi past. The state grants nationality by descent and denies dual citizenship, failing to reflect its status as a country of immigration, unlike Germany, which awards birthright citizenship. In Austria, young girls are not permitted to wear a Muslim headscarf, and authorities report up to 60 attacks on hijabis a week. The Austrian Black Lives Matter protest has offered hope in a fight that has long seemed like a lost cause. Since June, migrant activists have found their voice and formed groups vying to overhaul the system. One is the Citizens Initiative Black Voices, which is rallying civil support to pressure the national parliament to adopt an action plan against racism. Others raise awareness and construct safe spaces on social media. Ultimately, the individuals want a seat at the table to determine their own fate in the country.

**Does Politics Affect American Romantic Relationships?**  
*Cecilia Gai, Mathematics, Politics*  
*Sponsor: Professor Chris Dawes, Politics*

Political scientists have argued that party affiliation is becoming more important for Americans when it comes to finding “The One”, and some recent surveys show that couples feel more alienated when their partners sympathize with the opposite parties than ever before. This research project correlates the annual marriage and divorce rate data, measured as the number of cases per 1,000 residents of the 50 states and the District of Columbia spanning from 2008 to 2017, with the percentage of residents who identify as Democrats and Republicans in their respective states and years. Regarding marriages, my research findings indicate that the state’s annual Democrat identifier percentage negatively correlates with the marriage rate, with the coefficient of 0.036, whereas the Republican identifier percentage positively correlates with the marriage rate at 0.041. As for divorces, my research findings indicate that the Democrat identification does not correlate to the divorce rate, while the Republican identification positively correlates with divorce rates, with a coefficient of 0.018. The directions of correlation stay the same when controlled for unemployment rates, GDP growth rates, educational attainment levels, and religiosity measurements, and the correlation coefficients alter slightly after controls. By studying the correlation between party identification and
romantic relationship in America, my research provides empirical evidence on the behavioral differences between Democrat and Republican partisans at the state level. This thesis furthers provides several possible explanations for the research findings.

West African Women’s Educational Attainment: The Significance of Religion and Immigration on Gender-based Educational Procurement
Janaba Gakou, Sociology
Sponsor: Professor Ann Morning, Sociology

This paper investigates the trajectories of Muslim women from Gambia, Ghana, Guinea Conakry, Ivory Coast, Mali, and Senegal. Taking a qualitative approach, I examine the educational and professional trajectories of 20 West African Muslim women who have immigrated to NYC from West Africa between 1989–2002. Further, this paper analyzes what education means to these women and how they envision their daughters’ futures in regard to education and career paths. On one hand, the place of the mosque is crucial in West African Muslim women’s immigration journeys. On the other hand, traditional gender roles inform how they view education for themselves and their daughters. The research follows West African women on their immigration journeys starting from their Arabic-oriented upbringing in sub-Saharan Africa, to the place of the mosque in NYC, and finally, to motherhood and the expectations they hold and futures they imagine for their daughters. Along the way, I will identify the mosque, traditional gender roles, and what it means to be a good Muslim as emerging themes that inform how education is perceived among this group of women and the ambivalence it creates for their daughters.

The Abolish Greek Life Movement
Mikaela Gegelys, Journalism, Psychology
Sponsor: Professor Jason Samuels, Journalism

In my documentary, I tell the story of the Abolish Greek Life Movement, which is currently unfolding on many college campuses across the US. The Abolish Greek Life Movement is a widespread push to remove fraternities and sororities on college campuses for their promotion of racism, classism, and hazing. Although there has been a push to abolish Greek life for the past decade, at the height of the Black Lives Matter Movement in June of 2020, a new Abolish Greek Life Movement formed. In the Abolish Greek Life Movement, students from universities across the US took to creating Instagram accounts and posts about the problems they encountered with Greek Life. I believe that it is very important for this story to be told now because it is currently unfolding as the movement gains traction. In my documentary, I interview students who have dropped out of Greek organizations, students who are advocates against Greek life, Greek organizations’ national headquarters representatives, and students who are proponents of Greek life. There has not been much coverage on the movement because of its recent development, so I hope that this documentary can provide insight into the inner workings of the movement.

Integration vs. Autonomy: Regional Infrastructure and Voter Accountability in the Plurinational State of Bolivia
William David Gutierrez Parra, International Relations
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics

Infrastructure projects can provide opportunities to connect small, relatively isolated communities to larger national and transnational economies. As such, political leaders may advance development projects to curry favor with both local constituents and international financiers. The regional infrastructure development plan first created as the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA), and later institutionalized as the Council on Infrastructure and Planning (COSIPLAN), presents one prominent example. While the council has centered equitable standards in raising development indicators through regional cooperation and integration, some critics have questioned the utility of regional projects to local communities and the power imbalance within the intergovernmental organization through which these projects are being developed (Delgado, 2017). Given the standing literature on infrastructure projects and elections, as well as the unique political shift in Bolivia over the last three decades in terms of indigenous identification, this paper addresses the central question: What effect have IIRSA-COSIPLAN infrastructure projects had on general election outcomes in Bolivia at the municipal level? The paper finds an overall negative relationship between the number of infrastructure projects in a given municipality and the vote share received by the incumbent party in the nearest general election. However, once projects are disaggregated by the execution stage, the paper finds that the relationship between vote share and infrastructure projects becomes positive in the “In Progress” stage. Interaction with the proportion of the population identifying as part of an indigenous community, further reveals a more pronounced and significant negative relationship.

Understanding the Impact of Nuclear Weapon Capabilities on Militarized Interstate Disputes
Lauren Hagstrom, Philosophy, Politics
Sponsors: Professor Chris Dawes, Politics; Professor Anna Harvey, Politics

How do nuclear weapons and the capacity to build nuclear weapons affect the intensity and duration of conflict in which states engage? Significant research has evaluated the ability of nuclear weapons to deter higher
ongoing racial injustice. I posit that agriculture practices of farming as proactive healing efforts in response to qualitative interview measures to further explore practic-
Black health by incorporating ethnographic research and justice framework, I aim to capture their efforts in restoring fresh foods and plant medicine. Building on a reproductive vocate for their communities through providing access to this reason, the Black community has continued to resort to self-sufficient measures to sustain their health through long-existing racial inequities in the country since enslavement, create and self-perpetuate barriers to health. For this reason, the Black community has continued to resort to self-sufficient measures to sustain their health through coordinating grassroots and mutual aid organizational efforts, which work to increase accessibility to healthy food and holistic healing (Blair, 2011). One group that has historically advocated for food and land sovereignty who historically advocated for food and land sovereignty who can contribute meaningfully to addressing these disparities are Black farmers (Penniman, 2018). In this paper, I will address how Black farmers have deployed their knowledge and skills to cultivate healing and utilize food as empowerment as an act of resistance against systemic oppression. This study examines the methods Black farmers use to advocate for their communities through providing access to fresh foods and plant medicine. Building on a reproductive justice framework, I aim to capture their efforts in restoring Black health by incorporating ethnographic research and qualitative interview measures to further explore practic-
es of farming as proactive healing efforts in response to ongoing racial injustice. I posit that agriculture practices can offer bodily and economic autonomy for Black people while simultaneously contributing to their communal healing to advance their journey in liberation.
De Aquí y de Allá: A Transnational Analysis of Undocumented Latine Healthcare Access and Utilization Maria Herrera Felix, Global Public Health/Sociology, Spanish Sponsor: Professor Iddo Tavor, Sociology
Undocumented migrant status has been established to influence people’s experiences with the exclusionary healthcare system in the US. This thesis seeks to provide a new transnational analysis of the experiences that undoc-
dumented Latine immigrants have with healthcare in the US. Drawing from data of 21 semi-structured interviews with Latine immigrants from Mexico and Central Amer-
ica living in Phoenix, Arizona, this thesis finds that Latine immigrants in Phoenix face various structural and transna-
tional barriers that shape their healthcare accessibility and perceptions as well as their utilization of medical services. This thesis finds that there is a connection between exclu-
sion in the US and exclusion in people’s birth countries in Latin America. This study finds that long-term periods of exclusion from multiple healthcare systems have impacts on people’s utilization of healthcare and their perceptions of their need for medical care. In addition, this paper combines previous scholarship on masculinity, Hispanic identity, and mixed status families as being modifiers to people’s health experiences. This paper seeks to provide a new understanding to the heterogeneity within the undoc-
dumented Latine population, showing the complexities of immigrants’ diverse socioeconomic upbringings and their relationships with health and healthcare. Public health interventions should be shaped around addressing these complexities to ensure more effective services and policies.
Canine Size and Reproductive Success in Female Rhesus Macaques (Macaca mulatta) Maddy Hillegas, Anthropology, Journalism Sponsor: Professor James Higham, Anthropology; Clare Kimock, Anthropology
Sexual selection favors traits that improve an individ-
ual’s success in obtaining reproductive opportunities with members of the opposite sex (Andersson, 1994; Dar-
win, 1871). Intrasexual selection, selection on traits that improve an individual’s ability to compete with members of the same sex, often manifests as male-male competition and can select for the evolution of weaponry. Canine size has been studied in male primates as one potential trait that may have been influenced by intrasexual selection, and it is correlated with male reproductive success in strongly sexually dimorphic primates such as mandrills and baboons but not in rhesus macaques (Galbany et al.,
The settler-colonial project in misdirecting Native anger, the Ramapough Lenape of New Jersey is a continuation of the (mis)/(non) recognition of the federally unrecognized themselves as sovereign in order to be recognized as such. This construction of what it means to ask sovereign nations to prove themselves as such destabilizes settler-colonial ideas of “tribes” and provides critical legal anthropological understanding and deconstruction of how Native peoples are asked to prove their sovereignty. The federal acknowledgment process finds its roots in political unrecognition, and titles of Federal and State recognition, and to be recognized as such? How do such politics of asking permission to be sovereign, and to be recognized as such? How do such politics of recognition, and titles of Federal and State recognition, create inter-tribal ruptures? I will address these questions by investigating the case of the Ramapough Lenape and Delaware Lenape. Indigenous land acknowledgments in New York City, and across the country, involve uncritical discussions of federal recognition and are rather political in their claims of territoriality on behalf of some tribes, but not all. Within NYC, there have been ruptures between the federally-recognized Delaware Lenape and the federally-recognized Ramapough Lenape. My work on the federal acknowledgment process finds its roots in political histories and legal precedents of federal Indian law in order to destabilize settler-colonial ideas of “tribes” and provides critical legal anthropological understanding and deconstruction of what it means to ask sovereign nations to prove themselves as sovereign in order to be recognized as such. The (mis)(non) recognition of the federally unrecognized Ramapough Lenape of New Jersey is a continuation of the settler-colonial project in misdirecting Native anger through the confusions of legal bureaucracy and fuzzy precedents.

Predictors of Clinically Significant and Reliable Change in Multiple Family Groups
Lia Iwai, Psychology
Sponsor: Professor Anil Chacko, Steinhardt School of Culture, Education, and Human Development, Applied Psychology

Multiple Family Groups (MFG) is an evidence-based behavioral parent training intervention for children with Disruptive Behavior Disorders (DBDs). Previous literature has established predictors of treatment outcomes for MFG based on statistically significant change. However, whereas statistical significance testing evaluates the efficacy of a treatment at a group level, clinically significant change and reliable change examines treatment efficacy on an individual level by examining each participant’s pre- and post-treatment scores on various key outcomes (e.g., child symptoms, impairment). This study examines predictors of clinically significant change and reliable change in MFG, utilizing data previously collected from 225 families of youths with DBDs that had participated in MFG. Clinically significant change and reliable change was determined using a clinical cutoff point and a reliable change index, respectively, for three outcome variables (i.e., inattentive-impulsive-overactive behaviors, oppositional-defiant behaviors, and overall functional impairment). Four different predictors were evaluated: the child’s gender, parents’ full-time employment status, pre-treatment parenting stress, and pre-treatment parenting behaviors. Parents’ employment status served as a predictor of reliable change for inattentive-impulsive-overactive behaviors, with parents who were not employed full-time over four times more likely to experience reliable change than parents who were employed full-time. Further studies must be conducted to evaluate other possible factors that are predictors, and to create an enhancement of MFG that will better serve parents who are employed full-time.

Drug Addiction: A Biological, Psychological, and Social Explanation
Jaime Jacoby, Global Public Health/Anthropology
Sponsor: Professor Melissa Maldonado-Salcedo, Anthropology

There is a tendency in today’s society to overlook the impact that substance abuse has on the brain, making it hard for people to understand that addiction is a diagnosis. It is a mental illness that, unlike others, receives very little compassion and public support due to the existing stigmas concerning addiction. There is still a remarkable amount of misinformation concerning substance abuse disorder that makes it difficult for those who are ill to access services that can support their recovery. Although in recent years there
has been a focus on addressing mental health, addiction remains misunderstood. In this project, I would like to draw on personal illness narratives and experiences concerning the ways in which addiction has impacted my family and community. I would also like to put these insights into conversation with the emerging science concerning addiction. If we can view addiction through the lens of science as well as a psychological and social issue, then this information can help strip away the stigma and focus on the problems. In this way, I would like to argue that it is imperative for society to alter the public perception concerning addiction to address it as a vital public health issue and not as an issue of unlawful action and moral failure. Lastly, I would like to highlight the importance of scientific/brain-informed educational initiatives as a way to also address prevention and support recovery as a public health strategy.

**Colonial America: A Comparative Study of the French and Spanish Colonial Empires**

*Rucheka Jain, French, Politics*

*Sponsors: Professor Anna Harvey, Politics; Professor Christopher Dawes, Politics*

Today there seems to be a widespread consensus that colonialism did more harm than good and stifled development, and this study in no way refutes that. However, is there a particular colonial power that was more conducive to growth than its counterparts? There is a lot of scholarly work out there suggesting that British colonialism was the most conducive to development, but there is a dearth of evidence on the matter when it comes to other colonial powers, specifically the French and Spanish colonial empires. Using historical data spanning over a century, I establish a positive correlation between colonialism and development. Using the borders of the Louisiana Purchase as the boundary dividing the areas colonized by the French and Spanish along with a regression discontinuity design, I show that French colonization later resulted in growth as opposed to Spanish colonization. The measures of economic development used were areas of improved agricultural land and total population, both of which were found to be higher in counties colonized by the French and contributed to development in later years. This went against the hypothesis of this study, which stated that Spanish colonialism was more advantageous compared to French—a theoretical argument based on Spanish focus on agriculture and Christian missions compared to the French focus on fur trade.

**Even the Water: An Analysis of the Navajo Nation’s Water Crisis**

*Brooklyn Alicia Johnson, Asian/Pacific/American Studies, Environmental Studies*

*Sponsors: Professor Colin Jerolmack, Environmental Studies; Professor Tyson Patros, Social & Cultural Analysis*

Currently, up to 30% of residents on the Navajo Nation do not have access to clean, running water. There is a lack of access for several reasons, including failure of the federal government to uphold treaties with Native nations, the sequestration of Native Americans to desolate reservations, and a lack of infrastructure, mainly water lines and septic systems. These failures are a reflection of past injustices that are upheld to this day, and they are especially damaging to the Navajo Nation both physically and psychologically. I present a comprehensive review of why there are failures to provide water to these nations, how they are damaging to the environment and community of the Navajo Nation, and a review of the relationship between the Navajo people and water. In addition, I propose policies to address these failures, focusing on the federal level.

**The History and Implications of No-entry No-take Zones in the Mediterranean: Examining the North Aegean**

*Katerina Kalergios, Environmental Studies*

*Sponsor: Professor Jennifer Jacquet, Environmental Studies*

No-take no-entry zones are the most restrictive tier of Marine Protected Areas (MPAs) and prohibit all human activity that impacts the ecosystem they protect including boating; diving; and recreational, artisanal, and commercial fishing. Their success in protecting biodiversity can be compromised by the non-compliance of regional actors such as recreational fishers. Recent anecdotal studies capturing both the frequency of which recreational fishers commit violations of conservation guidelines in general and the impacts of recreational fishers in the Mediterranean on the integrity of conservation efforts highlighted the need to understand the benefits and conflicts of no-take no-entry implementation from the perspective of recreational fishers themselves. Here, through a case study of ten recreational fishers spread across the North Aegean using a series of interview questions, I compare this group’s view of no-take no-entry zone implementation through personal accounts and anecdotal evidence. I show that this group of ten fishermen, who are connected to wider organizations of regional fishing, is generally concerned with the compliance of other, commercial actors in the region, the prospective environmental and cultural impacts of no-take no-entry designations within their communities, and the uneven enforcement of currently existing, mildly stringent
restrictions. As I show that recreational fisher concerns largely align with regional community roadblocks in the effective implementation of no-take no-entry zones, I also uncovered that while recreational fishers say they are dedicated to preserving their maritime traditions and ability to engage in their pastime, they also say they are committed to protecting holistic and environmental values in line with the purpose of no-take no-entry zone implementation. These insights can be used to understand resistance to the implementation of effective conservation measures such as no-take no-entry zones and to identify pathways to encourage local acceptance of more stringent and evenly enforced fishing restrictions like no-take no-entry zones.

Go Call Your Ancestors: How Today’s Young People Can Learn to Reckon with a Plague by Talking about Tragedy with Generations Past
Anna Rachel Hart Kaufman, Journalism, Spanish
Sponsor: Professor Robert Boynton, Journalism

Young people’s anxiety is on the rise. It has been for years actually, and the pandemic has only compounded a previously burgeoning mental health crisis. How then can we prepare this nation’s twenty-somethings, the most anxious batch yet, to emerge from their “generation-defining” moment even a little bit intact? The answer has a lot less to do with teaching resilience and a lot more to do with teaching history. Emerging into adulthood as a cohort defined by trauma and loss may be a foreign experience to the millennials and Gen-Zers of today, but the grand timeline of American suffering certainly did not begin in 2020. Our history is replete with examples of unimaginable hardship, and the lesson follows that there is an undeniable durability to the human species. To access that lesson though, and to be eased by the power of historical context, young people will need to sit in conversation with their elders. Born in 1918 with the Spanish flu and over 60 years later with the HIV/AIDS crisis, American society weathered disease-induced traumas. The virtue of cross-generational conversation certainly does not require such parallelism, but as a place to start, the dialogue anchored by those events covers quite a bit. It reveals that refusal to acknowledge and process shared grief stymies progress and mental health recovery. It lauds the muscle power of collective bargaining and teaches that empathy for the marginalized will anger your grief into action. Needless to say, this moment is a hell of an ice-breaker.

Distributive Politics of Fertilizer Subsidy in India
Apurva Kothari, Environmental Studies, International Relations
Sponsor: Professor Alastair Smith, Politics

Considerations of economic inequity should determine the distribution of subsidies from the central to the state government. However, empirical evidence in the field of political economy diverges from this normative claim. Studies indicate that when the central incumbent holds discretionary power in allocating a public good, their political motivations are likely to determine the beneficiaries and timing of the good’s delivery (Ferejohn, 1986; Lasewell 1936; Cain et al., 1987; Lezzeri and Persico, 2001; Mile-si-Ferretti et al., 2002). In the Indian context, researchers have analyzed the distribution patterns of a variety of goods from schools (Vishnav and Sircar, 2010) and roads (Khemani, 2007) to agricultural loans (Cole, 2009). This project seeks to contribute to this literature by exploring the trends in the allocation of fertilizer subsidy. Particularly, it focuses on the center to state urea subsidy transfers, which amount to $6.09 billion/annum and constitute about 70% of total government expenditure on fertilizer subsidies. For opportunist incumbents, whose primary objective is to remain in office, the urea subsidy is the perfect “pork”. Essentially, a club good which could be used to either buy turnout before elections or reward supporters post elections. Findings from my 22-year (1997–2018) state-wise panel data analysis reveal that a state’s income level is not a statistically significant determinant of subsidy allocation. Instead, states where winning margins are thin and co-partisans of the central incumbent form the state government receive more subsidy per capita post general elections. Results of this study also indicate that there exists a robust political business cycle wherein pre-election austerity in subsidy distribution is followed by election year and post-election year fiscal expansion. The evidence of this paper concurs with previous studies of distributive politics in India and contributes to the literature by analyzing the distribution of a less-commonly explored central grant: Urea subsidy.

The Danger of Policing for Profit: Investigating the Relationship between Municipal Revenue Reliance on Fines, Fees, and Forfeitures and Police Violence
Olivia Kugiya, Politics, Violin Performance
Sponsors: Professor Anna Harvey, Politics; Professor Christopher Dawes, Politics

In many municipalities across America, police are used not simply to solve crime but to generate revenue through the imposition of fines, fees, and asset forfeitures. This paper aims to uncover the relationship between municipal collection of these police-generated revenue sources and violence inflicted by police. The hypothesized story behind this investigation posits that using police to generate revenue creates misguided priorities among police and frequent hostile interactions between police and civilians, building a context more conducive to police violence. I seek to empirically assess this hypothesis by asking how the proportion of a municipality’s revenue from fines, fees, and forfeitures impacts its rate of killings by police. I use three empirical approaches to investigate this question.
The first assesses the direct relationship between the two variables using a linear regression and a differences-in-differences model. The second measures the impact of crime clearance rates, an established dependent variable of fine and forfeiture revenue share, on killings by police. The final approach assesses the relationship between state laws dictating municipal fine collection and police killings statewide. The findings point to a strong association between fine and forfeiture revenue collection and killings by police but do not establish a clear over-time, causal relationship. Given the slow-moving nature of the hypothesized impact of police-generated revenue collection on police violence, further data will be required to establish the long-term impact of increasing or decreasing revenue collection from fines and forfeitures.

“I’ll Make a Man Out of You”: How Does Korean Military Service Shape Perceived Masculinity?

Jasmine Kwak, Psychology, Sociology
Sponsor: Professor Lynne Haney, Sociology

Every year, South Korean men ages 18 to 28 put their lives are on hold to enlist in the military for two years and live-in bases that are virtually cut off from the rest of the world. In the aftermath of the Korean War (1950–1953), the government mandated compulsory military service in 1957 for all able-bodied men to strengthen its defense. Over the past 60 years, conscription has become culturally regarded in Korea as a coming-of-age milestone to be recognized as men in society, yet the rise in military evasion in recent years put into question the practices of the military. This study focuses on masculinity ideology in military culture and examines its effects on perceived masculinity on young men. Using a qualitative case study of South Korean men, I conducted 12 in-depth interviews via Zoom with recently discharged Korean men and cross-referenced responses to a set of expectations associated with traditional masculinity derived from past studies: 1) avoid femininity, 2) strive for achievement, 3) hide weaknesses, and 4) seek adventure even if violent (Levant and Richmond, 2007). Across my interviews, an endurance of hardships, cultivation of independence, and gender socialization were similarities in conscription experiences. Although core military documents demonstrate a political and cultural bias toward conservatism, these findings reveal that the internalization of masculinity ideology in the military is an indirect consequence of long-established social norms to a greater extent than directly administered instruction from military personnel.


Cordelia Kwon, Global Public Health/Anthropology
Sponsor: Professor Fred Myers, Anthropology

The state of health of Aboriginal Australians, through the twentieth century and into the present, is an artifact of the colonial project and the biomedical system that accompanied and supported it. It is in this system that Aboriginal activists in the 1970s began to fight for their own health and establish community-control over their own health services. This fight was deeply influenced by the World Health Organization’s charter and primary health care movement, by the Black Panther and Civil Rights Movement in the US, as well as by the post-colonial era in India and Africa. This project will draw out those global influences and their impact on Aboriginal Australian communities and make the case that imported technologies of care can and should be utilized by states, particularly settler-colonial states, as solutions to their own health problems. Through this, I will also draw out the ways in which these global influences are localized and show that it is in this localization where the ideologies of health and wellness can be revealed. Ultimately, this project aims to reveal the impacts of the unmarked, hidden global influence of biomedicine on not only Aboriginal health but on the way settler-colonial states view self-determination of Indigenous people. In our present world, which is increasingly nationalistic and isolationist despite global threats to health such as -19 and climate change, this message about the importance of disrupting biomedical and colonial understanding of health in favor of lessons learned across the globe will ultimately create stronger, more resilient health systems.

Everybody Plays: Using Kink to Understand Consent

Brooke LaMantia, English and American Literature, Journalism
Sponsors: Professor Robert Boynton, Journalism; Professor Marybec Griffin, Rutgers University, School of Public Health

How does consent function in human relationships, whether sexual, romantic, or platonic? Consent is defined as permission or agreement, however, is complex in modern discussions regarding consent and sex. My goal is to highlight how individuals in the non-normative sexual sphere practice consent education and juxtapose it to more mainstream relationships. Consent is mostly “assumed or implied rather than overtly asserted” and this is only further complicated by the recent “Me Too” movement. To explore these questions, I will conduct in-depth interviews with individuals and communities that practice BDSM, polyamory, and kink. Polyamory, or ethical/consensual non-monogamy, are relationships that are not between two
people. Kink is any sexual practice that is non-conventional
or any practice that is outside what is considered normative
sex, and BDSM is a type of kink, which stands for “bond-
age and discipline, dominance and submission, sadism
and masochism” While learning about the communities,
I will research how they use and practice consent. BDSM,
polyamory, and kink are usually either demonized by news
programs or fetishized by pornography. However, I wish to
examine if by learning about consent through BDSM, con-
sent can be effectively applied in all relationships. Through
the study of consent in BDSM, polyamory, and kink, can
people grasp a more nuanced view of consent and feel
more empowered in all relationships, or is the gap between
normative relationships and these practices too large?

Loving More: Self-fulfillment and Management
Strategies in Polyamorous Relationships
Julia Leconte, Global Public Health/Sociology
Sponsor: Professor Paula England, Sociology

Non-monogamy has received increased attention
and public legitimacy in recent years. Polyamory is one
of the more complex forms of non-monogamy that has
become increasingly visible, more so than in previous
periods since the term was first coined in 1990. The sim-
plest definition of polyamory is having, or being open to
engaging in, multiple romantic and/or sexual relationships
simultaneously. In this study, interviews were conducted
with 23 individuals, ages 23 to 75, that have been in at
least one polyamorous relationship. The interviews sought
to understand both how and why participants became poly-
amorous, structured their relationships, and negotiated how
those relationships would be organized and conducted. The
researcher found that participants overwhelmingly shared
similar narratives about the ideology of polyamory, which
centered the self. Despite the shared narratives, participants
had very different ways of doing polyamory. Ultimately,
the researcher found that a tension exists for participants
between the ideals of self-fulfillment they were seeking in
relationships, but that polyamorous individuals experience it
to a much higher and more visible degree.

Social Media Impact on Electoral Outcomes
Zachary Lee, Journalism, Politics
Sponsor: Professor Gwyneth Hartman-McClendon, Politics

In 2016, the Russian Federation disseminated mis-
information to interfere in a US presidential election. In
the years that followed, some scholars assigned a decisive
role to Russian social media interference in determining
the election’s outcome. This study seeks to examine social
media’s effect on electoral outcomes, building on earlier
research. The DURF grant was used to hire 500 survey par-
ticipants through Amazon’s MTurk. The group of 500 was
split into two cohorts of equal size. Both received access
to social media feeds, with the fictional candidate in treat-
ment linked to misinformation. The change in support for
that candidate was an estimate of misinformation’s effect
on voter behavior. The candidate with misinformation in
treatment saw a 3.5 percentage drop-in support. In 2016,
Secretary Clinton lost the Electoral College because of
small margins in three swing states: Wisconsin (.77%),
Michigan (.72%), and Pennsylvania (.23%). A drop of 3.5
percentage points would have been sufficient to shift the
outcome in the three states that determined the election.
To test for statistical significance under a 95% confidence
interval, a binomial distribution was performed on MAT-
LAB. Data showed that a sample size of 2,000 was the
minimum threshold for statistical significance. But, while
the current sample size was too small to be statistically
significant, preliminary results did hand a pivotal role to
social media meddling in close elections. If confirmed, this
finding has wide ranging implications for national security.
More research with larger surveys is needed in the years
ahead.

“Are You White People?”: Race and Gender in the
1931–32 Massie-Kahahawai Cases
Zoe Lee, Art History, History
Sponsor: Professor Dean Saranillio, Social & Cultural
Analysis

In the wake of Thalia Massie’s false accusation of
Joe Kahahawai, Horace Ida, Ben Ahakuelo, Henry Chang,
and David Takai of sexually assaulting her, Joe Kahahawai
was murdered at the hands of her mother Grace Fortescue,
her husband, and two other Navy-affiliated men. Much
work has been done contextualizing these two court cases
in the racialized settler-colonial framework of Hawai‘i in
the early twentieth century. However, I attach a gendered
lens to the racial context to discuss how patriarchy affect-
ed the way Thalia and Grace made their decisions and,
more importantly, to examine the power dynamics that tie
race and gender together in order to foreground women of
color in Hawai‘i, whose stories were buried by white
voices. I piece together the events using the original court
transcripts, a 200-page report from the Pinkerton Detect-
ive Agency, and newspaper articles, and analyze them by
drawing from Indigenous and feminist scholars. I focus
first on Thalia Massie, who willingly folds herself into a
pre-existing discourse in pop culture that used white wom-
en as a symbol of whiteness, and thus, as rationalization for
white violence. I focus second on Grace Fortescue, whose
role as a mother offered her ways to rationalize murder. I
suggests that there is an effect that income shocks have certainly have an impact on its foreign relations. Literature is a significant source of income, and exogenous shocks
Politics
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Dylan Liang, International Relations
2014
Evidence and Analysis of Oil Production from 1993–
Commodity Price Shocks and Interstate Conflict:
from High School.
(HSE) for incarcerated individuals who never graduated
the currently mandated High School Equivalency Program
tions and Community Supervision (DOCCS) to build upon
proposal for the New York State Department of Correc-
programming. In this research, I suggest a three-part policy
improve its facilitation and execution of its educational
prison education in the US, requires policy advisement to
The New York State government, which once pioneered
higher likelihood of obtaining employment upon reentry.
participants in correctional education had a 28% less likely to return to prison than those who did not, while
those who participated in a prison education program were 43% less likely to return to prison than those who did not, while
prison education is a key tool to reducing recidivism, improving employment outcomes, and saving taxpayer dollars. A recent meta-analysis on prison education conducted by the RAND institute found that those
who participated in a prison education program were 43% less likely to return to prison than those who did not, while
as well as perform emotional labor as they
navigate their newfound role.

Education in New York State Prisons: A Deep Dive into Access and Quality of High School Equivalency Programs
Molly Leifer, Public Policy
Sponsor: Professor Timothy Naftali, Public Policy
The US is the largest incarcerator in the world, with 2.3 million people behind bars nationwide (Prison Policy Initiative, 2019). Our country makes up 5% of the world’s population, yet 25% of the world’s prison population (ACLU Mass Incarceration, 2020). In New York State alone, there are approximately 53,000 people currently imprisoned with 20,000 reentering society each year (John Jay, 2020). These formerly incarcerated individuals are ill prepared for life beyond bars to the extent to which two-thirds are arrested within three years of reentering society (DOJ Bureau of Justice Statistics, 2018). As for potential remedies, there is strong consensus across the political spectrum that prison education is a key tool to reducing recidivism, improving employment outcomes, and saving taxpayer dollars. A recent meta-analysis on prison education conducted by the RAND institute found that those
who participated in a prison education program were 43% less likely to return to prison than those who did not, while
their audiences. It also questions the labor that
micro-influencers do that goes beyond posting pictures and
videos. The back-and-forth interplay between micro-influencers and their followers not only serves to deepen engagement but also helps to commodify themselves into a brand which can then be leveraged for brand collaborations and partnerships. Therefore, this research helps to understand how micro-influencers construct an authentic self-presentation in relation to self-branding and consumption purposes as well as perform emotional labor as they navigate their newfound role.

Productions of Authenticity and Labor: A Case Study of Social Media Micro-influencers
Anna Liu, Sociology
Sponsor: Professor Iddo Tavory, Sociology
The rise of a new form of digital marketing, influencer marketing via social media platforms, has gained popularity over the years and has contributed to the growth of budding “micro-influencers”. These “social media influencers” are a new kind of celebrity that we still do not quite understand who they are and how they have emerged. These individuals are often regular people who have attracted a following through creating and posting content on social media platforms such as Instagram and Tik Tok and have achieved a level of internet fame. This study explores how social media micro-influencers produce authenticity and the different methods they use to communicate and interact with their audiences. It also questions the labor that micro-influencers do that goes beyond posting pictures and videos. The back-and-forth interplay between micro-influencers and their followers not only serves to deepen engagement but also helps to commodify themselves into a brand which can then be leveraged for brand collaborations and partnerships. Therefore, this research helps to understand how micro-influencers construct an authentic self-presentation in relation to self-branding and consumption purposes as well as perform emotional labor as they navigate their newfound role.

Commodity Price Shocks and Interstate Conflict: Evidence and Analysis of Oil Production from 1993–2014
Dylan Liang, International Relations
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics
For many states, the production of commodities is a significant source of income, and exogenous shocks certainly have an impact on its foreign relations. Literature suggests that there is an effect that income shocks have
CAT bonds are an appealing strategy to hedge against the risk that they take on and whether it has broad implications for firms trying to decide how they should hedge against their exposure to catastrophe risk. While insurance firms have scrambled to find new reinsurance mechanisms to help hedge against their exposure to catastrophe risk, many are turning to insurance securitization as another way to increase their underwriting capacity. As a result, catastrophe bonds (CAT bonds) were developed as a financial instrument through which insurance firms could participate in insurance securitization. Given the rapid growth of the market for these CAT bonds, in this paper I examine the relationship between CAT bonds and shareholder wealth. Consistent with previous research, I find a limited connection between the wealth of shareholders and the issuance of CAT bonds. However, when analyzing the relationship of specific characteristics of a CAT bond and the issuing firm and shareholder wealth, I find that markets may respond more positively to specific types of bonds and firms. This has broad implications for firms trying to decide how they should hedge against the risk that they take on and whether CAT bonds are an appealing strategy.

The Forecasting Power of Implied Volatility in the Emerging Chinese Financial Markets
Zoe Lu, Economics, Mathematics
Sponsors: Professor Simon Gilchrist, Economics; Professor Viplav Saini, Economics

The volatility of assets reflects risk and economic uncertainty in the financial markets so it is essential for investment decision-making and risk modeling. From a macroeconomic perspective, the uncertainty of financial markets would negatively impact employment and economic outputs. Hence, a comprehensive understanding of the financial market volatility and volatility forecasting methods is crucial for financial-economic research. Previous researchers have conducted various volatility forecasting methods in the past 30 years, mainly categorized into two fields: time-series models and implied volatility (IV). The basic definition of volatility is the standard deviation of historical asset returns, often used as input in more complicated time-series models to forecast future realized volatility (RV). On the other hand, IV does not depend on historical fluctuations of returns. Instead, IV is driven from an options pricing model: given the option price and contract information (strike price, time to maturity, risk-free rate, and the current underlying asset price), IV can be deduced from the specified model (Black-Scholes). Thus, IV is widely used for measuring market expectation of future volatility of the underlying asset over the remaining life of the option contract. This thesis examines the forecasting power of implied volatility in predicting future realized volatility in the emerging China financial markets. The main focus will be on the stock index (SSE 50 ETF Index) launched by the Shanghai Stock Exchange in Feb 2015. Because the implied volatility is driven by a specified options pricing model, it is not easily accessible for retail investors, the primary market participants in the stock market. Thus, the Shanghai Stock Exchange also launched a volatility index (iIVX) for SSE 50 ETF index. The forecasting power of this volatility index will also be investigated in this thesis.

The Role of Colonial Histories in Natural Hazard Management
Carla Alejandra Lugo Martin, Environmental Studies, Global Liberal Studies
Sponsor: Professor Anne Rademacher, Anthropology

Climate change induced hurricanes are expected to increase in magnitude and become a more frequent occurrence. Islands in the Caribbean Sea and Pacific Ocean are disproportionately vulnerable to these events both physically and socially. While many refer to hurricanes as “natural” disasters, contemporary theories of disaster highlight that disasters are never natural but socially induced. More specifically, disasters are defined to be a combination of hazard risk and social vulnerability—a single hurricane or
earthquake would not be a disaster unless it had a social effect. However, current disaster management plans in the face of Climate Change focus on mitigating physical vulnerabilities by promoting resilient infrastructure and engineering plans. Seldom in these plans is there an attempt to mitigate social vulnerabilities. Furthermore, when these plans do consider social vulnerability, it is mostly a call for social resilience which literature proves is a neoliberal, biopolitical tool. Even less evident in these plans is consideration of the colonial history of islands and the impacts that colonialism has had in producing contemporary social and ecological vulnerabilities within them. What is the importance/role of colonial history in natural hazard management plans?


Cameron Maglio, Politics, Sociology
Sponsor: Professor Chris Dawes, Politics

Previously, recount election literature has been mired in case studies and the recount process itself. In light of recent recount concerns and media attention, I ask how does a recount in a US House election affect vote margin, party victory, and party performance in the following election cycle? From a sample of 75 close House races and their subsequent elections from 1940 to 2008, I include 29 post-recount elections. Regressing using a differences-in-differences design with fixed district and year effects, I seek to isolate the effect of a recount in the ballot booth two years later. I found that recounts increased vote margin in the following elections at a significant level, but this effect did not benefit either party or result in a differing rate of party turnover. After adding controls, I concluded that my treatment effect was not confounded by state characteristics. My research comments not only on the effect of recounts on voting behavior but also on the lasting impact of major electoral events.

The Effect of Independent Redistricting Commissions on Partisan Advantage in US House Elections

Ruchi Marfatia, Politics
Sponsor: Professor Chris Dawes, Politics

This paper examines the effects of gerrymandering reform on partisan advantage in US House elections. Using a difference-in-differences regression model with state and time fixed effects, I examine to what extent the introduction of independent redistricting commissions affects the likelihood of gerrymandering in congressional districts. If partisan majorities in state legislatures have the authority to redraw House district lines after a census to adjust for population movements, they may draw the lines in a way that advantages their party, creating more districts in which their party has a higher probability of victory. Redistricting reform introduces independent bipartisan commissions that determine district boundaries with the objective of reducing this partisan advantage. Existing literature suggests that redistricting by an independent body leads to more competitive elections, making it likely that redistricting reform creates more representative districts. However, I find that during a period between 1972 and 2018, the introduction of independent redistricting commissions made it 14.9 percent more likely for candidates from the same party that held a majority at the time of redistricting to win their election. These results suggest that the independent redistricting commissions are not sufficient to reduce partisan gerrymandering and that states will have to consider alternative ways to ensure fair representation in the redistricting process.

Beyond Quality Snapshots: Reimagining High-quality Schools for Black and Hispanic Students

Jhenelle Marson, Social and Cultural Analysis, Sociology
Sponsor: Professor Linsey Edwards, Sociology

Specialized high schools have been the central focus of New York City’s education equity discourse due to their exclusive admissions policies and the relatively low number of admitted Black and Hispanic students each year. School quality data shows that these schools are designed to offer rigorous college preparatory education and present them as high-quality schools because of their high graduation and college enrollment rates. While increasing access to specialized high schools is worthwhile, focusing merely on traditional measures of school quality might be limiting, by too narrowly focusing on the school-level factors that matter most for Black and Hispanic students’ academic achievement. Black and Hispanic students account for the majority of students who experience school discipline, including in-school suspensions, law enforcement referrals, and expulsions. School climate issues, such as these, are particularly important because they characterize the norms, values, and expectations that shape students’ social, emotional, and physical well-being (National School Climate Center, 2019). This research investigates the school-level factors that are most associated with Black and Hispanic students’ academic achievement.

Assessing the Impact of Natural Disaster Incidence on Terrorist Activity

Jake Mayerson, International Relations
Sponsor: Professor Alastair Smith, Politics

This study examines the effects of natural disasters on terrorism. Empirical scrutiny of monthly data on the occurrence of natural disasters and terrorism at the national level suggests that exogenous natural disaster shocks such as earthquakes and landslides precipitate terrorist attacks.
Exogenous natural disaster shocks can inhibit a government’s capacity to suppress existing terrorism, opening an immediate window of opportunity for terrorist networks to exploit. Exogenous natural disaster shocks can also foment newfound grievances against a government over time, leading to long-term terrorist attacks. My findings suggest that if a terrorism campaign were present in the year prior to a given attack, the driving mechanism for that attack tends to be opportunity-based, while if terrorism were absent in the year prior to a given attack, the driving mechanism for the attack tends to be grievance-based. Further analysis reveals that endogenous natural disasters—namely, famines—increase terrorism when considered alone but reduce terrorism when they cause fatalities. This effect is more pronounced in the long term than in the short term. Finally, in a democratic regime, the occurrence of exogenous natural disaster shocks alone tends to have little to no effect on terrorism, whereas disaster-induced fatalities increase levels of terrorism. In an autocratic regime, conversely, the occurrence of exogenous natural disaster shocks alone increases terrorism, but fatalities attributed to these shocks lower the incidence of terrorist attacks.

Investigating the Divisions of Labor among Straight and Lesbian Couples without Children
Allison McGavish, Sociology
Sponsors: Professor Iddo Tavory, Sociology; Professor Kathleen Gerson, Sociology

There has been significant research devoted to the topic of household divisions of labor. However, previous research has focused on older, straight couples with children. In an attempt to bridge this gap, this research investigates what a division of labor among younger couples (aged 21–32) without kids looks like and the potential differences between lesbian and straight couples. In order to investigate this topic, 20 interviews (5 straight, 5 lesbian couples) were conducted via Zoom. Data was also collected from self-report surveys, which asked the couples to report how they divided approximately 25 different household responsibilities. The research showed that there was no “straight” and no “lesbian” division of labor. There was actually great similarity in the sense that divisions of labor ranged both among and between these two groups, with similar factors influencing these divisions of labor. However, this sameness contained hidden differences. In the straight couples with fairly uneven divisions of labor, the partner with more household responsibilities blamed themselves for the imbalance. Their partners either acknowledged the imbalance but made no effort to change it or were unaware. On the contrary, when a lesbian partner felt an imbalance, they either accepted it or expressed a desire for a more even division of labor to which their partners were receptive and active in their remedies for change.

The Effects of Transitions in Care in Heart Failure Rehospitalization
Vibha Mital, Global Public Health/Biology
Sponsor: Professor Himali Weerahandi, NYU School of Medicine, Population Health

In this project, we compared the discharge process from a skilled nursing facility (SNF) to the home to the discharge process from a hospital to a SNF, following treatment in a hospital for heart failure and symptoms of heart failure. Through this comparison, we attempted to identify points of difference that could contribute to the higher rate of re-hospitalization for heart failure-related symptoms following the discharge to the home. To accomplish this, we interviewed SNF patients, caregivers, and staff for their perspectives on the discharge process and to understand points of disagreement between the perspectives of patients versus those of the staff. We have identified certain areas of discrepancies that might contribute to higher rates of hospitalization. These factors include access to home health care, income levels, and an understanding of post-discharge self-care. By furthering our work, we hope to find ways to ease the transition processes for families across the socioeconomic spectrum and ensure that all patients have the tools to keep themselves healthy.

The Rise of Populism in European Parliament Elections Post-Eurozone Crisis
Eline Munster, European and Mediterranean Studies, Politics
Sponsor: Professor Chris Dawes, Politics

Europe has been hit by a wave of populism in the past decade, with populist parties even gaining traction in the supranational European Parliament elections. This study explores to what extent the Eurozone crisis in 2010 can explain trends in the vote share of populist parties in subsequent European Parliament elections. Utilizing a difference-in-differences design with district fixed effects, the vote share of populist parties in Eurozone versus non-Eurozone member states’ regions will be examined pre- and post-Eurozone crisis as well as the populist vote share in Eurozone members with austerity measures imposed versus members in which no austerity measures were imposed and in Western versus Eastern member states. The vote shares of the center-right, center-left, Green, and second populist parties will also be considered in order to fully comprehend the evolution of the electoral scene in European Parliament elections post-crisis. There was significant evidence in favor of the primary hypothesis that Eurozone member states experienced a greater increase in the populist party vote share compared to non-Eurozone member states post-crisis, albeit with some reservations. Eurozone members with austerity measures imposed saw a greater increase in their populist vote share compared to Eurozone members in which no austerity measures were
Naming Chinese America: Personal Names as Signifiers of Identity Construction among Chinese Americans
Felicia Nara, Global Liberal Studies, History, Philosophy
Sponsor: Professor Ifeona Fulani, Global Liberal Studies

Our names are more than a collection of sounds and symbols. They are a snapshot of identity, one of many chapters in our story, and, in the story of Chinese America, we see the link between name and identity manifest. An investigation into the reciprocal causal relationship between onomastics and diasporic ethnic identity, this thesis is an interdisciplinary blend of literary, historical, and ethnographic analysis, through which I argue that personal names are a venue through which Chinese Americans experience their own ethnic identity, even when their names may appear Anglo-American. To do so, I apply existing theories of identity formation—many of which describe journeys from acceptance to rejection to negotiation of whiteness—to the case of Chinese American names and identity. I use names and naming patterns to trace the formation of the Chinese American identity throughout history and demonstrate that Chinese American identities were being meaningfully navigated and negotiated by even the earliest Chinese immigrants to America as well as through subsequent waves of immigration into the present day. Through names, this thesis illustrates the complexities and nuances that lie within the diverse Chinese diaspora in the US and how they have viewed themselves through time.

American Jails: A Substitute for Substance Abuse Treatment Resources
Marie Nercessian, Politics, Psychology
Sponsor: Professor Anna Harvey, Politics

How should lawmakers begin to address the addiction crisis in the US? With opiate abuse and rates of substance use disorders in incarcerated populations on a steep incline, the answer to this question remains in limbo. One possible solution to the drug epidemic could be an increase in substance abuse treatment facilities. Using national census county-level data on jail populations and substance abuse treatment facilities, I establish a positive correlation between the number of treatment facilities and jail populations per 1,000 members of a given county. These results provide empirical evidence of co-occurring phenomena rooted in the boom of drug use and drug arrests rather than a single causational relationship.

Ethnography of an Essential Worker: How Social Ideas of Race, Status, and Ability Are Expressed in COVID Testing and Vaccination Sites
McKenna Nisson, Anthropology
Sponsor: Professor Melissa Maldonado-Salcedo, Anthropology

The media’s current narrative of the COVID-19 pandemic highlights legislative, political, and numerical stories of the coronavirus, yet fails to humanize the preventative measures enacted by the government and implemented by healthcare workers. This project aims to personalize the experience of engaging with the systems built for monitoring the pandemic. I ethnographically capture and present the frontline worker’s experience working at a COVID testing site and vaccine distribution center. By offering critical snapshots of daily affairs, this narrative details how institutional conceptions of race, status, and ability are expressed in these locations through the study of linguistics, kinesics, and physical space. Furthermore, I underscore how these ideas impact the experience and incentive of getting tested for and vaccinated against COVID-19. I posit that we must shift our focus to these spaces and experiences in order to critically consider the implications for how to move forward in public health utilizing the theories and methods of anthropology. Overall, my observations stress the importance in advocating for a more diverse workforce in healthcare.

American Anarchism: Haight Ashbury and the Analysis of Modern Movements
Layla Passman, American Studies
Sponsor: Professor Tyson Patros, Social & Cultural Analysis

The 1960s led America to a new era of social upheaval. Along with many overlapping movements, the countercultural movement that took a widespread hold on America’s youth played a crucial role in how we approach social transformations. Its home base, The Haight Ashbury district in San Francisco, became a testing ground for an anarchist movement. While they are often dismissed as disillusioned “hippies”, I argue that the people of Haight Ashbury were embarking on a radical form of protest, that of exit and rebuilding from the ground up. Seeking to create an entirely new counter-society, one that goes against the very existence of the American Capitalist State. I consult both primary and secondary sources to prove the radical political work that was done in Haight Ashbury. I offer critiques and analysis of why this task was ultimately too difficult for the community and what challenges they faced. While a small part of the era, Haight Ashbury can be seen as a case study in American anarchism.
Cartels or Concessions?: The Hidden Use of State Violence in Mexico
Elan Pelegri, International Relations
Sponsors: Professor Pablo Querubín, Politics; Rafael Ch, Politics

Mexico initiated its War on Drugs in 2006 with the support of the US government and initiated a crackdown on Drug-Trafficking Organizations (DTOs) that has greatly exacerbated internal conflict. In 2008, Mexico initiated “Plan Mérida”, a joint Mexico-US security initiative with the express purpose of enhancing and expanding Mexico’s existing anti-narcotic programs. In the years since its signing, however, numerous qualitative data have illustrated the initiative’s role in the exploitation of natural resources and the suppression of local opposition groups through violence. This paper presents the novel quantitative finding that the Mexican government allocates military resources to suppress opposition to private mineral resource exploitation. Due to the lack of accessible data on the allocation of military resources, I employ measures of anti-narcotic activities to approximate this allocation while mining concessions serve as a proxy for mineral resource exploitation. The initiation of mining activity in a given municipality induces a 9.1% rise in anti-narcotic activity, measured as kilos of marijuana seized. The absence of any relationship between mining activity and DTO presence, however, indicates that this rise in anti-narcotic activity cannot be attributed to narcotic activity. Rather, it reveals the allocation of military resources toward the protection of private mining interests.

The Effects of Intraminority Discussions about Race on Collective Action
Maureen Petica, Psychology
Sponsors: Ashley Berkebile-Weinberg, Psychology; Professor Tessa West, Psychology; Professor Maureen Craig, Psychology

Since the development of contact theory (Allport, 1954), research has shown that intergroup contact is an effective mechanism for improving majority group members’ intergroup attitudes (Pettigrew & Tropp, 2011). However, it can also decrease minority group members’ desire to take collective action on behalf of their own group (Dixon et al., 2010). In this study, we examined the potential of sharing experiences of discrimination to increase both positive outgroup attitudes and collective action intentions. 192 Asian female students participated in the Fast Friends Procedure (Aron et al., 1997) with a Black confederate and were assigned to discuss either discrimination or culture (control). Afterwards, participants completed a questionnaire measuring their outgroup attitudes and willingness to take part in collective action. Results indicate that there was no difference in attitudes toward Black people after discussing discrimination (z-scored; M = 0.07, SD = 0.98) compared to discussing culture (z-scored; M = -0.07, SD = 0.87, t(190) = 1.08, p = .30. Additionally, there was no difference in willingness to engage in collective action after discussing discrimination (M = 5.42, SD = 1.03) compared to discussing culture (M = 5.39, SD = 1.08), t(190) = .03, p = .87. Overall, intraminority discussions about discrimination compared to culture do not seem to have an effect on intentions to engage in collective action nor outgroup attitudes.

To Defund or Not to Defund: Is Community Policing Viable in the #BLM Era?
Chris Pyo, History, Journalism
Sponsor: Professor Robert Boynton, Journalism

In the midst of a global pandemic, the “Defund the Police” movement gained steam at a rapid pace. Millions of people marched hand-in-hand against police brutality in the summer of 2020. Calls were made to defund or even outright abolish the police altogether, and local governments across the country promised to reinvest that money into community programs and social services. But there are many others speaking out against the movement, wanting to either leave the police alone or looking for different policing tactics to promote. Community policing has emerged as a viable alternative to traditional policing. It consists of increased officer accountability, the decentralization of police, and the development of relationships between police and community members. Cities such as Rockland (IL) have developed initiatives where police officers live in the neighborhoods they patrol and actively engage with the community. However, putting more police officers in neighborhoods with the aim of fostering relationships between citizens and the police seems paradoxical, especially when people argue that police officers themselves are the root of the problem. According to Bloomberg, more than half of the 50 largest cities in the US either maintained or increased their police budgets last year. Major cities such as Tampa, San Diego, and Atlanta actually experienced an increase in their police budgets. With President Biden disapproving of the defunding of police and promising to allocate $300 million towards community policing initiatives, activists are watching their momentum slip out from under them. Is defunding the police still a feasible proposition or is community policing the future of modern-day policing?

Shadow Banning and Video Deletion: A Cross-sectional Study of TikTok’s Application of Community Guidelines between Black and White Creators
Diego Quintana Licona, Chemistry, Gender and Sexuality Studies; Zora Hall, Environmental Studies
Sponsor: Professor Marie Bragg, NYU School of Medicine, Population Health

TikTok is currently one of the fastest-growing social media platforms in the world. Their Community Guide-
lines algorithm has been a subject of controversy due to the alleged deletion and delay of content of Black creators in comparison to their white counterparts. This issue became evident during the increase of protests for the Black Lives Matter movements. The cross-sectional study aims to analyze the current application of community guidelines between Black and white creators. It will examine the relationship between instances of shadow-banning on TikTok and recent events of police brutality and anti-Black activism in the US and better understand the relationship between content suppression, perceived discrimination, and psychological and physiological health effects. 300 creators (150 white and 150 Black) of the most popular posts under the hashtags #BlackLivesMatter, #BLM, #GeorgeFloyd, and #BLMMovement will be contacted via the platform’s messaging service to be surveyed on matters related to the BLM content, race, and perceived community guideline violations. The data gathered will be analyzed by members of the SEED Lab to draw conclusions that may confirm or deny our hypotheses. Currently, the project is pending IRB approval and will soon start the surveying process. Data collection on the most popular videos as well as the contact information of the creators has already been collected.

Children’s Phonetic Imitation of Dialect-specific Features
Janie Rist, Communicative Sciences and Disorders
Sponsor: Professor Susannah Levi, Steinhardt School of Culture, Education, and Human Development, Communicative Sciences and Disorders

Adult talkers are known to spontaneously modify their speech to become more similar to another talker, a process known as phonetic imitation. Research has shown that adults imitate a variety of phonetic details, including dialect-specific features. The current study examined if children also exhibit phonetic imitation and if acoustic parameters change based on dialect-specific features. Eight children between the ages of 6 and 10 years old (Mage = 8.78) repeated words after hearing them produced by two adult talkers; one with a New York City dialect and one with a Generalized American dialect. Half of the target words were pronounced differently by the two adult talkers based on their dialect (i.e., words with the “coffee” vowel, words that contrast the vowel before ‘r’ such as “marry” and “merry”, and words that begin with “str”). The other half of the words contained no dialect differences. Acoustic analyses of the children’s productions revealed that children imitated dialect-specific features across several measures, indicating that children perceive fine-grained acoustic details in the speech signal and integrate this information into their speech production. Children also imitated general properties of the words that differed across the two talkers, including fundamental frequency and duration. In line with past literature, children in the current study exhibited more examples of phonetic imitation than adults, suggesting that the degree of phonetic imitation could possibly be linked to the development of language and spoken language processing.

Concrete Implications? How Confederate Monument Removal Shapes Political Attitudes within the US
Isabel Rudie, International Relations
Sponsor: Professor Pablo Querubín, Politics

There is minimal existing research within the US today that informs us on the significance of symbolic politics and how impactful physical symbols can be in terms of the shaping of history, interpretation of events, representation of government, and framing of a country’s ideals. This paper hones in on Confederate monument removal to explore the effect it has on subsequent changes in Republican vote share and political attitudes of US citizens. Using a two-way fixed effects model with electoral and monument data as well as an ordinary least square model with unique data collection via an online survey experiment, I find that the removal of Confederate monuments, on average, significantly decreases subsequent Republican vote share at the Presidential level and caused US citizens to be significantly more likely to support and believe in the validity of the Black Lives Matter movement. The effects are even more extreme when considering gender and support for Donald. J. Trump. These findings add to a hyper-relevant and quickly growing field of research and literature pertaining to symbolic politics and its connection to political and racial attitudes with the US today.

Sanctuary Policies and Income Inequality
Dan Russo, Politics
Sponsor: Professor Chris Dawes, Politics

The relationship between “sanctuary” immigration policies and economic outcomes are a widely discussed topic in political science research. This paper expands that research to include the effects of sanctuary policies on income inequality at the county level. Both issues are ones that have become increasingly more salient in the past few years, and a possible intersection between them would perhaps shed new light on them. This project used a differences-in-differences analysis of all roughly 3,000 counties in the US over a time period of roughly a decade, accounting for county-level covariates and fixed effects for time (in years) and county. While future research may need to be done, no significant link between sanctuary policies and income inequality was found as a result of this analysis.
Searching for Synergies: Permaculture for Agroecological Transition in Marda, Palestine
Grace Samaritano, Middle Eastern and Islamic Studies
Sponsor: Professor Zachary Lockman, Middle Eastern and Islamic Studies

Israel’s occupation of the West Bank has weakened the Palestinian agriculture sector, increased Palestinians’ socio-economic vulnerability, and degraded the environment. The existing environmental justice literature demonstrates the difficulty of transnational, multistakeholder initiatives working to address these unjust and unsustainable conditions within the occupation context. Since its introduction in Palestine during the 1990s, the permaculture movement has worked to create integrated agricultural systems that promote environmental sustainability and improve Palestinian livelihoods, a process known as agroecological transition. As there has yet to be substantive discussion of Palestinian permaculture as a multi-stakeholder initiative, this thesis investigates the various actors involved in permaculture projects and how they have furthered agroecological transition under occupation.

Using online sources and interviews, the thesis identifies actors through a history of two permaculture projects in Marda, Palestine, and applies the framework of agroecological transition to evaluate how these actors promoted holistic transition within the agricultural ecosystem. The thesis ultimately finds that the dynamic cast of local and international actors, ranging from Palestinian farmers to permaculture NGOs, who contributed to permaculture projects in Marda were instrumental to the continuation of its practice under occupation’s difficult conditions. Though local governance and ongoing occupation challenged their work, the participatory permaculture network promoted environmental, social, and economic aspects of agroecological transition, thereby improving Palestinian livelihoods and protecting the environment. As agroecological transition is needed to increase Palestinian resilience under occupation and in the face of climate change, this thesis demonstrates the potential of permaculture as an inclusive, holistic approach working towards this goal, though there is a need to integrate more local actors into permaculture’s network of support.

Activism and Community Care during the COVID-19 Pandemic: New Challenges and New Possibilities
Sophia Santaniello, Sociology
Sponsors: Professor Iddo Tavory, Sociology; Professor Gianpaolo Baiocchi, Gallatin School of Individualized Study

The COVID-19 pandemic has obviously affected all facets of life, but it particularly has exacerbated already existing inequalities and has affected the most vulnerable members of society at an even greater rate. Given the nature of this crisis as all-encompassing and ongoing, the nature of its crisis relief will inherently differ from crises like natural disasters and so on. It has necessitated ongoing support for those most affected, support which has been largely organized by activist organizations, mutual aid groups, and other community groups or networks. Seeing this increase in grassroots networks, providing for the essential needs of community members, I began this project hoping to understand how and in what ways community organizers assign meaning to the work that they are engaging in during the COVID-19 pandemic. By conducting qualitative interviews with organizers, activists, and community members engaging in mutual aid and/or housing organizing, I hoped to understand how my respondents understand their relationships to the community and to institutions. The overarching story in my data is the multifaceted ways in which COVID-19 has created barriers for organizers in both the literal ways in which they can organize as well as the way in which it has kept organizers in “crisis mode” and created a priority of serving peoples’ basic needs. This “crisis mode” has meant that groups have had to prioritize responding to the exacerbated need for basic necessities that COVID has caused rather than living up to the theoretical ideals of mutual aid as reciprocal and rooted in mutual solidarity within a community. Yet, some organizers see it as a silver lining that COVID has demonstrated the interconnectedness of the problems that activists organize around, and many also see the way that COVID-19 has catalyzed people’s involvement in activism and mutual aid as a positive.

Sub-tropical Fruit Production and Water Availability in the Mediterranean
Angela Isabella Scafidi, Environmental Studies, Romance Languages
Sponsors: Professor Mary Killilea, Environmental Studies

New subtropical fruits such as mango and avocado are emerging in Spain and Italy. These fruits provide much higher profits for small farmers, but as climate change increases water stress in the region, will this new market exacerbate dwindling water resources? This research investigates the water needs of these different emerging fruits, the water budget of Spain and Italy, and features a case study on this trend in Sicily. This research highlights the need for more data on water availability, crop water requirements, and information about these crops in-situ, especially in Sicily. Findings show that these crops may have a wide range of suitable locations, primarily in southeast Spain and smaller portions of Italy, which may further increase water stress. However, there are many areas for improvement in water use, notably via increasing access to irrigation technology, reducing domestic water consumption, and improving water infrastructure. While it is important to assess how agricultural profiles of particular areas interact with water availability, Spain and Italy may
benefit from reducing non-beneficial consumptive water use in other sectors, while potentially supporting subtropical fruit production as a means of sustainable rural development.

**Protests vs. Policing: How Do Black Lives Matter Protests Affect Police Behavior at the Municipal Level?**
*Andrew Schlager, Politics*
*Sponsors: Professor Chris Dawes, Politics; Professor Anna Harvey, Politics*

How do Black Lives Matter (BLM) protests affect police behavior at the municipal level? Although civil rights protests play an essential role in socio-political movements historically, the field studying the effects of demonstrations in the US is vastly underdeveloped. Using contemporary data on monthly municipal BLM protests through the year 2020, I discover a positive correlation between BLM mobilization and police killings occurring within the same month. This finding is misleading in its interpretation, for it underscores previous research establishing lethal police encounters as a determinant of BLM protest frequency. Moreover, I do not find a statistically significant reduction in police killings in the subsequent three months following periods of BLM demonstrations. I then introduce comprehensive crime and arrest data from New York, Los Angeles, Chicago, and Baltimore to determine whether the Ferguson Effect applies to BLM protests from 2017–2020 with a state and month fixed effect difference-in-differences design. I find that BLM protests significantly increase total crime and nonviolent crime in the same month refuting the conclusions of previous studies claiming no relationship between BLM mobilization and crime/arrest rates. However, I discover that BLM protests have no significant impact on violent crime. Contrary to the Ferguson Effect, I show that BLM protests increase proactive policing with a significant increase in arrests for violent offenses in both the month of and month following the protest. Despite the increase in total crime and nonviolent crime during months of BLM protests, proactive policing also increases. Although this study’s results do not provide evidence supporting the efficiency of BLM protests in reducing police killings, they reject the Ferguson Effect’s assertion that BLM mobilization causes increased crime rates as a result of reduced proactive policing.

**The Effect of Identity-based Protest Movements on Racial Minority and Female Candidacy**
*Keri Shi, Philosophy, Politics*
*Sponsor: Professor Chris Dawes, Politics*

What is triggering previously underrepresented demographics such as women and minorities to now seek political office? Are identity-based protest movements such as Black Lives Matter and the Women’s March causing this change? From existing research, we know who has historically run in elections and we have some explanations for why others are not as likely to run, but there remains a gap in scholarship addressing these new questions. Employing data that tracks racial and gender demographics in state legislature lower chamber candidacy as well as geographic data on identity-based protests throughout the nation, I establish a positive correlation between racial protests and nonwhite candidacy in recent years. I show that these protests increase nonwhite candidacy by around 0.19% and black candidacy by about 12% nationwide. However, the conclusiveness of this result is limited and would benefit from more robust, consistent protest data collection and further analysis.

**A 3D Geometric Morphometric Analysis of Hominid Sacra**
*Saul Shukman, Anthropology*
*Sponsor: Professor Scott Williams, Anthropology*

Human pelvic morphology is highly derived and can be viewed as a compromise to the requirements of large neonatal head sizes and bipedal locomotion. The pelvis is made up of various structures, one of which is the sacrum: a triangular bone consisting of fused sacral vertebrae, which is both part of the pelvis and the vertebral column. Like the rest of the pelvis, sacral morphology has been hypothesized to be driven by locomotive and obstetrical compromises. Although there have been various linear studies of sacral morphology, there is a serious dearth of 3D analysis. In order to elucidate the driving forces behind sacral evolution in humans, we conducted a 3D geometric morphometric (3DGM) analysis of the sacra of various extant and extinct hominins and great apes. The methodology followed included landmarking 3D models of the sacra and then comparing Procrustes-adjusted 3D landmark data through a principal component analysis (PCA) in order to view and assess variation in the landmarks. This comparative analysis indicates that hominin sacral morphology is divergent from those of great apes and mosaic morphologies were largely absent—at least by the time of the australopiths (*Australopithecus* and relatives) represented in the analysis. Additionally, our study indicated that overall human sacral morphology is not obviously sexually dimorphic, suggesting that obstetrical adaptations of the sacrum may be less obvious than previously assumed.

**The Antisymmetry of Korean and Japanese Relative Clauses**
*Holden Sinnard, Linguistics*
*Sponsor: Professor Stephanie Harves, Linguistics*

This study presents an analysis of Korean and Japanese relative clauses using the raising structure anal-
York City Department of Environmental Protection and water. Through interviews from educators from the New fishermen wearing head flashlights to better see into the ty liquor bottles next to bait and personalized tackle, and including Spanish and Ukrainian. You will see half-emp- more than ocean waves, but bickering in various languages riences. When you venture closer onto the pier you will hear toxins (mercury and PCBs) New York's aquatic life car - they catch. However, many are unaware of the industrial of the night fishermen of Coney Island consume the fish tures they seek bear more than a late-night dinner. Many the shoreline. However, unbeknownst to them, the crea- hunters and gatherers of New York City convene just by at night, We Hunt: How the Topics of Immigration, Public Health, and Fishing Congregate at a Pier in Coney Island Amaan Stewart, Environmental Studies Sponsor: Professor Alice Elliot, Tisch School of the Arts, Film & TV

According to the 2016 US Census, 35 million people took part in fishing, continuing to make it the number one outside past time for adults. What is most surprising is that out of the 35 million, the majority of these anglers resided in metropolitan cities. The piers of Coney Island attract various characters when the sun goes down, all coming together to engage in the ritual of fishing. The hunters and gatherers of New York City convene just by the shoreline. However, unbeknownst to them, the creatures they seek bear more than a late-night dinner. Many of the night fishermen of Coney Island consume the fish they catch. However, many are unaware of the industrial toxins (mercury and PCBs) New York’s aquatic life carries. When you venture closer onto the pier you will hear more than ocean waves, but bickering in various languages including Spanish and Ukrainian. You will see half-empty liquor bottles next to bait and personalized tackle, and fishermen wearing head flashlights to better see into the water. Through interviews from educators from the New York City Department of Environmental Protection and fishermen who fish at Steeplechase pier, my documentary will highlight themes of tradition, assimilation, immigration, public health, and socioeconomic class. I aim to shift the perception and narrative of who is affected by environmental degradation through documentary storytelling; one that is not muddied by Al Gore-esque facts and figures but grounded by the stories of people who are directly affected.

At Night, We Hunt: How the Topics of Immigration, Public Health, and Fishing Congregate at a Pier in Coney Island Amaan Stewart, Environmental Studies Sponsor: Professor Alice Elliot, Tisch School of the Arts, Film & TV

Golf has always been a staple of the modern recreation industry, and, since its advent, scientists have been raising concerns about golf’s water use and environmental impacts. A cursory review of prominent golf organization websites (including the USGA and the National Audubon Society) revealed a pattern of pro golf rhetoric which argues that 1) compared to agriculture, the golf industry’s water use is negligible, 2) golf courses promote biodiversity, and 3) the pesticides used on golf courses do not harm neighboring ecosystems. In order to find out whether these claims have any scientific merit, I used the search engine JSTOR to review golf course and turf grass studies published between 1990 and 2021 in environmental and ecological categories. I found a total of 785 relevant studies. Among those studies, 179 simply mentioned golf in relation to the main issue/experiment being discussed, 606 of those studies were specifically conducted on golf courses or turf grass either in whole or in part. Of those 606 studies, the majority were written by or for the golf industry (pesticide/herbicide efficacy, turfgrass herbicide resistance, etc.). Only 30 of the studies tested the survival of protected species on golf courses and of those studies over half were funded by the golf industry in some capacity. Even fewer studies discussed issues of water use and pesticide run-off. These results lead me to conclude that there needs to be a concerted, independently funded effort to better understand the environmental impacts of the golf industry. There appears to be evidence that the golf industry is purposefully obfuscating the true environmental impact. In a time where water is a scarce resource, ecosystems are collapsing and habitats are being lost, it is clear that golf’s place in society must be re-evaluated.
An Evaluation of Fundamental Frequency, Intonation Patterns, and Vocal Fry in Multilingual Singlish and Manglish Speakers
Dilys Tan Chiat, Communicative Sciences and Disorders
Sponsor: Professor Celia Stewart, Steinhardt School of Culture, Education, and Human Development, Communicative Sciences and Disorders

There are often disparities between the standardized language of a region and its creole, a naturally occurring integration of the various tongues and dialects in a colonized geographical region. Unlike differences between languages, little is known about the differences between English-based creoles, which have influences from other widely spoken languages in the region. This pilot study asks the following question: When multilingual creole speakers from Singapore and Malaysia speak in creole and Standard English, is there a difference in the aspects of fundamental frequency (f0), intonation patterns, and vocal fry? A PRAAT analysis was conducted on speech samples produced by six female, college-aged students. The analysis investigates whether there is a noticeable difference in f0, intonation patterns, and vocal fry in Singaporeans and Malaysians when they speak Standard English compared to their respective creoles. While observable differences in the overall intonation patterns between Standard English and the creoles were identified, there were no significant differences in average f0 and vocal fry percentages among participants. However, there was a large amount of variability among participants. Two participants had significant differences in f0, and each participant had vast differences in vocal fry prevalence. These differences emphasize the variability in speech and raise awareness to areas of variance between Standard English and English-based creoles. It is a stepping stone for the cultivation of more inclusive clinical practices for an increasingly globalized patient profile in Speech-Language Pathology.

The Effects of Reforming Driver’s License Suspension Laws on Unemployment in the US
Corinne Taranov, Politics
Sponsor: Professor Chris Dawes, Politics

This research concerns the effects of reforming laws which mandate the suspension of driver’s licenses in response to unpaid criminal justice debt. Specifically, I look at the effect of these reforms on unemployment rates in US states and US counties by comparing those that changed their laws across the past ten years to those that have not. I use the differences-in-differences design for causal inference to conduct two analyses: one that controls for state- and year-fixed effects, and another that controls for county- and year-fixed effects. My county-year regression in particular determined a slight decrease in a county’s unemployment rate when the respective state adopts driver’s license suspension reform (-0.32 percent). This finding is significant and may hint at the fact that people rely on their licenses to commute to their jobs. Since employment is necessary for the prospect of ever paying off criminal debt, suspending licenses is not a suitable punishment. The goal of this research is to build on the platform of criminal justice reform that has been initiated in the US in the past couple decades; ideally, this research can inspire other states to take a close look at what is happening to the poorer communities who are disproportionately affected by such laws and consider similarly changing them.

Is the Contraction of “I” and “Don’t”, to Produce “Io”, a Feature of African American English?
Awa Touray, French and Linguistics
Sponsor: Professor Laurel MacKenzie, Linguistics

My research topic focused on a feature of African American English (AAE) that is widely used but very under researched: “Io” or [aõ] in IPA. “Io” is formed through the contraction of “I” and “don’t”. After closely examining several overviews of the phonological, morphological, and syntactic characteristics of AAE, I learned that “Io” has never been documented as a feature of AAE. This research intends to add to the literature surrounding AAE by acknowledging the many features that form it. With the help of the Corpus of Regional African American Language (CORAL), I listened to over 50 different recordings of African American speakers from all different age groups and socioeconomic statuses from Washington D.C. (at two time points), Atlanta, Rochester, NY, and Princeville, NC. I concluded that “Io” is certainly a feature of AAE as it was used frequently by the speakers; however, its usage varies depending on several social factors. I focused on the prevalence of “Io” based on location, sex, age, and socioeconomic status. Overall, I found that males used the feature more frequently than females in every state. I also found that, with the exception of D.C., individuals in the middle class (earning $22,500–$80,000) used the feature more frequently than individuals in the higher middle class (earning more than $75,000). Lastly, I noticed that “Io” is used more frequently in Washington D.C. (in 2016) than any other city. The study shows that, despite decades of research on AAE, there are still new features that can be learned about this dialect. It is imperative that we continue to research this dialect because as it continues to evolve, new features emerge that only assist with further understanding and recognition.

Identity Management and Motherhood Visibility in STEM PhD Programs
Phoebe Tuite, Sociology, Spanish
Sponsors: Professor Sarah Cowan, Sociology; Professor Iddo Tavory, Sociology

The motherhood penalty is a well-known phenomenon that describes the negative impact of motherhood...
on women’s advancement and compensation in the workplace. This penalty permeates into academia as well, due to the culture of academia, which emphasizes complete dedication to research. Academic mothers, particularly those in STEM fields, face a double bind, as they must balance two roles (mother and scientist), each of which expects complete devotion. This study aims to assess how PhD mothers in STEM fields manage and balance these conflicting roles, particularly in light of motherhood and pregnancy discrimination. Interview data from 17 current PhD students in and recent graduates of STEM programs find that perceived faculty support, how “family friendly” the PhD program is, and whether or not the student was a mother before entering the program are all crucial factors in determining how a PhD mother manages her motherhood status in the academic space. Most significantly, PhD mothers who had at least one child before entering their PhD program are highly visible about their motherhood status and pregnancies in the academic space, while PhD mothers who had their first child during their PhD program minimize the extent to which they show faculty and other PhD students that they are mothers. These differences in visibility highlight the difficulty that modern-day PhD mothers in STEM fields face in finding a balance between family and academia. I discuss the implications of these findings, which suggest the necessity for stronger formal support systems for PhD mothers in STEM fields.

Religious Toleration in Colonial US
Jessie Lynn Wall, Economics, International Relations
Sponsor: Professor Melissa Schwartzberg, Politics

Polarization today divides people not only along party lines but along moral lines, carving out deep differences in values and ethics. Partisans from both the left and the right denounce their opposition before honest disagreement, let alone compromise can be possible. At the same time, both sides complain that the other is “intolerant”. On both sides, positions are grounded in people’s value systems, be it a religious one such as Christianity or an agnostic one such as feminism or liberalism. Questions about the role of toleration in political and moral spheres date back at least to the Protestant Reformation and the founding of liberalism. This report seeks to uncover what type of tolerance of moral difference liberal democracies require. Must there be any limits to what a liberal society can tolerate in order to maintain a sense of common methods in the society or peace between factions? By investigating early modern legal charters and constitutions in the New England colonies as well as in England during the same time period, my research uncovers divisions between early modern conceptions of tolerance. On one hand, some laws are justified on the basis of humanism and acceptance of differing views. Others are justified on the basis of tolerance as a necessity for evangelism and the conversion of others to believe in what one group of people sees as the only “moral view”. The result is a division between contemporary ideas of toleration as a “virtue” in contrast to early modern ideas of toleration as a “necessity”. In this way, the division gives insight into our contemporary partisan polarization. Polarization around moral lines continues to persist and to be influenced by what conceptions of tolerance colonial laws, legal systems, and societies were founded on.

Challenges of a Safe Transitional Discharge from a Skilled Nursing Facility following a Heart Failure Hospitalization
Emily Wang, Mathematics; Ellie Pourasgari, Biology
Sponsor: Professor Himal Weerahandi, NYU School of Medicine, Population Health

Readmission rates for heart failure (HF) patients remain high at 21.9%. Prior work has demonstrated that many HF patients who are discharged to a skilled nursing facility (SNF) face a high readmission risk. Our objective here was to understand the current challenges to a safe discharge from SNF to home for heart failure patients. Detailed individual semi-structured interviews with employees across three SNFs in New York City were conducted. Audio-recorded interviews were transcribed professionally. Data was analyzed with Dedoose. Transcripts were coded using the constant comparative method to identify themes. Nineteen employees across these SNFs were interviewed. Participants included 4 social workers, 2 nurse case managers, 2 registered nurses, 1 licensed practical nurse, 4 nurse practitioners, 5 physicians, and 1 administrator. Five major themes emerged on the topic of safe discharge challenges: 1) community-level factors—for example, lack of social support or inadequate housing; 2) insurance-level factors—for example, reduced SNF coverage and coverage gaps for home care services, coverage deadlines; 3) institution-level factors—for example, high patient volume, rapid patient turn-over, limited time spent on patient teaching, limited staff; 4) provider-level factors—for example, lack of coordinated communication between team members complicating discharge; 5) patient-level factors—for example, inability to manage themselves due to severe mental illness, cognitive impairment, frailty; and lack of adherence to recommended treatment. Challenges to safe discharge from SNF are multifactorial, and these challenges may be more pronounced as this population is frailer and often require structured support to ensure a safe transition home.
Censorship and Creative Communities: Fragility and Changes of Fanfiction Writing in China
Ran Wang, Metropolitan Studies, Sociology
Sponsors: Professor Iddo Tavory, Sociology; Professor Carly Knight, Sociology

Research on cultural production has recognized the way that artistic creation, and especially fandom subcultures, depends on social interaction. Yet, less research has examined how creative production functions in instances of crisis when interactions are disrupted by exogenous social forces. This study leverages the case of how Chinese fanfiction writers respond when state censorship interrupts and threatens the activity of cultural production to better understand the vulnerability of creative communities. I conducted 22 interviews with Chinese fanfiction writers who have experienced an unexpected intensification of online censorship in 2020. Following previous fandom studies in understanding fanfiction as rooted in a creative gift economy, I first show that intra-community interactions are crucial for such art creation and consumption. The online nature of the fanfiction community, as I then show, makes it exceptionally vulnerable to disruption. I show how writers initially attempted to hold on to the original community by continuing to share works on the original platform. Later, writers aware of the inevitable decline of the native community scatter to diverse new modes of production. Yet, as I show, although writers resist top-down regulation by developing strategies to maintain the community for cultural production, their efforts are not able to restore the gift exchange activity crucial for fanfiction. This is due to the high cost of interactions imposed by censorship. This study demonstrates that censorship moderates cultural production through blocking social interaction, transforming the field, and reorganizing social networks. Rather than directly forbidding creation, censorship discourages it. Understanding the resilience of community against censorship pressure suggests the fragility of artistic creation especially in an online space as well as new opportunities embedded in the transformation of fields.

A Racial Crisis at the US Census: Do We Still Need a Race Box?
Sophia Yufei Wang, Journalism, Psychology
Sponsor: Professor Robert Boynton, Journalism

What is “your” race? Simple as it may sound like, the shifting answers to this question on the decennial censuses illuminate a dissonance between the government’s “statistical races” and individuals’ self-identifications. Racial statistics have been a crucial component of American social policy, as it formulates the distribution of congressional seats and federal funding. Thus, finding out how to count race matters to communities’ social welfare, especially for those marginalized because of their races. By conducting literary analysis and interviewing census experts and immigrant families, I researched the social reality of counting race from multiple perspectives. Does counting by race help or hinder the progress of addressing racial diversity? Has the movement related to census reforms shown that statistical classification is new means of expressing social identities? My current research project answers the question in three parts. First, I delved into the history and politics of counting racial diversity in the US census since 1791 and provided historical narratives of counting races domestically and internationally. Then, through personal narratives about demanding census question reforms, I discussed how racial identities are reshaped across generations and in cross-cultural communication. Finally, I presented the alternatives to count race: racial nationalism (like French Census) or racial democracy (like Brazil Census)?

The Effects of Sexual Violence in the Post-conflict State
Donna Yang, Politics; Jamin Chen, International Relations
Sponsor: Professor Congyi Zhou, Politics

Conflict-related sexual violence (CRSV) is often referred to as a weapon of war that directly impacts mass population displacement, extremism, and gender-based inequality and can directly impact post-conflict stability. Empirical efforts have studied CRSV extensively, notably on its effects on military and armed groups (Koos, 2017; Wood, 2009), prevalence, frequency (Cohen, 2013), and potential mechanisms through which it occurs (Kelly, 2010; Wood, 2006; Wood, 2009). This study identified a lack of understanding of the transformational, often temporal, and inherently destabilizing effects of CRSV on post-war societies in current research efforts and is, therefore, interested in how CRSV influence conflict recurrence. We combined the UCDP/PRIO Conflict Recurrence Database and the SVAC dataset (Cohen, 2013) and analyzed 242 conflict-dyads between 1989 and 2004. Using Ordinary Least Squares (OLS) regression of conflict recurrence on CRSV and controlling for type of conflict, length of conflict episode, number of casualties, and recurrence value of conflict episodes, this study found limited evidence that as CRSV increases the likelihood of a conflict recurring increases. It highlights the statistically positive effects of certain types of CRSV on conflict recurrence. This study provides evidence that the occurrence of CRSV is likely to impede stability in post-conflict contexts and foster endemic cycles of violence. Despite progress in establishing safeguards and reparation programs, many conflict zones are experiencing heightened levels of CRSV. This study advocates for a concerted effort to combat both institutional and actor-based obstacles in reducing and preventing CRSV.
In an effort to combat the economic impacts of the coronavirus disease 2019 (COVID-19), Congress passed the Families First Coronavirus Response Act (FFCRA) in March 2020, which included state fiscal relief through increased federal matching funds for Medicaid spending. I examine the effect of this fiscal stimulus on a state’s employment levels. Given that federal fiscal aid is often endogenous to economic conditions in a state, I exploit the fact that these funds were allocated to states based on an exogenous factor, which is pre-pandemic Medicaid spending. This factor is then used as an instrument in a cross-state instrumental variables (IV) regression in which I determine the effects of fiscal stimulus on total nonfarm employment along with employment in different sectors.

In the preferred specification, fiscal stimulus had a statistically significant, negative impact on total nonfarm employment for every month in 2020 from March onwards. A similar relationship between federal fiscal aid and employment is observed in every other sector examined, with the state and local government sector being the only exception.

More Than Just Words?: An Analysis of the Relationship between Local News Media and Hate Incidents in the US

Joo-Yeon Ann Yoon, International Relations
Sponsors: Professor Pablo Querubin, Politics; Rafael Ch, Politics

Recent conflicts among various social cleavages have been resulting in prevalent violence instead of peaceful coexistence, particularly in the US. The most recently published FBI’s Uniform Crime Reporting (UCR) report on hate crime revealed a recording-breaking number of more than 50 fatalities resulted from bias-motivated crimes in 2019. The year 2020 was followed by an alarming surge of hate crimes targeted toward Asian Americans amid the COVID-19 pandemic, with more than 3,000 cases being reported by the Stop AAPI Hate Crime initiative. Although there may be numerous factors including structural and socioeconomic variables that affect the incidence of hate crime, the effects of the language of local news media cannot be easily neglected with historical and empirical evidence suggesting words being more than “just words”. Thus, the research employs a two-way fixed effects model to discern the possibly existing relation between local news media language targeted towards bias groups and hate crime incidents across all fifty states and the District of Columbia. The regression results show that the frequency of some keywords related to bias groups in the local news media is positively associated with variables related to hate incidents, exhibiting greater effects than general news coverage.

An Ethnographic Account of an Online Occult Community in China

Harry Zhu, Anthropology
Sponsors: Professor Angela Zito, Anthropology; Professor Elayne Oliphant, Anthropology

My research centers around an online occult community based in China and its members’ relationship with occult practices including Tarot reading. Given the country’s complicated relationship with the occult in the past century and the ever-looming labels of “superstitious” and “irrational” associated with activities such as divination, it is worth understanding why some people are drawn to the occult despite its negative perception by the public and the mainstream media. Through my ethnographic work, I discovered that this occult community interprets the occult in ways which align with the larger national sentiment of “equating success and status with wealth accumulation”. In the eyes of these occult practitioners, mastery of the discipline either facilitates or equates to financial advancement. What’s more, the occult generates a shared identity and a sense of community. Lastly, my research reveals that China has always had trouble in defining “the superstitious”. I hope my work succeeds in providing more evidence as to why the modern world remains enchanted.

Characterization of Patient Health Education after Discharge from a Skilled Nursing Facility following a Heart Failure Hospitalization

Natalie Zhu, Biochemistry
Sponsor: Professor Himali Weerahandi, NYU School of Medicine, Population Health

Heart failure (HF) is currently the leading cause of hospitalization and readmission for Medicare patients. 25% of Medicare patients after a heart failure hospitalization are discharged to skilled nursing facilities (SNF), and these numbers have tripled within the last ten years (Weerahandi, 2019). These facilities serve as a transition from hospital to home, especially for medically complex patients. While there are several studies that examine the patient’s discharge transition from hospital to home, this project focuses primarily on the discharge transition from SNF to home and the importance of patient education during this process. We conducted 15 semi-structured interviews with employees across three SNFs in NYC to identify staff members who have experience working with HF patients and the self-care teaching process. The three major themes that emerged on the topic of patient education include what is taught to HF patients on discharge (symptoms and severity of disease), usage of patient education resources (booklet, swag bag, and discharge instructions), and challenges to providing patient education (patient-level factors...
and institutional/provider level factors). There appears to be a lack of health literacy found in HF patients, which is related to the challenges associated with patient education. Thus, it is important to ensure safe discharge planning and continued post-discharge patient education for this patient population.

**How to End a Food Apartheid: Lessons from Black Vegans**
*Alison Zimmerman, History, Journalism*
*Sponsor: Professor Robert Boynton, Journalism*

Plant-based eating is perhaps more popular than ever in the US, but, in terms of media representation and accessibility, it is a movement that is catered to an elite, predominantly white audience. Though veganism has become popular as a vehicle for animal rights activists in Western countries in recent decades, the ideals of plant-based living have roots in many Indigenous cultures and non-Western spiritual and religious beliefs. Increasingly, BIPOC have turned to these old traditions and to plant-based lifestyles in general as a means of liberation, both for the self and for all humans and animals. For many vegans of color and particularly for Black vegans in America, this has forged a subculture within the vegan movement (and anti-racist movement) which places anti-racism and animal liberation in the same conversation. Although Black vegans are less often represented within the mainstream vegan movement than white vegans, they form a sizable demographic and are cultivating a growing toolbox to increase their ranks and influence. From books like *Racism as Zoological Witchcraft* by Aph Ko and *Sistah Vegan* by A. Breeze Harper, to businesses like Seasoned Vegan and Aunts Et Uncles in New York City, to nonprofits like the Food Empowerment Project, Black vegans and vegans of color are creating their own spaces to debate issues like animal rights, human rights, and climate change. And, on a more tangible level, many are working to provide avenues for more people to embrace plant-based living in the form of affordable vegan restaurants and food accessibility programs.
Causal Reasoning and Working Memory: An Investigation of Overlapping Cognitive Mechanisms
Zack Adams, Neural Science, Psychology
Sponsor: Professor Bob Rehder, Psychology

Causal relationships between real-life events provide meaning and context to the world around us. Causal reasoning, specifically, refers to the process of using knowledge about these relationships to draw inferences about a specific situation. However, no reliable model regarding the actual mental operations involved in causal reasoning existed until now. With the introduction of an empirically tested process model of causal reasoning from Davis and Rehder (2020), we can begin to investigate how causal reasoning occurs and not just the conclusions that are made as a result of it. The model suggests that differences in causal reasoning success arise from differences in how many times a reasoner is able to sample different causal states—in other words, the number of instances in which a reasoner is able to consider the probability of a particular causal scenario. What cognitive mechanism mediates this sampling? The present study investigates the possibility that sampling is a working memory-related process and that differences in working memory capacity account for differences in causal reasoning success. We examined the relationship between 25 undergraduate students’ working memory capacities and causal reasoning abilities using working memory tests and a separate causal inference task that measured reasoning success. Participants with greater working memory capacities were only very slightly more successful causal reasoners. These findings, while inconclusive, corroborate previous causal reasoning research while offering possible directions for future work investigating a possible cognitive mechanism behind causal reasoning and sampling processes.

Oxytocin Modulation of Maternal Behavior
Ayo Adewakun, Neural Science
Sponsors: Professor Robert Froemke, NYU School of Medicine, Neuroscience and Physiology; Dr. Ismail Ahmed, NYU School of Medicine, Neuroscience and Physiology

Oxytocin is a neurohormone that is understood to be an important component in regulating parental care. It diffuses broadly throughout the body, and the oxytocinergic axons responsible for its release do not synapse directly onto postsynaptic neurons. As such, it is not understood how and when oxytocin regulates these behaviors, and in which circuits it acts. These spatial and temporal dynamics might underlie different social and maternal behaviors, and perturbations in oxytocin release might induce noticeable changes in well-defined behaviors. More importantly, it is imperative to determine what circuits receive oxytocin inputs, what behaviors are driven by these circuits, and when oxytocin induces these behaviors. We intend to create an ethogram of oxytocin-related behaviors. Our research project is interested in identifying oxytocin linked social and maternal behaviors, and determining which neural circuits and brain regions are responsible for these behaviors. Doing so will allow us to pinpoint regions of interest that we can later visualize activity in.
Who Gets the Last Ventilator?
Ana Aguirre, Psychology, Spanish
Sponsors: Professor Pascal Wallisch, Center for Data Science; Professor Gabriel Giorgi, Spanish

During the early months of the COVID-19 pandemic, doctors had the difficult task of allocating limited medical resources. Ethical guidelines provide utilitarian principles for making these decisions in an unbiased manner to save the greatest number of lives. However, there is a lack of research on how such high-stress decisions about the allocation of limited medical resources are made without such guidelines. This study explores the influence of social demographic factors on these consequential decisions by asking 355 participants to make a series of hypothetical decisions regarding whom they would allocate the last ventilator to during the early months of the pandemic. The age, education level, race, and gender of each individual presented as a choice were varied to assess how decision-makers weigh each factor when making essential decisions. Given the hypothesized cultural biases behind real-world prioritization, the study also analyzed whether or not ethnicity (Hispanic vs. non-Hispanic) had an effect on participants’ prioritizations. Results show that Hispanic subjects prioritized youth above a higher education level, while non-Hispanic subjects prioritized youth and higher education level equally. For both subjects, this was followed by the equal prioritization of black individuals and females. Allocation of resources applies more broadly in the context of a pandemic, as this issue has arisen again in the creation of protocols for the COVID-19 vaccine.

Molecular Targets of a Non-COX Inhibiting Novel Anti-inflammatory Drug
Abrar Ahmed, Sociology
Sponsor: Brian Geohagen, Albert Einstein College of Medicine, Anesthesiology

Inflammation is a biological immune response (to pathogens, cellular injury, or environmental stimuli) which causes, among other things, platelet aggregation. If the platelet aggregation response is uncontrolled, severe and sporadic blood clotting can occur resulting in stroke and other hypercoagulation disorders that negatively affect blood circulation. Current medications (NSAIDs) at market alleviate inflammation by inhibiting a key enzyme, Cyclooxygenase (COX), which initiates the Arachidonic Acid Molecular Pathway. Unfortunately, COX inhibition proceeds after and in places outside of the inflammation-initiating injury leading to increased risk of stroke, ulcers, and hemophilia. To mitigate this risk, these NSAIDS are prescribed in intervals to allow the enzyme inhibition to be reversed or the enzyme replaced. Our PI, Brian Geohagen, designed a novel NSAID that showed anti-inflammatory efficacy on par with current market NSAIDs Acetylsalicylic Acid (Aspirin) and Naproxen (Aleve). We were tasked with figuring out potential mechanisms by which our novel NSAID may work. After doing a deep journal search, we hypothesized that the novel drug targeted prostaglandins (PGs), which are major mediators in the inflammatory response and nociception in the spinal cord. To determine which PGs were targets, we mapped out a flowchart of the Arachidonic Acid cascade, identified mediators that may be reactive towards our drug and performed molecular modeling using Spartan Software to determine the reaction feasibility/strength between target PGs and our novel drug. We identified six PG targets with significant reactivity towards our drug and are conducting mechanistic platelet aggregation experiments using rat blood, and later, on human blood to validate our Spartan predictions. A drug that targets injury-present prostaglandins as opposed to COX is a significant design with therapeutic benefit and minimal risk. Along with anti-inflammatory activity, the added analgesic benefit of this novel drug was the muting of pain responses to the brain.

To Eat or to Run? The Role of E-to-I Balance in the Prefrontal Cortex of Food-restriction-stressed Adolescents during Decision-making and Maladaptive Behaviors
Cenk Akiz, Neural Science
Sponsor: Professor Chiye Aoki, Neural Science

Anorexia Nervosa (AN) is a mental illness characterized by severe self-imposed starvation and intense anxiety manifested as fear of gaining weight. With no accepted pharmacological treatments available and high mortality and relapse rates, a better understanding of the neurobiological basis of AN is needed. Activity-based anorexia (ABA), is an animal model of AN that captures multiple of its core features including voluntary food restriction, excessive exercise, and heightened anxiety. The food restriction phase of ABA evokes excessive running, which may promote adaptive foraging in times of food scarcity, but can become lethal if energy expenditure exceeds caloric availability which is often the case in ABA (Aoki, Chowdhury et al., 2017). The chemogenetic activation of the general medial prefrontal cortex (mPFC) pyramidal cell population drives running during hours preceding limited food availability but not during ad libitum food availability. Contrarily, the chemogenetic inhibition of the mPFC pyramidal cell population reduces wheel running, again, only in limited food availability. The parvalbumin (PV) interneurons in the mPFC are able to inhibit that pyramidal cell population. We hypothesized that the chemogenetic activation/inhibition of these PV cells are able to influence the pyramidal cell activity, and decrease/increase running respectively (Santiago, Makowicz et al., 2020). We tested this hypothesis by exciting and suppressing the PV interneuron population in the mPFC using excitatory and inhibitory AAV-DREADDs in PV-Cre knockin mice. If our
findings on social media use and mental health. We discuss the implications of our research.

However, we did find that women scored slightly higher on FOMO. In an online study (n = 72), we randomized participants to either scroll through Instagram for 10 minutes or play Flappy Bird, a single-player video game. Participants self-reported on their experience of FOMO. While contrary to our expectations, we found no significant difference between the two groups on FOMO. However, we did find that women scored slightly higher than men on FOMO. We discuss the implications of our findings on social media use and mental health.

Reputation and Racial Discrimination in Online Peer-to-peer Platforms
Paul Arias, Economics, Psychology
Sponsor: Professor Emily Balcetis, Psychology

Online peer-to-peer platforms assist in every aspect of life, from transportation to personal services. These platforms, known as the sharing economy, allow users to exchange their underutilized assets, a process that reduces waste and is more flexible and inclusive than the traditional commercial economy (IE University, 2020). Despite these remarkable benefits, sharing economy platforms have gained media attention due to evidence of racial discrimination, including lower acceptance rates for Black guests and higher earnings for non-Black hosts (Edelman, Luca et al., 2017; Edelman & Luca, 2014). It is paramount to discover effective remedies to the disadvantages facing minorities within these platforms so that their growth can be equitable and beneficial to all users. To this end, we will explore race-based differences in guests’ reliance on reputational information about hosts (i.e., star ratings). We hypothesize that the main effect of reputation will be greater when considering hosts from a racial outgroup versus ingroup. However, we expect race-based differences to subside as reputational levels increase. We are in the process of collecting data that will shed light on how the interaction between race and reputation influences likeliness to rent, perceived host trustworthiness and willingness to pay.

Sources of Anxiety around the Fear of Missing Out
Dennis Aronov, Journalism, Psychology
Sponsor: Professor Emily Balcetis, Psychology

Previous studies have determined the negative effect of social media on one’s mental health, but what about the fear of missing out (FOMO)? FOMO is a source of stress for many individuals. When people witness others engage in hedonic experiences while they themselves are not producing distracting cognitions and anxiety. In the present study, we investigated whether social media usage increases FOMO. In an online study (n = 72), we randomly assigned participants to either scroll through Instagram for 10 minutes or play Flappy Bird, a single-player video game. Participants self-reported on their experience of FOMO. While contrary to our expectations, we found no significant difference between the two groups on FOMO. However, we did find that women scored slightly higher than men on FOMO. We discuss the implications of our findings on social media use and mental health.

Towards the Total Synthesis of Pyxidicycline B
Melissa Barrera, Chemistry
Sponsor: Professor Dirk Trauner, Chemistry

Topoisomerases are a class of enzymes critical for DNA transcription and replication. DNA topoisomerases and their effective inhibition have been well studied, posing them as optimal targets for cancer and antibiotic therapy (Jain et al., 2013). The natural product family of pyxidicyclines was found from activating genes within the myxobacterium strain Pyxidicoccus fallax and was identified to act as effective topoisomerase inhibitors (Muller et al., 2018). Our current work has been towards the synthesis of one of these analogs, pyxidicycline B. Further optimization of this synthetic route will allow for easy access of the entire natural product family and further analogs thereof. This approach will allow for an efficient structure activity relationship study in order to enhance the selectivity of inhibition of human or bacterial topoisomerases.

Deficits Identified between FMR1 and Wild-type Rats Reflect Role of the Cerebellum in Perceptual Timing and Temporal Processing
David Besprozvany, Neural Science
Sponsor: Professor Eric Lang, NYU School of Medicine, Neuroscience and Physiology

One of the neurological disorders that has long interested investigators and has been linked to cerebellar activity is autism spectrum disorder (ASD). Given our understanding of the FMR1-gene’s role in Fragile-X Syndrome (FXS) and some forms of ASD and its heightened expression within the cerebellum, the FMR1-KO rat provides us with a useful model to understand the precise physiological and behavioral differences between FMR1-KO and wild-type rats. To understand any potential differences between these rats, our laboratory utilized a temporal bisection behavioral task that measures temporal perception and decision-making in the animal models. In this task, rats are trained to discriminate between short- and long-duration tones in order to receive a drop of sugar water as a reward. Preliminary training and discrimination results show that the FMR1 animals take a significantly longer time to learn to discriminate the two tones and learn the task when compared to their wild-type counterparts. Once the animals learn this discrimination, trials with tones of intermediate duration are interspersed. For each tone duration, the probability that the animal chose the long lever is calculated and then plotted as a function of tone duration. The resulting curve is sigmoid (S-shaped) and can reflect the timing ability of the animals. Our results indicate that the FMR1 rats have a shifted sigmoidal curve when compared to their wild-type controls, another reflection of a potential timing deficit in these animals. With the knowledge that direct electrical stimulation has shown physiological changes in human trials to those with cerebellar-mediated neuro-
logical disorders, electrical stimulation presents itself as a useful tool to understand how behavior can be changed in certain neurological phenotypes. It has been demonstrated that stimulation could have an effect on behavior in animal models, which lends itself to applications that exceed beyond coordination and extend towards correcting learning deficits.

**The Gaussian Distribution: Streamlined Noise Benchmarking on Quantum Computing Hardware**

*Aurelia Meiqi Brook, Mathematics, Physics; Andreas Tsantilas, Mathematics, Physics*

*Sponsor: Professor Javad Shabani, Physics*

A classical computer has bits which are in one of two states, whereas a quantum bit, or “qubit”, can assume a continuum of values. In essence, the complexity of this state and the properties of quantum physics allow quantum computers to solve problems classical computers cannot. While advancements in quantum algorithms have been significant, there is still much to be done in terms of quantum computing hardware. There are few practical uses of current NISQ (Noisy Intermediate-Scale Quantum) era quantum computer chips. An errorless or “noiseless” quantum computer, however, could solve classically intractable problems which span from protein-folding to code-cracking. In our research, we implement the Grover search algorithm (Grover, 2002), and Kitaev-Webb state preparation algorithm (Kitaev and Webb, 2008). Utilizing IBM’s Qiskit and quantum computing chips, we have streamlined a novel way of benchmarking and characterizing error on noisy qubits. However, the challenge in manipulating and maintaining states at quantum scales results in noise levels that exceed the relative tolerance of quantum algorithms. We witnessed this effect of noise on real quantum computers as we applied the Kitaev-Webb algorithm, which theoretically produces a Gaussian distribution of quantum states. We thereby introduced KL divergence, a measurement capable of tracking the experimental deviation from the expected result, to benchmark the noise level of contemporary quantum computers. Patterns in probability amplitude deviation reveal different sources of error, whether they be from depolarization, bit flip, or sign flip errors. Our research contributes to the usability of NISQ-era qubits, benchmarking and characterizing noise levels of IBM’s quantum chips. This improves the utility of noisy qubits, putting our work at the forefront of technological advancement and bringing the quantum computing community closer to a noiseless future.

**Elucidating Nucleocytoplasmic Transport with Fluorescent Proteins**

*Isabel Brown, Chemistry*

*Sponsor: Professor Alexandra Zidovska, Physics*

In eukaryotic cells, transport between the nucleus and cytoplasm is a necessary process for multiple biological functions. Proteins are synthesized in the cytoplasm, and thus proteins required for DNA replication and transcription, which take place in the nucleus, must be imported in from the cytoplasm. From the nucleus, RNA transcription products are exported out to the cytoplasm for translation into proteins. Fluorescent proteins allow for the observation of the molecular dynamics of this nucleocytoplasmic transport, contributing to the Zidovska Lab’s efforts in understanding the physiological processes and behavior of eukaryotic cell nuclei. Previous work of the Zidovska lab found that the membrane surrounding eukaryotic cell nuclei, the nuclear envelope, undergoes shape fluctuations. We hypothesize that these shape fluctuations directly influence nuclear transport by accelerating the local fluxes of molecules, which may elucidate how transport is both quick and selective, a transport paradox. To test this hypothesis, the fluorescent protein mCherry is assembled with either a nuclear localization signal (NLS) or nuclear export signal (NES). The mCherry proteins containing NLS will be imported from the cytoplasm to the nucleus through a nuclear pore complex, while mCherry proteins with NES will remain in the cytoplasm. This project aims to collect data in live cells and develop analysis for measuring nucleocytoplasmic fluxes in this data. Six constructs (NL/ES-1x-3xmCherry) have been successfully transfected into HeLa cells and data analysis is currently in progress, allowing us to understand the molecular dynamics of the elusive transport process.

**Caution: Trigger Warnings May Be Doing More Harm than Good**

*Kiarra Burkitt, Psychology; Candice Medine, Psychology*

*Sponsor: Professor Denis Pelli, Psychology*

Trigger warnings are notices that caution the viewer of subsequent, potentially distressing content. From university classrooms to news outlets to social media, these warnings have not only become a common practice, but they are also expected. Recent research with participants suffering from post-traumatic stress disorder (PTSD) has shown that trigger warnings do not reduce anxiety if shown before distressing passages (Jones, Bellet, & McNally, 2020). Furthermore, the effects of trigger warnings are negligible even when utilized on those not suffering from PTSD (e.g., Sanson, Strange, & Garry, 2019). The current study was created to resemble a social media platform—a realistic way for undergraduate students to view neutral and distressing visual stimuli. To expand on previous studies, looking-time and quantifiable data was collected in
addition to conventional emotional responses. Consistent with prior studies, trigger warnings had a negligible effect on anxiety. Further, trigger warnings did not decrease time spent viewing distressing stimuli. Despite these findings, a majority of participants believed trigger warnings to be beneficial to those with or without PTSD. This practice, therefore, may be causing more harm than good. Because the general public believes trigger warnings to be a useful protective measure, we are not actively seeking practices that scientifically help to reduce anxiety or looking-time.

The Effect of the Object Discrimination Task on a Rat Model of Sporadic Alzheimer’s Disease
Eisha Butt, Psychology
Sponsor: Professor Francisco Villegas, York College, Behavioral Sciences

Alzheimer’s disease (AD) is a progressive neurodegenerative disorder that deteriorates neuronal function and cognitive ability. This project aims to study the relationship between continuous deep brain stimulation (DBS), a known treatment for several neurological disorders, and a rodent’s performance on an Object Discrimination Task (ODT). The ODT is an attention task utilized to evaluate the responses of object recognition, discrimination, and anxiety in rodents introduced to a novel and a familiar object. That is, the ODT tests the spontaneous tendency of rodents to spend more time exploring a novel object rather than a familiar one. A rodent model of sporadic Alzheimer’s disease (sAD) is created in 13 male Long-Evans Rats by bilateral intraventricular injections of the neurotoxin Streptozotocin (STZ). Additionally, a control group of 13 male Long-Evans Rats is created by bilateral intraventricular injections of artificial cerebral spinal fluid (aCSF). An Intracranial Self Stimulation (ICSS) electrode is surgically implanted in the medial forebrain bundle at the level of the lateral hypothalamus, a region of the brain associated with reward and “pleasurable” sensation, of each rodent for the administration of DBS. The rodents are subjected to pre-DBS ODT testing, followed by a round of DBS and then post-DBS ODT testing. A comparative analysis of pre-and post-ODT tests in STZ and aCSF rodents reveals a lack of memory function in the rodent model of sAD, which is slightly improved after DBS.

The Influence of Social Media Food Advertising on Racial Minority Adolescents’ Health
Joanne Callaghan, Psychology
Sponsor: Professor Emily Balcetis, Psychology

Social media platforms have 3.8 billion users—49% of the world population as of January, 2020 (WeAreSocial, 2020). Roughly nine in ten US adolescents go online multiple times per day (Abderson & Jiang, 2018). Minority adolescents use social media at the highest rates, thus are poised to experience the most detrimental effects of health-relevant advertising that occurs on these platforms. Past studies have found that 70% of adolescents reported engaging with food/beverage brands on social media, with Black adolescents being more likely to engage than white adolescents (Fleming-Milic and Harris, 2019). This study investigates the effects Instagram food ads have on adolescents’ calorie intake, individuals endorsing food on adolescents’ food choices, and racial congruity of influencers on Black (compared to white) adolescents’ food preferences. We hypothesize that adolescents will select a total of more calories after being exposed to food-related ads compared to non-food-related ads and to racially congruent food ads compared to racially incongruent food ads. Minority adolescents who view racially congruent food ads should select a total of more calories than white adolescents who view racially congruent food ads. The results of this study will contribute to understanding the effects social media food advertising has on adolescent’s consumption of unhealthy food.

Paper or Plastic?: Hydrodynamic Resistance of Drinking Straws
Tina Cao, Mathematics
Sponsor: Professor Leif Ristroph, Mathematics

As environmental issues continue to be an increasingly hot topic, New York City along with many other cities have been considering plastic straw legislation. This project studies the hydrodynamic resistance of straws and how this depends on different material properties. Paper straws are considered as porous pipes, so the flow causes it to change shape, which will also affect the flow, and so on. This is an example of a flow-structure interaction. The proposed hypothesis is 1) a paper straw has higher resistance than a plastic straw of the same initial dimensions, and 2) the paper straw’s resistance will increase over time as it soaks up liquid, swells, and maybe even deforms. To prove this hypothesis and better understand straw resistance, pipe flow theories were studied in depth. This study calculated the Reynold’s number based on measured flow rate and used pipe of varying length and inner diameter ratio. After fitting all data onto a master plot, it was found that regular drinking straw dimensions do not follow existing pipe flow theories. The findings of this study can be related with the law to ban all plastic straws and give more insights to the pros and cons of using paper straws instead of plastic straws.

Zinc Treatment of Hydroxyapatite Surfaces
Steven Cherny, Chemistry
Sponsor: Professor Marc Walters, Chemistry

In this study zinc phosphate was investigated as a complement or alternative to silver diamine fluoride (SDF) for the treatment of dental caries. Synthetic milled and unmilled Hydroxyapatite (HAP) bound by adhesive to car-
bon tape was employed as a model for dentin apatite. This HAp was treated sequentially with zinc nitrate hexahydrate, Zn(NO3)2 (aq), and ammonium phosphate, dibasic, (NH4)2HPO4 (aq) to form polycrystalline zinc phosphate bound to the HAp layer. Results from Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray Spectroscopy (EDS), and X-Ray powder diffraction showed that the zinc ammonium phosphate layer consisted of Zn(NH4)PO4, or amorphous zinc phosphate, as a function of solution concentration. Further data showed that with extended exposure to water, Zn(NH4)PO4 converted to hydrolytically stable polycrystalline hopeite, Zn3(PO4)2. These results suggest new protocols for the addition of zinc, followed by the addition of phosphate, to exposed dentin for the treatment of carious lesions or hypersensitivity in teeth.

### Potential Downstream Social Consequences of Ability Grouping

**Dan Choi, Psychology**  
**Sponsor:** Melis Muradoglu, Psychology

Ability grouping—the practice of sorting students into groups based on academic ability—is a commonly used instructional method in elementary schools across the US. Whether and how ability grouping influences high- versus low-grouped students’ achievement has been a major focus of past research. However, less is known about potential social consequences that arise from ability grouping. To address this gap, we examine whether elementary-age children’s experience in ability-grouped classrooms relates to their preferences toward students of varying achievement levels. In the present study, four- to nine-year-old children (N = 154) were read vignettes about an ability-grouped classroom (or about two individual students that differed in ability) and were then asked to rate how much they liked each of the groups (or individuals) presented in the vignettes. Caregivers were asked whether their child has been in an ability-grouped classroom. While children overall showed a preference for the high-achieving group (or individual), this preference was equally strong among children who have and have not been ability grouped. Compared to older children, younger children tended to have a stronger preference for the high-achieving group (or individual). These findings suggest egalitarian views of high- and low-achievers emerge relatively late in children’s development. Future studies should examine potential sources of children’s bias against low-achieving students and other social consequences that may arise from ability grouping.

### Disabling the Helicase Activity of the Severe Acute Respiratory Syndrome Coronavirus 2’s Nonstructural Protein 13 by Small Molecule Inhibitors

**Sam Ciervo, Biochemistry**  
**Sponsor:** Professor Tania Lupoli, Biochemistry

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has a high mortality rate. The high mortality rate coupled with the lack of therapeutic treatments against this virus demands for an investigation of antiviral inhibitors that can combat this pathogen. Non-structural protein 13 (nsp13) is vital for replication of the viral genome and the propagation of SARS-CoV-2, and nsp13 plays an integral role in the formation of the replication-transcription complex that replicates the genomic material. Nsp13 is a superfamilly 1 helicase that has been shown to be a valuable target for small molecule inhibitors. Through computational modeling, in collaboration with the Zhang lab at NYU, potential small molecule inhibitors have been identified for the ATP binding pocket of Nsp13. Inhibition of the activity of the nsp13 in the presence of potential small molecule inhibitors selected from the virtual screen is investigated by various biochemical assays, including an ATPase activity assay and a helicase unwinding. Previous research has shown that the helicase from SARS-CoV and SARS-CoV-2 can be targeted by small molecules, and, here, we discovered repurposed small molecule inhibitors of the SARS-CoV-2 Nsp13’s helicase activity. Two inhibitors, Telatinib and Dibenzazepine, were found to inhibit ATPase activity. Telatinib had an IC50 in the micromolar range: \( 34 \text{ uM} \). Dibenzazepine is shown to fully inhibit both ATPase and helicase activity. Our results elucidate small molecules that can be used to target the helicase activity of Nsp13 in the novel COVID-19, and possibly other coronaviruses, which will potentially lead to the discovery of therapeutic drugs to combat coronaviruses.

### Debugging Syn 1, the Synthetic Yeast Genome Sc2.0

**Camila Coelho, Biology**  
**Sponsors:** Professor Jef Boeke, NYU School of Medicine, Biochemistry and Molecular Pharmacology; Dr. Yu Zhao, NYU School of Medicine, Biochemistry and Molecular Pharmacology; Dr. Stephanie Lauer, NYU School of Medicine, Biochemistry and Molecular Pharmacology

The most important property of the Sc2.0 genome is a maintained wild type phenotype while also introducing inducible genetic flexibility and minimizing sources of genomic instability. The changes made to the Sc2.0 genomes are: TAG stop codons which are changed to TAA, addition of a loxPsym site that is involved in a SCRaMbLE system, and the relocation of transfer RNA (tRNA) genes to their own chromosome. This SCRaMbLE system is an inducible system that randomly rearranges and modifies the genome to create genetic diversity. This is expected to be an important part of this design as it will allow for many
inducible, quick genomic changes. The SCRaMbLE system works because Sc2.0 has hundreds of loxPsym sites that are placed downstream of non-essential genes, thus the organism is reactive to the inducible changes made when Cre recombinase is introduced. The assembly of synthetic chromosome 1, Syn1, has been completed yet the strain with Syn1 has major growth defects. Using the loss of heterozygosity, LoH, method the Syn1 was mapped, confirmed and solved.

The Relationship between Trait Narcissism and Antisociality in Altruistic Behavior
Elena Conte, Psychology
Sponsor: Professor Lawrence Reed, Psychology

Are individuals with narcissistic or antisocial personality pathology less likely to give to someone who has experienced loss? Are they less likely to experience feelings of empathy? The diagnostic criteria and the research on narcissistic and antisocial personality define narcissistic individuals as less empathetic and antisocials as less remorseful. Here, we examine whether they will be less motivated to help someone who has experienced loss. Participants will play the role of a proposer in a dictator-like game with a fictional backstory and real monetary payoffs. Participants will be shown a video of a confederate recipient displaying either a neutral or a sad expression paired with a claim of loss. Participants will then decide how much money to give to the recipient. Participants will also complete items from the Schedule of Nonadaptive and Adaptive Personality (SNAP - 2nd edition) to assess levels of narcissistic and antisocial personality traits.

Dendrite Superlattices: Investigating the Variable Atomic Structure of Electrodeposited Zinc Crystals
Alex Cushen, Anthropology, Physics
Sponsors: Professor David Grier, Physics; Professor Michael Ward, Chemistry

The atomic structure of a material can be as impactful on its physical properties as the elements it is made of. We present evidence for a relationship between the driving voltage of zinc crystals grown by electrodeposition and the resulting atomic structure. The crystals are grown by depositing zinc ions onto an electrode and examined using x-ray diffraction techniques to determine properties of their atomic lattice. Using the Bruker D8 Advance General Area Detector Diffraction System, we find additional diffraction peaks present at low angles in crystals grown at higher voltages. These results suggest the presence of a superlattice—a periodic crystalline structure of multiple materials or lattice configurations—rather than purely the hexagonal close-packed structure zinc forms at lower voltages. We suggest that an FCO-HCP superlattice is a possible candidate structure which explains a number of the additional diffraction peaks observed.

Quantification of in vivo Metal Concentrations Using a Ratiometric Multi-modal Low-affinity Calcium Sensor
Georgina Dabdoing, Chemistry
Sponsor: Professor Daniela Buccella, Chemistry

Endogenous metals including calcium, potassium, iron, copper, and magnesium play a variety of physiological and pathological roles within the body. Each metal regulates a variety of pathways and does so distinctly. In order to understand how small changes in metal concentrations within a cell successfully completes a distinct function, a sensor with the capacity to quantify metal content in vivo is necessary. Presently, many fluorescent sensors are used to quantify a variety of metals. Despite the success of these sensors, we propose that a ratiometric multimodal calcium sensor, TCF BAPTA, that works on the basis of both fluorescence and Raman spectroscopy can provide more reliable information about the calcium content within the cell. Specifically, calcium regulates many cellular processes including cellular metabolism and neuronal signaling. Calcium also plays an integral role in diseases such as cancer and Alzheimer’s disease. Thus, in order to sense calcium and gain further insight into the metal’s importance within the body, we successfully developed TCF BAPTA. The sensitivity, selectivity, and stability of TCF BAPTA were tested by completing various titrations with other metals, nucleophiles and under different pH’s. TCF BAPTA was also transformed in cells and visualized on the fluorescence microscope. After various tests, TCF BAPTA was found to be an appropriate low-affinity calcium sensor that has the additional advantage of sensing Calcium with a greater affinity than magnesium, a common competitor. Further research must be completed to explore the Raman capabilities of TCF-BAPTA and what advantages can be exploited by using this sensing method.

The Parasite Within: Revealing the 3-Dimensional Organization of the Microsporidian Spore
Alina Davydov, Philosophy
Sponsors: Professor Gira Bhabha, NYU School of Medicine, Skirball Institute of Biomolecular Medicine; Professor Damian Ekiert, NYU School of Medicine, Skirball Institute of Biomolecular Medicine

Microsporidia are intracellular, single-celled eukaryotic parasites that infect a wide range of hosts, causing costly agricultural losses and fatal infections in immunocompromised patients. To infect the host, microsporidia use a tightly-coiled invasion organelle called the polar tube (PT), which uncoils, ejects, and penetrates the host cell membrane allowing for transport of infectious material from the spore to the target cell. The mechanism of PT germination is poorly understood, and 2D TEM images only hint that the PT is coiled, with no further information about its organization. A three-dimensional reconstruction of the packaged PT would reveal this information as well as
how it interacts with other organelles. Using serial block-face scanning electron microscopy (SBFSEM) on the microsporidia species *Anncalilia algerae*, we generated a 3D reconstruction of the entire dormant spore. In addition to gaining a novel model of the spatial relationships between spore organelles, we found that the PT is a right-handed helix that apically interacts with the central, thinnest part of the spore wall membranes. Comparing these results with microsporidia species *Encephalitozoon hellem*, we found similar overall organization—with notable differences in spacing between PT coils and placement of the PT tip relative to the anterior-posterior axis of the spore, revealing differences in where the PT is expected to exit the spore between species. Future research will use SBFSEM to follow the changes in organelle volume and organization during the germination process to further elucidate the mechanism of microsporidia host-cell invasion.

When Is It a Waste of a Wax: Understanding Female Sexual Preparation Behaviors from a Dyadic Perspective

Melissa Domingues, Global Public Health/Anthropology  
Sponsor: Yasmin Ghodse-Elahi, Psychology

Why do many women continue to engage in sexual preparation behaviors that are painful or are harmful to vaginal health, such as waxing and douching? It’s important to analyze and understand where the motivation to participate in sexual preparation behaviors stem from, especially given that different motivations bear different consequences for the sexual experience. Our previous research has discovered there is a correlation between sexual satisfaction and intrinsic or extrinsic motives to engage in sexual preparation. Using an online sample of 169 women in heterosexual relationships, we found that women who engage in sexual preparation behaviors of their own volition (i.e., intrinsically motivated) experienced higher sexual satisfaction. On the other hand, women who engaged in preparation behaviors because of factors such as to meet their partner’s desires or because of external expectations (i.e., externally motivated), experienced lower levels of sexual satisfaction. In the current research, we aim to continue investigating the motivation behind women’s sexual preparation behaviors and its association with sexual satisfaction. We also aim to understand the dyadic perspective, that is, how do couples think about sexual preparation as a unit rather than as separate individuals. We began by conducting another survey to replicate our initial findings. Then, we conducted interviews with heterosexual couples to investigate the male partners’ perspectives on sexual preparation and how both partners’ motives influence their sexual satisfaction. Data collection is ongoing. Our current research allows us to strengthen our previous findings and better understand how motives to engage in sexual preparation shape sexual satisfaction for the dyad as a whole.

Effects of Toy Type and Caregiver Availability on Infants’ Object Play

Yasmine Elasm, Psychology; Jamie Karns, Psychology  
Sponsors: Professor Karen Adolph, Psychology; Dr. Justine Hoch, Psychology; Christina Hospodar, Psychology

Infants learn through spontaneous, exploratory play. How do the types of objects and people in infants’ environments shape infants’ exploratory play? We tested the effects of toy type and caregiver availability on infants’ toy play. We observed 40 12- to 22-month-old infants during free play in four within-subjects conditions and coded their interactions with toys and locomotor activity. Infants played with toys designed for gross-motor play (e.g., stroller) and toys designed for fine-motor play (e.g., toy piano) both with and without their caregivers. Infants spent the same amount of time interacting with toys regardless of toy or caregiver conditions, but how infants used toys differed. When infants played with their caregivers, their interactions with both types of toys were shorter and more frequent than when they played independently. Regardless of the caregiver condition, infants were more likely to play with gross-motor toys in the course of locomotion, and to play with fine-motor toys while stationary. When infants played with fine-motor toys with their caregivers, infants locomoted less, were less likely to carry a toy, and were more likely to consider the toy’s designed actions (e.g., pushing the stroller, pressing a piano key) than when they played on their own. Our findings suggest that the affordances of different toys and caregivers’ play preferences shape infants’ object interactions. A related project focused on locomotor practice.

How POC Stereotypes and Skin Color Affect Perception of Intellectual Ability

Christianne Evasco, Psychology  
Sponsors: Professor Denis Pelli, Psychology; Dr. Tim Marsh, NYU Sydney, Psychology

Previous research suggests that individuals, regardless of their own race, perceive skin color to be reflective of intellectual ability, with lighter-skinned individuals more associated with intelligence than darker-skinned individuals (Jaxon et al., 2019; Hannon, 2015). However, less is known about the endorsement of this skin color stratification on People of Color’s (POC) social perception of other POC’s intellectual ability. The current study examined the effect of stereotype-based expectations and internalized notions of skin color on POC’s social judgments of intellectual ability in other POC as well as possible factors that contribute to these judgments. Specifically, this research considered the mechanism of defensive projection as the basis of POC social perception. The experimenter hypothesized that participants who identified as POC would report lower levels of self-perceived intellectual ability and,
subsequently, lower levels socially-perceived intellectual ability in darker-skinned POC when compared to the ratings of non-POC. To test this, we asked a sample of mostly college-level students (N = 77) to complete a priming task, four short reading tasks, and five sets of Likert scale questions. After data analysis, the results did not support our hypothesis and suggest that there is no difference in self-perceived and socially-perceived intelligence between POC and non-POC. However, we found two significant ancillary findings: 1) participants who identified with multiple ethnicities reported higher levels of self-perceived intelligence than both white and POC participants who identified with one ethnicity and 2) there appears to be a difference in reported responses to statements regarding enjoying academic work between individuals who only identify as white or individuals who identify as POC or mixed POC. The implications of our negative results and significant ancillary findings are explored in the discussion.

Coping with Cell Stress: A Phosphoproteomics Approach Identifies Putative Downstream Effectors of the ER Transmembrane Kinase PERK
Md Fahim, Biology
Sponsors: Professor Christine Vogel, Biology; Dr. Shuvadeep Maity, Biology

Proper protein structure and folding are necessary for robust protein function. Previous studies have identified protein kinase R-like endoplasmic reticulum kinase (PERK) as a key regulator of cellular response to the accumulation of misfolded proteins in the endoplasmic reticulum (ER), a condition known commonly as ER stress. PERK is known to phosphorylate two downstream effectors—eukaryotic translation initiation factor 2 subunit 1 (eIF2α) and nuclear factor erythroid 2-related factor 2 (NRF2)—but little is known beyond these two immediate phosphorylation targets. To identify further phosphorylation targets of PERK, we studied changes in the phosphoproteome and whole proteome in two biological replicates of wild-type (WT) and PERK-deficient (KO) cells in response to ER stress. We quantitatively mapped phosphosites at different timepoints of ER stress induction by use of isobaric tag-based MS/MS. We identified six phosphoproteins which showed greater abundance in PERK-intact WT cells relative to KO cells between 0.5- and 1-hour timepoints of ER stress induction. Our data suggest that PERK-dependent activity may peak during the early ER stress response, between 0.5- and 1-hour timepoints, and be less active later in the stress response. We also identified 128 differentially expressed proteins (25 upregulated and 103 downregulated) in the whole proteome. In particular, some protein clusters in the whole proteome data which were differentially expressed in the early stress response have mitochondrial and cell cycle function. Biological Replicate 2 underwent a stronger response to ER stress than Replicate 1 and, consequently, may have undergone greater levels of apoptosis. Our data indicate that, on the whole, PERK activation under ER stress initiates the phosphorylation of an array of proteins and prompts global changes in whole protein expression.

Behavioral and Cellular Characterization of a New Mouse Model for DDX3X Syndrome
Michael Flores, Biology
Sponsors: Dr. Marta Garcia-Forn, Icahn School of Medicine at Mount Sinai, Psychiatry; Professor Silvia De Rubeis, Icahn School of Medicine at Mount Sinai, Psychiatry

The molecular mechanisms underlying developmental deficits such as intellectual disability (ID) and autism spectrum disorder (ASD) are widely understudied. DDX3X syndrome, caused by mutations in the DDX3X gene, accounts for nearly 3% of unexplained ID cases in females. The cellular and molecular mechanisms driving it are not fully understood. Therefore, it is critical to further the knowledge of this neurodevelopmental disorder to identify new targets and therapeutics. Although studies have shown that DDX3X serves a critical role in mRNA translation and corticogenesis, its specific function in neurons remains unclear. In this research project, we used a mouse model with construct and face validity for loss-of-function mutations clinically associated with DDX3X syndrome to better understand the neurobiology behind this condition. By using a battery of behavioral tests, we found that DDX3X haploinsufficient mice presented delays in acquiring physical, sensory, and developmental milestones as well as motor, cognitive, and anxiety deficits in adulthood. In addition, we studied the impact of DDX3X haploinsufficiency on cortical development to provide further information on the relationship between cellular function and observable behavior. We found defects in cortical cytoarchitecture—particularly, the displacement of specific projection neurons in the developing cortex. These data provide insights into the developmental mechanism driving DDX3X syndrome.

Did Famous Scientists Have to Overcome Obstacles? Investigating Motivational Messages in Children’s Books
Edward Foran, Psychology; Gabby Applebaum, Psychology; Theodora Simons, French, Psychology
Sponsor: Professor Andrei Cimpian, 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. These books are typically created as a way to help foster interest in STEM among children. However, while research has
Timing and Mechanisms of Transmedullary Neuron Circuit Formation in the Drosophila Optic Lobe

Adelia Grace Gaffney, Biology
Sponsors: Dr. Isabel Holguera, Biology; Professor Claude Desplan, Biology

The generation of neurons and their integration into functional circuits are two key processes in brain development. The largest compartment of the Drosophila optic lobe, the medulla, is an ideal model system to study these processes. It has been demonstrated that temporal patterning mediates the generation of the 70+ neural cell types in the Drosophila medulla in a specific and stereotyped order. However, the role of temporal patterning in circuit formation remains poorly understood. We will investigate this using Transmedullary (Tm) neurons, which form in the medulla and target their axons to the lobula. Temporal patterning generates different Tm subtypes at different times during development in a known birth order sequence. The birth order of Tm subtypes is correlated with the lobula layer they target their axons to, with the earliest-born Tm subtypes targeting the most superficial layers and later-born subtypes targeting progressively deeper layers. We propose two models to explain this correlation: a “first come, first served” model, in which birth time is the sole determinant of targeting layer, and an “intrinsic temporal identity” model in which each Tm subtype has a unique molecular identity as a result of its time of birth, and these unique molecular identities instruct axon targeting to different depths of the lobula. We aim to determine how temporal patterning instructs Tm circuit formation by distinguishing between these models. We will determine whether Tm neurons target their axons to the lobula in a birth order-dependent manner using multicolor, stochastic labelling of Tm subtypes. We will also investigate whether cell surface molecules that are differentially expressed between early and late-born Tm neurons instruct axon targeting using RNA interference and whole-animal mutants.

Perceptions of Leadership in Adolescents: Understanding the Formation of Leadership Bias

Alexis George, Psychology
Sponsor: Professor Emily Balcetis, Psychology

What factors relate to adolescents’ mental representation of leaders? I hypothesized that the strength of students’ racial identity, social support, and support of the status quo influence adolescents’ visual representation of what a leader looks like. Middle and high school students from across New York City completed a survey to assess the degree to which they enhanced their racial-ethnic group, believed they received social support, and degree to which they defended the status quo. Students constructed a visual representation of a leader by selecting facial features from arrays. These characteristics included skin shade, eye shape, nose shape, etc. From those selections, I reconstructed a digital avatar collating each adolescents’ selected features to generate a composite image representing what they imagined a leader to look like. A second set of adult participants viewed the constructed avatars and rated them for prototypicality of race and gender. The results suggest that Black and Hispanic participants with strong group enhancement and weak defense of the status quo produce less prototypically non-Hispanic white avatars. Participants with strong defense of the status quo produce more prototypically non-Hispanic white avatars. Male participants with strong group enhancement produced more prototypically masculine avatars. Female participants with strong perceived support produce more prototypically feminine avatars. We conclude that group enhancement defense of the status quo and perceived support impact adolescent’s mental representations of leadership. I discuss implications for researchers and educators on mentorship and educational programs aimed at diversifying adolescents’ perceptions of leadership before they are solidified.

Intuitive Psychology of Infants and AIs: Understanding Agents in Terms of Preferences and Efficiency Principle

Sabana Gonzalez, Psychology
Sponsors: Professor Moira Dillon, Psychology; Dr. Gala Stojnić, Psychology

How do infants’ and artificial intelligence (AI) systems’ reason about agents? Prior research shows that around 12 months of age, infants attribute goals, intentions, and beliefs to agents to predict their actions (Liu & Spelke, 2017; Shimizu & Johnson, 2004; Woodward, 1998; 1999). Via Zoom teleconferencing, we presented 11-month-old infants with videos of geometric shapes of “agents” and “objects” in a 2D grid-world environment. The videos consisted of two tasks: one probing their understanding of
an agent’s preference and one probing their understanding of an agent’s efficient action. In the preference task, an agent repeatedly approached a preferred object in a specific location. At test, the objects switched locations, and the agent either approached the same object (expected) or a different object (unexpected). In the efficiency task, the agent navigated around barriers to reach a goal object. At test, the barriers were removed, and the agent either used a new, efficient path (expected) or the same, inefficient path (unexpected) to reach the object. Adopting the violation of expectation (VOE) method from infant studies, we used infant looking times as a main measure, with longer looks indicating infants’ surprise by the stimuli. Our pilot results revealed significantly longer looking times at the unexpected outcomes, for both the preference task (n = 24, β = 3.24, p = .04) and the efficiency task (n = 24, β = 4.51, p = .02). We plan to pre-register the study with the same tasks and also others that together will test a comprehensive understanding about agents and their intentions. After gathering all the infant data, we will finally compare it to AI data to see how similarly (or differently) they reason about agents and their actions.

Moral Beliefs Align through Conversation and Collective Judgments
Sarah Gotfredsen, Journalism, Psychology
Sponsor: Professor Jay Van Bavel, Psychology

When confronted with a moral dilemma, we tend to turn to people around us for their interpretation of what is “right” and what is “wrong”. Such interactions challenge and, sometimes, even change our initial judgement. Yet, previous research in moral psychology has mainly focused on how individuals make moral judgements in isolation. Moreover, most of this work focuses on artificial and unrealistic scenarios (e.g., the Trolley Problem) that people aren’t likely to encounter in real-life. Here, we explore how social interactions influence individuals’ moral judgements to real-world moral dilemmas. We had pairs of strangers (N = 142 dyads) discuss morally ambiguous dilemmas related to the COVID-19 pandemic and make moral judgements about them, first alone and subsequently together. While participants’ initial moral judgements were uncorrelated, they became strikingly aligned after the conversations. Furthermore, we found that the demographics of participants did not predict moral alignment, but their sense of shared reality with their partner did. Lastly, we found that participants’ fundamental moral views and personal experience did not predict initial moral judgements, but their political orientation did. These results suggest that our moral judgements aren’t fixed. Rather, they are highly sensitive to small changes in our social context, such as having a conversation with a stranger.

An Analysis of Altruism and Collaboration Goals Present in Children’s Science Biographies
Stephany Justine Guadalupe Rivas, Psychology
Sponsors: Professor Andrei Cimpian, Psychology; Dr. Jessica Gladstone, Psychology

The National Science Foundation reported that women and people of color are consistently the minorities in science, technology, engineering, and mathematics (STEM) higher education and professional settings (NSF, 2018). To combat this disparity, an influx of children’s books about scientists have been published: their purpose being to present children with a scientist as a role model, thereby showing them that success in STEM is attainable. However, existing research suggests that role models with qualities that seem disconnected or unobtainable for a child may instead deter them from STEM fields (e.g., Betz & Sekaquaptewa, 2012; for a review, see Gladstone & Cimpian, 2020). For example, if we consider how cultures of color tend to be largely collectivist, protagonists of these books that fail to exemplify communal and altruistic goals may also fail to motivate children of color to pursue STEM (Corneille et al., 2020; Fuesting & Diekman, 2016). In my project, I explored the presence of altruism and collaboration constructs in these books and analyzed whether these constructs were found with differing frequency in books about people of color and women. I found that books about scientists of color and female scientists contained a higher number of altruism and collaboration constructs. However, books about male scientists of color and female scientists of color had the most variance between construct frequencies. This indicates an inconsistency in messaging across books with these protagonists. Thus, more children’s science biographies must be written keeping altruism and collaboration in mind.

Cross-cultural Essentialism in the Early Development of Childhood
Yunlai Silvia Gui, Journalism, Psychology
Sponsors: Dr. Yan Xu, Psychology; Professor Marjorie Rhodes, Psychology; Michelle Wang, Psychology

How do children explain the differences they observe between social groups? One explanation children might provide is that different social groups are fundamentally distinct from one another, which reflects social essentialist thinking. However, most of the past research has focused on the commonly studied WEIRD (western, educated, industrialized, rich, and democratic) community. Thus, more work is needed to investigate cultural variability in social essentialism. Our research aims to investigate how five dimensions of social essentialism develop in early childhood and how they vary across different cultural contexts (Western individualism vs. Eastern collectivism). We recruited 275 American children through our online data collection platform PANDA and 258 Chinese children.
from a public kindergarten in Ningbo, China. Children between 3 to 5 years old completed five essentialism tasks probing beliefs about novel and familiar social groups (causal explanation, homogeneity, category stability, strict boundaries, and naturalness). Overall, results showed opposite developmental patterns across the two cultural samples: essentialist responses decreased with age in Chinese children but increased in American children. This pattern held up for four measures of essentialism. However, responses on the homogeneity measure showed a different pattern: Chinese children were more likely to believe category homogeneity as they grow older, despite their overall decreasing essentialist tendency. This finding suggests a possible role of collectivist culture in shaping children’s essentialist thinking by increasing perceived group homogeneity. Results from the current study help to understand the origins of social essentialism as the first step to combat the development of social prejudices in early childhood.

The Role of ELF-1 Bound Genes in the Type I Interferon Response
Juhana Habib, Biology
Sponsor: Professor Melke Dittmann, NYU School of Medicine, Microbiology

Upon virus infection, infected cells produce the innate immune cytokine, interferon, to signal neighboring cells to bolster antiviral defense mechanisms, interferon stimulated genes (ISGs) in host cells. These ISGs display a wide range of antiviral activities that can affect the viral life cycle at multiple stages. One of the ISGs of interest is E74-like ETS transcription factor 1 (ELF1) due to its broad range of antiviral activities. However, the mechanisms through which ELF1 is able to inhibit a variety of viruses is unknown. It has previously been shown that ELF1 is upregulated on mRNA and protein levels approximately 6 hours post interferon treatment. Furthermore, interferon stimulation causes changes in chromatin, allowing either more or less DNA available to be bound by transcription factors. Given ELF1’s upregulation and broad chromatin changes due to interferon, we expect to see differential and/or a broader range of ELF1 binding throughout the genome. Here, a ChiP-Seq analysis of genes bound by ELF1 0 and 6 hours post interferon treatment shows that interferon upregulation of ELF1 allows its steady state activities to be heightened. Our results show that post interferon treatment, ELF1 is enriched at genes involved in transcription, g-protein coupled receptor signaling, and calcium signaling. We also believe that ELF1 may regulate the Orai1 gene to hinder viral infection. These results direct further analysis of genes bound by ELF1 6 hours post interferon treatment to determine the potential antiviral pathways ELF1 may be a part of. It is also important to further study the ways in which ELF1 may regulate the Orai1 gene to impact viral infection of host cells.

Identifying the Role of Transcription Factor Prdm16 in the Differentiation of Motor Neurons in Zebrafish
Hanna Hameedy, Chemistry
Sponsor: Kristen D’Elia, NYU School of Medicine, Neuroscience and Physiology

Across all vertebrates, not much is known about how the functional subtypes (i.e., the motor neurons that innervate fast, slow, and intermediate muscle) of motor neurons develop. This project seeks to identify the molecular mechanisms by which functional subtypes of motor neurons are specified in zebrafish. In particular, this project focuses on determining the role of a transcription factor, Prdm16, in this process. Since there are no known subtype markers for motor neurons during development, we are interested in seeing if our protein of interest, which is expressed in a subpopulation of motor neurons, labels a specific subtype of motor neurons as well. If Prdm16 is a subtype marker, then it could potentially be involved in motor neuron development. Here, we have used in vivo imaging of a Prdm16 reporter line with sparse labelled motor neurons throughout the spinal cord in order to clearly visualize the motor neurons that express Prdm16. Using the transverse motor neuron subtype conventions established by the McLean lab, these labelled motor neurons were classified by transverse subtype and domain of innervation. The McLean Lab defined three distinct types of motor neurons by the type of muscle fiber and nerves they innervate: “m” which innervates fast twitch muscle via medial nerves, “s” which innervate superficial fast and slow fibers through medial and septal nerves, and “s” which innervates slow muscle with septal nerves (Bello-Rojas, et al., 2019). Prdm16 positive motor neurons were almost exclusively of the m and ms type. These observations suggest that Prdm16 is the first subtype marker for fast motor neurons in fish. But this alone does not demonstrate Prdm16’s importance in motor neuron development, so further experiments are being conducted to evaluate its necessity for these subtypes.

Polarity Classification and Sentiment Shift Analysis on E-commerce Reviews
Eric He, Computer Science and Mathematics; Dalia Zhu, Computer Science and Mathematics
Sponsor: Professor Adam Meyers, Computer Science

Sentiment Analysis has been broadly studied in various domains with methods ranging from lexicon-based approach to machine learning classifiers. Many popular systems use the bag-of-words model which treats each individual word as a feature without considering its order in the document. One of the main challenges of this approach is the existence of sentiment shifters, such as negations and intensifiers. This paper introduces a novel method that compresses reviews that contain contrasting sentiments into much shorter extracts. Based on the classification re-
results, the extracts seem to retain a cleaner version of the polarity information as compared to the original full review. Along with negation treatment, the method is tested on Naive Bayes, Logistic Regression, and Support Vector Machine on Amazon product reviews. SVM and Naive Bayes improved visibly from the original model by around 2.6% on beauty product reviews. The test on Amazon movie reviews also obtained similar improvements with slightly lower overall accuracy.

**Lipid Oxidation and Its Role in Aging in *Harpegnathos Saltator***

*Luís Hernandez, Biology*

**Sponsor:** Professor Claude Desplan, Biology

Social insects are animals that live in societies in which their roles are divided and have a queen that stands at the top and lives longer than the rest. The *Harpegnathos saltator* ant species has a unique function in that it can drastically alter its lifespan depending on whether it is a regular worker or a pseudo-queen, called a “gamergate”. In the absence of a queen, workers can transform into gamergates and perform the roles of the queen which include reproducing (Peeters, Liebig et al., 2000). Not only do they physically morph to fit the role (i.e., growing ovaries, decreasing brain volume), but they also increase their lifespan five-fold (Keller and Jemielity, 2006; Ghaninia, Haight et al., 2017). This project focuses on one of the possible causes of aging: lipid oxidation. Over time, the mitochondria in various tissues generate reactive oxygen species that can damage biological molecules such as lipids and DNA. In the case of lipids, lipid oxidation produces several products including lipid hydroperoxide (LPO) which we can measure through colorimetry (Golden, Hinerfeld et al., 2002). We hypothesize that gamergates will have a reduction in LPO compared to regular workers of the same nest and age. This project may provide insight into the mechanisms of aging as well as be useful for studying human aging. It is also part of a larger endeavor to study the role of the known mechanisms of aging: lipid oxidation, telomere shortening, protein aggregation, etc. in the lifespan extension in *H. saltator* gamergates.

**Influence of Sound Level on Auditory Psychometric Task**

*Robert Hotz, Psychology*

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

Hearing loss during developmental critical periods can disrupt auditory behavior and neural function. Brief periods of hearing loss do not lead to developmental disruptions if they occur after the critical period (Mowery et al., 2015; Caras & Sanes, 2015). However, evidence suggests that a longer duration of hearing loss spanning adolescence may be harmful even after the critical period. Indeed, gerbils with a reversible hearing loss (i.e., using earplugs) induced after their critical period (P23) and spanning adolescence are later impaired on an amplitude modulation (AM) depth detection task. Although auditionality had been restored (earplugs were removed), some animals had a minimal residual hearing loss from the earplugs. This is a concern, because the peripheral hearing loss may contribute to the perceptual deficit and not central auditory mechanisms. Thus, the purpose of our experiment was to assess how perceptual sensitivity to amplitude modulations (AM) are influenced by varying sound levels. Four normal-hearing gerbils were trained on the AM depth detection task at 45 DB. Once animals reached task proficiency, the sound level for each session was varied from 10-60 dB. Depth detection thresholds were computed from each animal’s psychometric function and compared across sound levels. We found that detection thresholds were consistent above 27 dB and get significantly worse for sound levels below 25 dB. The results suggest that AM detection is not largely impacted by louder sound levels and that a minimal hearing loss would not affect detection thresholds.

**Role of Ventral Tegmental Area in Social Behavior of Infant Rat following Adversity-rearing**

*Shannon Hu, Neural Science; Wei Song, Neural Science*

**Sponsors:** Professor Regina Sullivan, NYU School of Medicine, Child and Adolescent Psychiatry; Dr. Maya Opendak, NYU School of Medicine, Child and Adolescent Psychiatry

Childhood experience with trauma during maternal caregiving produces later life deficits in social behavior, which can be precociously uncovered by stress. This effect has been modeled in rats, defining a causal link between amygdala and dopamine (DA). Since the ventral tegmental area (VTA) is a major DA source for the amygdala, we used infant rats to test the hypothesis that infants experiencing adversity-rearing from their mother develop a disrupted network from the VTA to the basolateral amygdala (BLA). Postnatal day (PN) 8–12 pups were reared with a control mother or an adversity-rearing mother given insufficient bedding for nest building, which produces maternal rough treatment of pups. On PN22, prior to weaning, we tested the impact of adversity-rearing on social behavior using 3 Chamber Tests (3CT), first with a social vs. non-social stimulus and, the next day, with a socially familiar littermate vs. a novel peer. Testing was filmed and scored using automated Ethovision software (Noldus) and hand-scored by experimenters blind to conditions using BORIS software. How was DA altered? Results showed that consistently elevated dopamine levels in the basolateral amygdala from the VTA was both necessary and sufficient in producing social behavior deficits and decreased time spent investigating a social or novel peer at PN22 (two-way ANOVA, main effect of light on/off: F(1,38)=5.009,
Glioblastoma (GBM) is the most common and most lethal type of primary brain cancer. In GBM, a subpopulation of cells, termed glioma stem cells (GSCs), exclusively drive disease progression; differentiated glioma cells do not. Hence, GSCs are the primary therapeutic target in the treatment of GBM. Tumor treating fields (TTFields) are alternating electric fields with different frequency and intensity settings that disrupt cell division and cause cell death in GSCs. However, the effect of TTFields on GSC differentiation remain to be determined. Stress-induced differentiation is a well-documented phenomenon, so we hypothesized that TTFields induce differentiation in GSCs. To evaluate this, we studied two GSC cell lines stratified by GBM subtype (mesenchymal and proneural) that underwent treatment at different TTField frequencies (200 and 300 kHz) and intensities (1.0 and 1.7 V/cm). Samples were collected every 24 hours across a 96-hour treatment, and real-time qPCR was performed to assess expression of all markers between the 1.0 and 1.7 V/cm intensity conditions, suggesting that specific treatment settings are better at driving GSC differentiation. This is particularly interesting as 200 kHz is the standard clinical frequency setting for GBM, when the goal of the TTField treatment is disrupting cell division. This posits the question of how the anticancer effects of GSC death and GSC differentiation compare, and whether TTFields should be optimized in favor of one over the other. Future studies are needed to confirm these findings and determine whether TTField-induced differentiation is a clinically-relevant prospect in the treatment of GBM.

Mathematical Modeling of Confined Space Airborne Virus Transmission
Jerry Ji, Computer Science, Mathematics
Sponsor: Professor Yury Ustinovskyi, Mathematics

This article focuses on using quantitative models to simulate the airborne disease infection in a university classroom. Infections in the classroom can be very dangerous in terms of condensed sittings and discussions during the class. The exhaled air produced by an infected individual will increase the density of the virus given time in a confined space. The longer a healthy individual is exposed in a virus-dense environment gives more probability for this person to be infected. The famous Wells-Riley equation has been commonly used to estimate indoor infections. However, one critical assumption of the Wells-Riley equation is that the virus is assumed to be uniformly distributed in a fixed confined space. In reality, this is not often the case. One of the most important aspects of virus transmission is the relative distance between an infected individual and a healthy individual. This article focuses on improving Wells-Riley’s model by incorporating the distance factor and present the simulation in different dimensions to provide more insight into building safer classrooms.

Influence of Anatomical Variability on Neural Decoding Strategies by Hippocampal Downstream Regions
Yingxi Jin, Neural Science
Sponsors: Professor György Buzsáki, NYU School of Medicine, Neuroscience Institute; Kathryn McClain, NYU School of Medicine, Neuroscience Institute

The hippocampus plays a vital role in animal’s spatial navigation, where place cells encode positional information through spiking activity. The spiking patterns of different place cells vary with the size of place fields and the phase of spiking in theta oscillations, a type of neural oscillation in local potential field with a frequency of 6–10 Hz. From the septal pole to temporal pole of hippocampus, the phase of local theta oscillations shifts around half a cycle as the wave travels along the axis, meanwhile, the size of place fields is reported to increase. Such variability in anatomical organization may impact the information decoded by downstream readers in distal regions. To investigate where and how such impact occurs, we simulated spiking activities of place cells with the position-theta-phase (PTP) model developed previously in the lab. We constructed two types of decoders using Bayesian approach that are able to quantify positional information contained in spiking activity, and then assessed the error when decoding information from different theta phases and place field widths. The first decoder utilized the firing rate code of place cells. Results suggested that the half-cycle theta phase shift did not have a significant influence on decoding accuracy, but the error increased as the place fields grew larger. The second decoder used the theta phase code. While the analysis is still ongoing, we hypothesize that theta phase decoder would have a similar pattern of impact as the firing rate decoder but with a smaller error. Understanding the decoding strategy of downstream regions may shed important light on revealing the hippocampal projection organizations and in-
from last year’s URC presentation, we tested the effects
infants’ locomotor practice? In a continuation
Sponsor: Professor Karen Adolph, Psychology
and Caregiver Locomotion
How Toy Type and Caregiver Availability Affect Infant
nature of eCB signaling within the NAc.
Finally, we use fiber photometry to elucidate the level and
mogenetic techniques and pharmacological treatments.
learned, we establish the necessity of the BLA-NAc pro-
condition. Our findings suggest that both infants and care-
givers played together with fine-motor toys, infants moved
less than when they played with fine-motor toys on
their own. Although caregivers moved considerably less
than infants, dyadic locomotor activity was correlated in
the fine-motor toy condition but not the gross-motor toy
condition. Our findings suggest that both infants and care-
givers are sensitive to the affordances of toys and that in-
fants can better capitalize on the affordances of gross-mo-
tor toys as they gain walking experience. Caregivers
encourage infants to remain stationary while playing with
fine-motor toys but do not affect infants’ locomotor play
with gross-motor toys. Thus, environmental and social fac-
tors interact with infants’ walking experience to influence
their spontaneous locomotor practice. A related project
focused on toy play.

How Mothers Teach the Designed Actions of Everyday
Objects
Bella Kasaba, Psychology
Sponsors: Professor Karen Adolph, Psychology; Brianna
Kaplan, Psychology
Activities of daily living—e.g., eating, dressing,
grooming—involves objects that require specific designed
actions for use (e.g., unscrewing or pulling open a container
lid). Previous work showed that young children struggle to
discover and implement the designed actions of everyday
objects because the required movements are highly specif-
ic, surprisingly complex, and involve non-obvious object
properties (Rachwani, et al., 2020). Successful implement-
ation also depends on the child-object “fit”—relations
between characteristics of the child (e.g., hand size and
manual skills) and features of the object (e.g., container
size, stickiness of lid). Caregivers are cultural experts who
may help children overcome the difficulties of discovering
and implementing designed actions. However, research-
ers know little about whether or how caregivers scaffold
designed actions for activities of daily living. We asked
mothers to teach their 12- to 36-month-old children to open
containers with twist-off or pull-off lids and different con-
tainer sizes to test whether mothers’ social input reflects the
designed action and the child-object fit. Preliminary results
indicate that mothers’ input decreased with children’s age (r
= -.66, p < .001) and their input was tailored to lid type and

Delineating the Neural Network Underlying
Cannabinoid Modulation of Active Avoidance
Behavior
Laura Kang, Neural Science, Psychology
Sponsors: Dr. Rodrigo Triana-Del Rio, Neural Science;
Professor Joe LeDoux, Neural Science
Anxiety and fear can often be debilitating, resulting
in paralysis and loss of a functional lifestyle. Active coping
strategies help humans adapt and get back to routine life
in the aftermath of trauma, and research in patients with
anxiety disorders shows the virtues of active engagement
as part of the therapeutic process. Avoidance behavior can
be modeled in rodents using the signaled active avoidance
paradigm. Several reports suggest that the projection from
the basal amygdala to the nucleus accumbens supports the
execution of signaled active avoidance, since the nucleus
accumbens has been implicated in appetitive instrument-
al behavior. However, it is still unclear in detail how the
neural circuitry and neuromodulatory mechanisms that
underlie adaptive avoidance responses differ from those
that underlie freezing responses. Therefore, we aim to elu-
cidate the neural circuitry and signaling that produces ac-
vie avoidance. Within the amygdalo- striatal circuit, we are
interested in the role of endocannabinoid (eCB) signaling
as eCB signaling has been implicated in both the develop-
ment and acquisition of aversive memories. Specifically,
cannabinoid-1 receptors (CB1r) and eCB have been found
to mediate synaptic plasticity in ways that affect reinforced
behavior. We hypothesize that active avoidance acquisition
is mediated by eCB signaling within the NAc, specifically
via eCB-dependent modulation of Parvalbumin Interneu-
ron release. In order to study these mechanisms, we apply
the signaled active avoidance paradigm in which rodent
subjects are exposed to a conditioned stimulus-uncondi-
tioned stimulus association and then taught that avoidance
in response to the conditioned stimulus can prevent the
aversive unconditioned stimulus. Once this behavior is
learned, we establish the necessity of the BLA-NAc pro-
jecttion using chemogenetic and optogenetic techniques.
Then we manipulate PV-INs and CB1r activity via che-
mogenetic techniques and pharmacological treatments.
Finally, we use fiber photometry to elucidate the level and
nature of eCB signaling within the NAc.

How Toy Type and Caregiver Availability Affect Infant
and Caregiver Locomotion
Jamie Karns, Psychology; Yasmine Elasmar, Psychology
Sponsor: Professor Karen Adolph, Psychology
Infant walking improves with practice. What fac-
tors shape infants’ locomotor practice? In a continuation
from last year’s URC presentation, we tested the effects
of environmental factors, social factors, and infants’ prior
walking experience on infants’ self-generated locomotion.
We observed 40 12- to 22-month-old walking infants with
a range of walking experience during free play and coded
infants’ and mothers’ locomotor activity. Infants played
with toys designed for gross-motor play (e.g., stroller)
and fine-motor play (e.g., toy piano), and they played both
with and without their caregiver. Both infants and mothers
moved more with gross-motor toys than with fine-motor
toys and infants’ walking experience predicted locomotion
with gross-motor toys. However, when infants and care-
givers played together with fine-motor toys, infants moved
even less than when they played with fine-motor toys on
their own. Although caregivers moved considerably less
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Objects
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Ex vivo and in vitro Analysis of the Tumor Microenvironment's Role in Chemotherapy Resistance

Angelica Kurtz, Biology
Sponsor: Professor Carlos Carmona-Fontaine, Biology

One of the deadliest forms of cancer is Pancreatic Ductal Adenocarcinoma (PDAC). This severe lethality stems largely from PDAC’s frequent resistance to chemotherapies. Previous research has suggested that aspects of the tumor microenvironment in many cancers may contribute to cancer chemoresistance. A tumor microenvironment includes the surrounding nutrient and oxygen levels, immune cell composition, and vasculature. Hallmarks of the PDAC microenvironment include low vascularization, ischemia (depletion of nutrients and oxygen), and high infiltration by macrophages and fibroblasts. My hypothesis is that there is a microenvironmental factor or a combination of factors that impedes chemotherapy and that we can model this therapy-suppressive microenvironment ex vivo. First, I will use drug titrations to investigate whether low vascularization leading to low drug delivery confers PDAC chemoresistance. This will enable me to identify the drug concentrations needed to inhibit cell growth. Next, I will investigate whether low vascularization leading to ischemia results in PDAC chemoresistance. I will carry out these experiments using a Metabolic Microenvironment Chamber (MEMIC)—a custom 3D-printed ex vivo cell culture device that allows replication of in vivo nutrient and waste product gradients. Lastly, I will investigate whether the high infiltration of tumor-associated macrophages and fibroblasts confers PDAC chemoresistance. To do so, I will use 2D PDAC co-cultures. In all cases, I will identify chemoresistant effects by measuring cell growth following chemotherapy treatment, relative to a control. After testing PDAC microenvironment factors individually in this study, in the future we can assess these factors in combination. Combined testing would allow identification of potential cumulative effects and pinpoint the most chemoresistant PDAC environment. Overall, this project will advance PDAC treatment strategies by providing a better understanding of how the tumor microenvironment protects PDAC from chemotherapy.

The Impact of Body Diversity of Female Media Characters on Preadolescent Self-esteem: An Assessment of Children’s Television Content

Jasmine Kwak, Psychology, Sociology
Sponsor: Dr. Mariana Diaz Wionczek, Graduate School of Arts and Science, Psychology

Despite growing numbers of media consumption among children, there is still a shortage of programs geared specifically for preadolescents and a corresponding lack of formative research on their television-viewing habits. This manuscript reviews recent research on female characters portrayed in current children’s television programs and examines how the glorification of female thinness that is most frequently perpetuated in Anglo-Saxon media has detrimental effects on self-esteem among preadolescent girls. Data from four studies showed greater body dissatisfaction among preadolescents engaged in peer discussions on body image. Cultural diversity on screen can combat the Western thin ideal not only by encouraging more diversity in appearance but also by shifting the focus of the narrative.
from female characters’ appearances to cultural identities, peer conversations veer away from topics on body image.

Serial Block Face Scanning Electron Microscopy of Host-pathogen Interactions in the Microsporidian Species *Encephalitozoon intestinalis*

Cherry Lam, Biology  
*Sponsor: Dr. Noelle Antao, NYU School of Medicine, Skirball Institute of Biomolecular Medicine*

Microsporidia are single-celled, obligate intracellular parasites closely related to fungi. In our research study, we focus on the human-infecting microsporidia *Encephalitozoon intestinalis*, which infects the gastrointestinal lining of the small intestines. As obligate pathogens, microsporidia have evolved highly reduced genomes and must siphon metabolites from the host for successful replication and development. However, we do not understand how microsporidia exploit their intracellular niche in order to survive and propagate. To better understand the physical niche that parasites occupy in the host, we used serial block face scanning electron microscopy (SBFSEM) to generate a three-dimensional reconstruction of the intracellular niche of infected host cells, which allows us to examine the interactions between microsporidia and host cell organelles at nanometer resolution. Analysis of the datasets through three-dimensional reconstructions revealed that the host cell nucleus, mitochondria, and endoplasmic reticulum are in close proximity to the developing parasites. One potential hypothesis for why *E. intestinalis* may be developing near the mitochondria is, because of its highly reduced genome, the parasite lacks a functional mitochondria that can perform oxidative phosphorylation. Therefore, it may use the host cell mitochondria for the energy it needs to survive and replicate. A potential reason for why it may be near the endoplasmic reticulum are for proteins, and a reason it may be near the nucleus are for lipids or fatty acids. These data provide insights into the host cell niche that the parasite occupies and sets the stage for further study of host-parasite interactions.

Learning about Consequences for Locomotion: Individual Differences in Crawling and Walking into a Deformable Foam Pit  
Yolanda Liu, Psychology  
*Sponsor: Professor Karen Adolph, Psychology*

Researchers’ intuitions about infants’ behavior are often based on an adult-centric view. For example, based on adults’ typical responses, we assume that falling is aversive, people walk to arrive at destinations, and a narrow bridge over a high precipice is scarier than over a low precipice. But, research with infants proved researchers’ intuitions wrong: Infants do not find falling aversive (Han & Adolph, 2020); they do not walk to get to destinations (Hoch et al., 2019); and they treat high and low bridges the same (Kretch & Adolph, 2013). In prior work with adults, falling into an unexpected foam pit was aversive (Joh & Adolph, 2006). In this case, do infants share adults’ view of the world? We tested 20 infants every three weeks from 10.5–15 months in “baseline” trials on a solid raised walkway interspersed with “foam-pit” trials, where the middle of the walkway was replaced with a deformable foam pit that disrupted ongoing locomotion. Preliminary data from 10 infants showed striking individual differences in infants’ responses to the foam pit, but all learned the consequences for locomotion. Machine learning clustered 5 infants as “pit-wary” and 5 as “pit-brave”. Pit-wary infants showed increased negativity, requests for help, touching, and latency, and they avoided crossing the foam pit. In contrast, pit-brave infants showed no change in emotions or requests and modified their strategies to cross the foam pit. Thus, infants can learn the consequences for locomotion but do so in distinctly unadult-like ways.

Political Orientation and Its Effects on Responsibility to Address Inequality  
James Lo, Psychology  
*Sponsors: Riana Brown, Psychology; Professor Maureen Craig, Psychology*

The US is a multiethnic society where many racial disparities exist. In this country, white people have the power to respond to these racial disparities. What leads white people to see themselves as personally responsible (or not) for addressing racial inequality and why? Furthermore, how does political orientation influence white Americans’ responsibility perceptions of themselves and their racial ingroup members? Recent work finds that liberals disassociate with their white identity when connecting white-ness to Trump (Dai, 2021). Do white liberals differ in ratings of personal responsibility to address racial inequality compared to ratings of group-based (white) responsibility to dismantle racial inequality? To test this question, we had white American participants report how much responsibility they perceive themselves, personally, and white people have to reduce and address racial inequality. Results showed that white liberals and moderates rated themselves as more responsible to address racial inequality (compared to conservatives) but rated white people as more responsible than themselves personally. In contrast, white conservatives rated themselves as less responsible than liberals and moderates but rated the responsibility of white people equally to their own level of personal responsibility. In the future, we hope to conduct research that investigates why white liberals and moderates feel less responsible than their racial ingroup members and if they may disidentify from their racial ingroup.
First Offer, Worst Offer?: Analyzing the Outcome of a First Offer When Negotiating with a Moral Violator

Ashley Lopez, Psychology
Sponsor: Professor Tessa West, Psychology

Negotiations require people to work together in order to achieve a mutually beneficial outcome for both parties (De Dreu, 2010). Yet, no work to date has explored how people behave when they have to work together with someone who is immoral. Prior research 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 (Kawakami, Dunn et al., 2009; West and Thorson, in prep). Therefore, I aim to address this gap in the literature by examining the following questions: 1) When tasked with working with a moral violator, who makes the first offer in the negotiation? 2) Are those who make the first offer more likely to win or lose? Participants (N = 200) were recruited for an online study in which they engaged in a negotiation with an immoral (or control) partner. I predicted that participants paired with a moral violator would be less assertive, leading them to make the first offer and be less likely to win the negotiation. Contrary to my hypothesis, participants with immoral partners were less likely to make the first offer and marginally more likely to win the negotiation compared to immoral partners. These results suggest that participants paired with immoral partners may have shown more dominance in the negotiation compared to the partners. This work has important implications for the interpersonal effects of immoral behavior and the influence of moral information on people working together.

Semantomorphic Syntax: 3D Arrangement of DNA Tensegrity Triangles within a Hexagonal Lattice Using Mismatched Sticky Ends

Brandon Lu, Chemistry
Sponsors: Professor Yoel Ohayon, Chemistry; Simon Vecchioni, Columbia University, Fu Foundation School of Engineering and Applied Science

The tensegrity triangle is a DNA nanostructure with helices that propagate in three dimensions, self-assembling to create a rhombohedral crystal lattice using complementary sticky end overhangs. A noncomplementary 5'-AG and 5'-TC mismatch in the sticky end instead results in large, needle-shaped crystals in the P63 hexagonal space group. We hypothesize that the hexagonal shape of the lattice is due to the DNA double helix bending at a crossover position, a departure from the linear double helices in the rhombohedral tensegrity triangle. Rather than propagating in a straight line, each double helix twists in a left-handed meta-helix-like structure in that direction. The small shift in sticky end sequence underscores the huge alteration in the phenotype of the crystal structure. A sequence change at the end of the motif results in a perturbation throughout the helix, highlighting the importance of the sticky end regions of DNA structures. Based on conventional wisdom, these mismatches should not allow for the continued propagation of the triangles in each direction. However, this pattern appears to be stable. Throughout multiple runs, solely hexagonal crystals formed, indicating the stability and predictability of this design. The ability for mismatched sticky ends to allow for cohesion between triangles is a novel discovery in a field where a single mismatch can disrupt structural formation due to the inability to hydrogen bond. This sheds light on the viability of predictable non-Watson-Crick interactions for designing more diverse structures. In this way, we aim to investigate the usefulness of non-Watson-Crick pairing in controlling long-range architectures in topological self-assembly, and further create a library of mismatched sticky ends to increase the syntactic diversity of semantomorphic design.

Amygdala Projections to the Nucleus Accumbens Medial and Lateral Shell

Sumaita Mahmood, Global Public Health/Chemistry
Sponsor: Professor Adam Carter, Neural Science

The main purpose of this project is to better characterize basolateral amygdala (BLA) projections to the medial and lateral shell subdivisions of the nucleus accumbens (NAc). This will be achieved with neuroanatomical tracing experiments, involving stereotactic injections of retrograde tracers, immunohistochemistry, and microscopy techniques. The BLA sends afferent projections to both medial and lateral subregions of the NAc and relays sensory information there to guide approach and avoidance behaviors. Preliminary data obtained in the lab indicates that two spatially segregated, non-overlapping populations of BLA neurons project to these subregions. This project aims to further characterize these neurons by identifying their cell type. Previous research indicates that different populations of BLA neurons can be tagged with cellular markers like cholecystokinin (CCK) and protein phosphatase 1 regulatory subunit 1B (PPP1R1B). To identify the cell type of NAc projecting neurons, I will inject two different fluorescent tagged retrograde tracers into the NAc medial and lateral shell. I will then cut brain slices that include the BLA, image these slices on a confocal microscope and will determine the spatial organization and overlap of the retrograde tracers with CCK and PPP1R1B. CCK and PPP1R1B neurons are thought to relay distinct signals to the NAc, therefore identifying the cell type of NAc projecting BLA neurons will give critical insight into the possible functional roles of these circuit connections.
Moving Language: Mothers’ Verbs Correspond to Infants’ Real-time Locomotion
Ramya Manikkan, Psychology, Studio Art; Anabelle Rampersaud, Psychology, Studio Art
Sponsors: Professor Karen Adolph, Psychology; Dr. Kelsey West, Psychology

How do infants learn language? Infants can only learn the words that they hear. So, we are testing whether infants’ motor actions—how they move about and interact with objects—shape the words that caregivers say. Prior work showed that compared to crawling infants, walking infants travel greater distances at faster speeds. Does walkers’ enhanced locomotion influence the verbs they elicit from their caregivers? We are documenting whether and how walking opens up new opportunities for infants’ verb learning. We observed 48 infants (16 13-month-old crawlers, 16 13-month-old walkers, and 16 18-month-old walkers) and their mothers during two hours of natural daily activity at home. We identified the locomotor verbs that mothers said—that is, verbs pertaining to infant locomotion such as “come”, “go”, “bring”, and “walk”. Additionally, we identified bouts of infant locomotion—the frequency and duration of infants’ crawling and walking. Our preliminary findings show that walking infants hear twice as many locomotor verbs compared to same-aged crawlers. We are currently testing whether this difference in locomotor verbs is explained by how much babies locomote during everyday activity. Our findings will shed light on how infants’ motor actions shape the words they hear from caregivers, and potentially the words they ultimately learn.

Cell-autonomous Lineage Tracing for Neuroblasts in the Drosophila Optic Lobe
Andy Mao, Biology
Sponsors: Dr. Jan Slabbaert, Biology; Professor Claude Desplan, Biology

Cell fate choices are controlled by an interplay of transcriptional factors that regulates diverse gene-regulatory-programs in a cell-specific manner. To understand what mechanisms undifferentiated cells undergo to obtain corresponding identities and functions in the whole system during different stages of growth help us gain a better perspective regarding cell biology. Our brain is by far the most complex organ and the process by which few neuronal progenitor cells lead to the diversity of neurons and glia remains a debated topic. In this project I will focus on neurogenesis in Drosophila, a genetic model organism whose neural system share essential similarities with that of mammals. The overall goal of the project attempts to establish an unbiased method to trace lineages in the optic lobe. We will base ourselves on a recent method in zebrafish, GESTALT, that uses the CRISPR/Cas9 system to label lineages uniquely. My specific aims are 1) Optimization of the GESTALT expression pattern, 2) Optimization of GESTALT activity, and 3) Lineage trace the optic lobe lineages. In aim 1, I want to verify the exclusive expression of Cas9 in stem cells. Immunostaining is applied to visualize where and how much Cas9 is expressed in the optic lobe. In aim 2, I will regulate the expression and efficiency of CRISPR/Cas9 systems with the use of region-specific Gal4 lines or use temperature as variables. Finally, we will use our findings to specifically target the optic lobe lineages. In conclusion, our work provides an optimized toolkit to analyze neuronal lineages with unseen resolution.

Stochastic Labeling and Activation of Neuronal Subsets in Drosophila
Ashley Medina, Neural Science
Sponsor: Professor Katherine Nagel, NYU School of Medicine, Neuroscience and Physiology

For survival, organisms must be able to find food, and several do this by tracking down the sources of odor stimuli. This odor stimuli are carried by wind, forming a plume of odorant molecules that Drosophila is then able to integrate and use in order to orient their bodies and fly towards the food source. I have set out to understand the neuronal processes behind this behavior in this organism. To do so, I utilized the gal4/UAS system, a genetic system within Drosophila that allows the expression of only certain cells. In order to increase specificity of cell labeling, I then combined this system with a brand-new technique that stochastically labels cells within a certain cell type. This allowed me to visualize the neurons responsible for this survival tactic as well as elicit behavioral experiments that activated the cells labeled. By comparing the visuals with the behavior, I was able to learn more about the type of cells that allow this organism to find food. Moving forward, this project will lead to a more complete understanding of the neural circuity behind this important behavior, giving us computational insight into how organisms are able to use environmental cues in order to navigate their environment and to learn more about the type of cells that allow this organism to find food.

Einstellung Effect in Groups; Cognitive Bias in Problem-solving and Creativity Tasks
Faya Movchan, Neural Science, Psychology
Sponsor: Professor Pascal Wallisch, Center for Data Science

We are interested in how performance scales as a function of group size. This question has been studied in a variety of settings including intelligence and coding. However, it has not been investigated in the domain of creative problem solving. We use a group version of the classic “Einstellung” paradigm to assess the role of group size in creative problem solving. We discuss the effects of group
composition on performance in creative problem-solving tasks.

The Perceptual Basis of Diagnostic Disparity
Emmanuel Omotayo Ologundudu, Psychology; Rachel Jacobson, Anthropology
Sponsors: Gustav Lundberg, Psychology; Professor Jon Freeman, Psychology

Decades of medical researchers have suggested that minorities in the US have far worse health outcomes than white Americans. In line with this, recent studies in social psychology have found that perceivers show a bias in pain perception, perceiving pain more readily in white faces than Black faces. Given alarming data suggesting that Black Americans are some of the most negatively impacted by the COVID pandemic, we aimed to investigate how perceptual bias based on target race might influence sickness perception or the ability to correctly diagnose a target individual as being sick. To tackle this issue, we constructed vignettes that contained varied statements by sickness severity (e.g., no symptoms, mild, moderate, severe symptoms) while pairing them with race specific visual cues—the perceived sickness scale was based on medical research and diagnostic criteria. We had our vignettes rated by perceivers without the presence of visual cues to measure the accuracy of variable symptomatology by severity before combining them with pre-rated faces gathered from the Chicago Face database. Vignettes of identical symptoms were then paired with white and Black faces. To assess whether there is a perceptual bias based on target race, we asked MTurk participants to rate targets and symptoms on a Likert scale ranging from 0 (not sick) to 6 (very sick). In the likelihood such bias is found, future studies should implement mouse tracking studies to better understand implicit processes through real time dynamics of social cognition (Stillerman & Freeman, 2019).

Uncovering the Role of a Novel Protein Kinase A (PrkA) in Bacterial Sporulation
Grace Pan, Anthropology, Biology
Sponsor: Professor Patrick Eichenberger, Biology

The formation of spores enables bacterial pathogens such as B. anthracis and C. difficile to lie dormant for extended periods of time and evade antibiotic treatment. While there is a pressing need for the development of therapeutic approaches to eliminate such spore-forming pathogens from clinical settings, the understanding of most genes required for sporulation remains incomplete. I investigate the role of a protein kinase A (PrkA) in spore formation using a genetic approach in the model organism Bacillus subtilis. To investigate the role that PrkA may play in spore formation, I tested whether mutants in prkA produced spores with altered properties. First, I performed β-galactosidase assays to measure the activation of the sporulation specific sigma factors σG and σK in a prkA mutant. I found that a deletion of prkA decreased σG and σK activity during the middle to late stages (hours 4–6) of sporulation. Second, I used spore heat resistance assays to determine the impact on spore formation of a deletion of prkA alone and in combination with other genes. My results identified a modest synergistic interaction between prkA and its flanking gene yhbH, which exhibits a similar transcription profile during spore development. Third, I tracked the dynamic localization of PrkA during sporulation using fluorescence microscopy with a PrkA-GFP protein fusion. The results imply that PrkA is neither a spore coat protein nor a structural component of the mature spore. As PrkA is a kinase, I hypothesize that it may be involved in an aspect of signaling related to sigma factor activation and/or phosphorylation of spore coat proteins rather than directly contributing to spore structure. These findings have opened a potential research avenue on a previously unknown sporulation pathway involving PrkA.

Influenza Diagnostic Test
Neelam Pandya, Chemistry; David Sung, Chemistry/ Chemical & Biomolecular Engineering
Sponsor: Professor Jin Kim, Tandon School of Engineering, Chemical and Biomolecular Engineering

The demand for at-home detection kits for the diagnosis of the influenza virus has quickly grown due to the ongoing impact of the COVID-19 virus, which shares many of its symptoms with the influenza virus and has caused over 1.71 million deaths worldwide. Due to the pandemic and its resulting shortages of testing centers and high infection rates in doctor’s offices and hospitals, individuals are unable to receive diagnoses for either the flu or COVID-19. With symptom-based self-diagnosis being the only readily available diagnostic resource, there is the associated uncertainty of whether infection is caused by the flu or COVID-19, thereby increasing the complexity surrounding the global pandemic. And, while many at-home diagnostic tests are available for the diagnosis of these two viral infections, they either are too costly for the average individual or require results to be sent to outside laboratories for analysis. To combat these limitations and help promote diagnosis for all individuals, innovative synthetic biology alternatives were explored. Though not tested yet due to closed laboratories, a possible viral diagnosis mechanism explored by our team was the use of toehold switches and their reporter genes in transformed bacteria. Further research elucidated that this mechanism can best be displayed for favorable user interaction on a paper based lateral flow device. Future work includes conducting computational and experimental analysis on the efficacy of the toehold switch mechanism in detecting influenza and ultimately organizing the scheme onto a lateral flow device capable of being used by the general public.
Systematic Use of Attentional Strategies while Running: Understanding the Role of Attentional Strategies in Running Performance
Joshua Pesantes, Psychology
Sponsor: Professor Emily Balcetis, Psychology

Physical activity is key to good health, but rates of inactivity are high. I test whether an attention-based mechanism, when used strategically, is related to improved physical activity. Specifically, I test the relationship between physical activity and the use of narrowed and broad attention while exercising and its relationship to performance in running. I hypothesize that individuals who strategically shift from using broad to narrowed attention as running tasks come to a close are those who are more likely to engage in the most intense exercise and are those who are most fit. Results show that runners strategically shift from using broad to narrowed attention as races go on. Furthermore, this shift was found to be stronger for runners who average faster running paces and those who were in better physical condition. We discuss implications of these findings regarding their capacity to inform intervention strategies to enhance exercise performance alongside future directions for this field of research.

Assessment of Remote Memory through Spontaneous Spoken Recall and Natural Language Processing in Temporal Lobe Epilepsy Patients
Haley Peters, Biology
Sponsor: Professor Anli Liu, NYU School of Medicine, Neurology

Introduction and Background: Memory dysfunction is the chief complaint of patients with temporal lobe epilepsy (TLE), but current models and memory assessments may be insensitive to subtle memory dysfunction, especially for event-related memory. To probe for remote memory, we administered a Famous Face task and then analyzed depth of subject recollection using a Natural Language Processing approach. Given that seizure networks overlap with mesial temporal memory structures, we hypothesized that TLE patients would report fewer details than healthy controls. 38 subjects (19 LTLE, 9 RTLE, 10 healthy controls) were included. Subjects were shown 20 famous faces in politics, sports, and media and then asked to spontaneously recall as much biographical detail as possible. To control for speech output, 29 subjects (9 LTLE, 5 RTLE, 15 healthy controls) completed the Cookie Theft task. Subject responses were transcribed in a manner blinded to the subject diagnosis. We ran an NLP algorithm (spaCy) to count the number of total words, content words, interjections, repetitions, and pauses. The number of accurate biographical details were then measured against a human-generated and automated keyword dictionary. There were no differences in age, gender, or education level between LTLE, RTLE, and healthy subjects in the Famous Face task, though healthy controls were younger by a few years in the Cookie Theft task. LTLE patients generated fewer biographical details than RTLE patients, using a human-generated keyword dictionary (p=0.034), although there were no differences in total and content words in the Cookie Theft task. LTLE patients appear to remember fewer biographical details in a remote memory task, which cannot be explained by decreased speech output alone. Our findings suggest that spontaneous spoken recall analyzed with NLP algorithms could be a powerful and sensitive method of assessing remote memory function.

The Effects of Intraminority Discussions about Race on Collective Action
Maureen Petica, Psychology
Sponsors: Ashley Berkebile-Weinberg, Psychology; Professor Tessa West, Psychology; Professor Maureen Craig, Psychology

Since the development of contact theory (Allport, 1954), research has shown that intergroup contact is an effective mechanism for improving majority group members’ intergroup attitudes (Pettigrew & Tropp, 2011). However, it can also decrease minority group members’ desire to take collective action on behalf of their own group (Dixon et al., 2010). In this study, we examined the potential of sharing about experiences of discrimination to increase both positive outgroup attitudes and collective action intentions. 192 Asian female students participated in the Fast Friends Procedure (Aron et al., 1997) with a Black confederate and were assigned to discuss either discrimination or culture (control). Afterwards, participants completed a questionnaire measuring their outgroup attitudes and willingness to take part in collective action. Results indicate that there was no difference in attitudes toward Black people after discussing discrimination (z-scored; M = 0.07, SD = 0.98) compared to discussing culture (z-scored; M = -0.07, SD = 0.87, t(190) = 1.08, p = .30). Additionally, there was no difference in willingness to engage in collective action after discussing discrimination (M = 5.42, SD = 1.03) compared to discussing culture (M = 5.39, SD = 1.08, t(190) = .03, p = .87). Overall, intraminority discussions about discrimination compared to culture do not seem to have an effect on intentions to engage in collective action nor outgroup attitudes.

Effort versus Ability Stereotypes in School-aged Children
Clara Plutzer, Cinema Studies, Psychology
Sponsors: Dr. Jillian Lauer, Psychology; Professor Andrei Cimpian, Psychology

Researchers have studied stereotype-driven attribution patterns, which we refer to as effort-ability stereotypes, in adulthood (e.g., Kiefer & Shih, 2006; Siegle et al., 2010; Swim & Sanna, 1996), finding that adults tend to attribute...
women’s intellectual achievement to effort, as opposed to talent, more so than men’s. For women, effort-ability stereotypes could harm their motivation to pursue STEM academically (Smith et al., 2013), contributing to gender disparities in STEM participation. Prior research on this topic has focused on adult participants; adults endorse effort-ability stereotypes when reasoning about the sources of children’s achievement, suggesting that children are likely exposed to these stereotypical messages about their own success. For example, both parents and teachers have been shown to attribute a boy’s math success to natural talent, whereas for girls math success is attributed to focused effort (e.g., Espinoza et al., 2014; Fennema et al., 1990; Madon et al., 1998). By the sixth grade, girls think they need to put more effort to succeed in math than boys do (Pinxten et al., 2014), suggesting that effort-ability stereotypes may have been incorporated into children’s self-concepts by middle school. However, no studies have directly addressed this possibility prior to early adolescence. This project, consisting of two studies, aims to understand the development of these effort-ability stereotypes, specifically when they manifest in development (Study 1), and it will attempt to understand the potential impact of these stereotypes on kids’ motivation and attitudes towards pursuing STEM. In Study 1, 158 kids ages 6–10 were sampled, and we found that children associated effortful success with women more so than men; p = .004. This research will also aid in the development of educational tools and teaching methods to enhance math learning and engagement for students.

Parallel Computing Framework for Molecular Simulations
Daniela Puchall, Computer Science
Sponsor: Professor Glen Hocky, Chemistry

Computational chemistry complements experimental data to determine molecular properties that are difficult to analyze physically. Molecular simulations often contain large datasets and complex computations that lead to long simulation runtimes. Parallel computing can be utilized to improve molecular simulation performance by permitting a program to run multiple simulations concurrently, increase efficiency, and reduce run time. In this project, a Python framework for parallel computing on colloidal structures and polymer simulations was developed by implementing Parsl, an open-source parallel programming Python library that manages concurrent task execution. The new framework overlays the generated input and output files and utilizes parallel computing principles to address how simulation submissions to the server are allocated. By integrating parallelism, a more streamlined procedure for running multiple simulations concurrently can be generated. A model framework was developed for Lennard Jones (LJ) particle simulations (HOOMD-Blue). In the command line, simulation specifications of system type (LJ, Kob Anderson, or Wahnstrom systems) and variables value(s) for parameters such as epsilon, sigma, number of particles, and temperature are defined. Parameters are easily modified and multiple parameter values for a system can be submitted once. All permutations of variable inputs are run for the system in parallel and results are distributed into unique directories. The model framework can be implemented for other system models and parameters. This new application of Parsl will allow simulations to run more efficiently and develop a better understanding of how parallel computing can be used to improve molecular systems simulation efficiency.

Conceptualizing Status and Its Contributing Factors
Jess Qiu, Psychology
Sponsor: Professor Andrei Cimpian, Psychology

There is little doubt that the concept of “status” and its effects have been widely studied in a social-psychological context. However, the term has not been uniformly defined across these studies—for example, some studies attribute status to socioeconomic factors such as occupation and annual income, while others value demographic factors such as race and gender. This variance is likely due to different understandings of what contributes to status, which can in turn cause inconsistencies when interpreting findings across multiple studies that assess status. In order to develop a comprehensive account of how people conceptualize status, we examined the existing status literature to obtain common factors that are used to measure and define status.

Methods and Applications of Matrix Inversion
Jason Rader, Mathematics; Yaroslava Kyrychenko, Mathematics, Psychology
Sponsor: Professor Gerard Ben Arous, Mathematics

Social media has become an essential part of politics in the US. Despite having its problems, online political engagement provides us with new ways to study how peo-
Exoplanet Search Algorithms Using Resonant Chains as a Statistical Booster

Anu Raghunathan, Mathematics/Mechanical Engineering
Sponsor: Professor David Hogg, Physics

As of March, 2021, more than 4,690 confirmed exoplanets—planets around other stars—have been discovered in 3,465 planetary systems with 771 systems containing more than one planet (Extrasolar Planet Encyclopedia). There are numerous ways of finding and cataloguing such extrasolar planets. This project will focus on “transit photometry”, which measures drops in starlight brightness as a function of time, which occur when a planet is oriented so that its transit periodically passes in between the star and the monitoring telescope—a method which has delivered the largest raw number of exoplanets to date. Specifically, this project concerns our ability to statistically find transiting exoplanet signals in stellar data with the end goal of finding new planets around other stars and will act as a pedagogical treatise on the mathematical and statistical methods used. We focus on mass shootings, as gun control is a highly discussed and polarized topic on Twitter. By periodically sampling and averaging over ideological clusters, we can understand how crises change the views of those with previous political affiliations.

The Effect of Transcranial Electrical Stimulation on the Neural Activity of the Cerebellum

Ramia Rahman, Neural Science
Sponsors: Professor Eric Lang, NYU School of Medicine, Neuroscience and Physiology; Dr. Billur Avlar, NYU School of Medicine, Neuroscience and Physiology

Transcranial electrical stimulation of the cerebellum may facilitate neural repair for those suffering from Traumatic Brain Injury (TBI) and has been shown to be involved in learning and recovery for individuals with TBI but little is understood of how this stimulation affects neural activity in facilitating recovery of function. We will investigate this in rodents by electrically stimulating the cerebellar cortex while extracellularly recording from the cerebellar nuclei, the output station of the cerebellum. AC electrical stimulation of various frequencies and intensities will be tested to determine how these factors may influence activity. Initial data indicates that cerebellar nuclear cells modulate with the applied stimulation frequency in a frequency dependent manner. In addition, the phase relationship of the activity and stimulus varied between cells, with some cells most active during the peak of the stimulation and others during the rising phase of the stimulation. Moreover, there are different classes of cerebellar nuclear cells, which have distinct firing rate ranges and projection targets. We have found that cells with higher firing rates seem to have a greater change in their firing patterns (measured by the coefficient of variation) from nonstimulation to stimulation periods, suggesting that stimulation affects this class of cells preferentially and thus would affect a subset of the brain regions downstream of the cerebellum. Additionally, histology will be used to determine the recording location in order to confirm the cell type. These findings are an initial step in understanding how electrical stimulation of the cerebellum affects the neural activity and output of the cerebellum. This information will help guide the search for optimal parameters of electrical stimulation for treatment of Traumatic Brain Injury (TBI).

Remote Memory in Subjects with Epilepsy and Healthy Controls

Sanya Rastogi, Neural Science
Sponsor: Professor Beth Leeman-Markowski, NYU School of Medicine, Neuroscience and Physiology

The phenomena of anterograde and retrograde amnesia (the inability to form new memories or recall past information, respectively) have fascinated clinicians for over 100 years as they have provided much insight into the neural processes underlying memory formation, consolidation, and recall. Many people with epilepsy face such memory impairments. Patients with temporal lobe epilepsy (TLE) especially often demonstrate memory dysfunction in the setting of otherwise normal intelligence. Though anterograde memory deficits are well documented in pa-
Genomic Stability and Cell Growth in TET 1/2/3 Triple Knockout MEFs
Lipi Raval, Biochemistry
Sponsor: Professor Mamta Tahiliani, NYU School of Medicine, Biochemistry and Molecular Pharmacology

Methylation of DNA allows for gene regulation and differentiation between DNA strands, and so it has been studied intensely for its long-reaching repercussions. DNA demethylation, however, was thought to be a passive mechanism unremarkable in its role in DNA replication and the genome at large until recent research showed that demethylation, specifically de novo demethylation, was an important mechanism regulated by ten-eleven translocation enzymes, or TET enzymes. These enzymes generate oxidized methyl-Cytosines which promote demethylation and, as studies suggest, are important for how cells respond to stress experienced during DNA replication. My research asks how the absence of TET 1/2/3 enzymes affects how fast mouse embryonic fibroblasts (MEF cells) grow both in primary MEFs and MEFs transformed with large T antigen or immortalized MEFs. This is done by using the CRE-LoxP (Tamoxifen) system to knock-out, or delete, the TET-encoding genes. Using tissue culture and cell counting methods, I maintain the cell lines and quantify the growth of the TET knock-out cells and control cells. I expect to see a notable difference in the rate of cell growth between tamoxifen-treated (knockout) cells and untreated (control) cells, where tamoxifen-treated (knockout) cells exhibit slower proliferation and die earlier (after fewer generations). The implications of this research involve proving that de novo demethylation mechanisms of TET enzymes in MEF cells have repercussions on the stability of the genome itself. Further research will tackle the question of the catalytic roles of TET enzymes.

Using Natural Intraspecific Variation to Determine the Functional Relationship between Larval Phenotypes and Predation Rate in S. benedicti
Carolina Rios, Biology
Sponsor: Professor Matthew Rockman, Biology

Marine ecologists are interested in the diversity of modes of larval development of benthic marine invertebrates. Planktotrophic larvae are born in large numbers from small eggs, requiring relatively less energy investment from the parent, and feed in the water column until metamorphosis. Lecithotrophic larvae are born in small numbers from larger eggs, requiring a greater energy investment from the parent, and settle directly into the benthos. Beyond body size, planktotrophic larvae also have distinct morphological features lost during metamorphosis that vary from lecithotrophic larvae. One common feature in planktotrophic larvae is the presence of chaetae. This has been proposed to be a method of larval defense against size-selective predators by increasing the size of the larvae. Streblospio benedicti are a marine polychaete that occur naturally in populations of either planktotrophic or lecithotrophic larval developmental modes. The unique genetic components of larval size and morphology in S. benedicti allow us to investigate the effect of larval phenotypes on the rate of predation independent of larval size. We will test whether the presence, length, and number of larval chaetae influence the survivorship of S. benedicti larvae exposed to predation (Aim 1). In addition, we will test whether predation pressure will result in changes in allelic frequencies of loci found in previous studies to be associated with chaetae morphologies (Aim 2). The goal of this research is to test the influence of the diversity of different larval phenotypes of benthic marine invertebrates on ecological fitness.

Do Famous Scientists in Children’s Books Portray Growth or Fixed Mindsets about STEM? Implications for Diversifying STEM
Maya Sacasa, Comparative Literature, Psychology; Diego Martínez Ortiz, Italian, Psychology
Sponsors: Professor Andrei Cimpian, Psychology; Dr. Jessica Gladstone, Psychology

This project aims to examine the motivational messages present in children’s books about famous scientists. Broadly, we are interested in whether scientists (i.e., role models) are portrayed in ways that are relatable and motivational for children or, alternatively, in ways that decrease children’s motivation for science, technology, engineering, and mathematics (STEM). Specifically, we aim to create a theoretical framework for understanding the extent to which popular children’s science biographies convey a fixed or growth mindset about STEM ability and interest. Furthermore, we will investigate whether the motivational messages in these books differ based on the gender and race/ethnicity of the protagonist. We will code a random
selection of 300 books from Amazon's top 1,000 selling children's science biographies for motivational phrases that represent the protagonist (i.e., scientist) as someone with a fixed mindset about their abilities and interests in a STEM domain (e.g., the protagonist had an innate talent and/or interest in a STEM domain) or as someone with a growth mindset (e.g., the protagonist developed their abilities and/or interests in a STEM domain). Prior research found that role models described as having a growth (vs. fixed) mindset in math increased confidence and interest among groups that are traditionally underrepresented in STEM (see Gladstone & Cimpian, 2020, for a review). Thus, how STEM ability and interest are portrayed can have an effect on whether success seems attainable. Given the popularity of these books, it is important to understand what motivational messages are portrayed.

Effort-ability Gender Stereotypes in Children
Julie Samuels, Biology
Sponsors: Professor Andrei Cimpian, Psychology; Dr. Jillian Lauer, Psychology

Adults commonly believe that men succeed in math by relying on innate talent, whereas women succeed in math by dedicating significant effort to their work (e.g., Espinoza et al., 2014; Tiedemann, 2000). Empirical evidence suggests that this stereotype attributing women's math success to their effort, rather than their abilities, may deter women's motivation to pursue math-intensive academic fields (Smith et al., 2013). In this work, we examined whether children, like adults, possess these gender stereotypes, reporting that women’s math achievements stem from effort while men’s math achievements stem from natural ability. Among 100 6- to 10-year-olds, we found that children, and particularly girls, associated effortful success with women significantly more than men (p < .01). However, only boys attributed success obtained through ability with men more than women (p < .05). There were no effects of age on children’s stereotype responses (ps > .20). These results suggest that children likely endorse the stereotype that women succeed in math through effort whereas men succeed via their innate talents. Furthermore, these results suggest that gender stereotypes about the roles of effort and ability in math success emerge within the first few years of schooling and thus may be influential in shaping children’s attitudes towards math early in life.

Gaining a Temporal Understanding into the Necessity of Protein Synthesis in Aversive Memory Retrieval
Karen San Agustin Ruiz, Neural Science
Sponsors: Professor Prerana Shrestha, Stony Brook University; Neurobiology and Behavior; Professor Eric Klann, Neural Science

Memory is at the center of who one is as a person, and yet, we do not quite understand how it is encoded or how memory retrieval works. Previous research has shown that memory consolidation requires continual de novo protein synthesis. However, the role of de novo protein synthesis in the complete temporal timeline that follows memory consolidation and enters memory retrieval is not yet firmly established. The primary goal of this study is to gain a temporal understanding into the necessity of de novo protein synthesis in neurons of the medial prefrontal cortex (mPFC) and lateral amygdala (LA) as time passes. A temporal understanding will provide us with a specific timeline as to when aversive memories are most reliant on protein synthesis in order to be consolidated, the process that converts short-term memories into long-term memories and allows for retrieval. Blocking protein synthesis immediately after training and then testing memory retrieval at various time points allowed me to pinpoint where memory retrieval fails: remote time periods. This study’s findings suggest that the mPFC begins protein synthesis immediately after training and it is required for proper remote memory retrieval. The implications of this study provide evidence to back up the systems consolidation theory and further evidence for the bidirectional feedback loop between the mPFC and the LA.

Multipotent Stromal Cell Derived Exosomes Promote Angiogenesis
Sonali Sharma, Biology
Sponsor: Professor Piul Rabbani, NYU School of Medicine, Plastic Surgery

Cutaneous wound healing involves a vast number of regenerative processes that are necessary but often impaired in metabolic diseases such as diabetes mellitus resulting in chronic wounds. Angiogenesis and neovascularization are key processes that are activated in response to wound healing but are shown to be compromised in diabetic wound repair. Recent findings uncover the efficacy of multipotent stromal cell (MSC)-derived exosomes in promoting wound repair in murine models. However, a mechanistic understanding of how these secreted membranous extracellular nano-vesicles impact wound repair is yet to be understood. In this study, we aim to uncover the functional role exogenous application of MSC-derived exosomes have on regenerative endothelial cell function in vitro, primarily on angiogenesis and neovascularization. Cytodex beads, which serve as a base for cells to branch from, were coated with endothelial cells from either murine lines or human lines and treated with or without MSC-derived exosomes prior to embedding in the three-dimensional fibrin gel cultures. The gels were seeded using a density of 400 cells/Cytodex beads and 250 Cytodex beads/fibrin gel matrix for 3 days at 37° C at 5% CO2. Gels were imaged and analyzed at T=0, 16, 24, 48, and 72 hours, Image J software was used to quantify the area of arborization (branching). Preliminary findings
show that exogenous treatment of endothelial cells with MSC-derived exosomes enhances neovascularization as demonstrated by an increase in endothelial cell sprouting, or ‘arborization’, after 72h incubation over control-treated cells. Statistical significance of the preliminary findings is yet to be determined due to paucity of data. The findings reported through this study show the promise of exogenous treatment of MSC-derived exosomes in promoting endothelial cell neovascularization and support the need for further investigation as a potential therapy for chronic wounds.

Functional Analysis of T cell Receptor Mutants That Affect Extracellular TCR-CD3 Interactions

Hye Won Shin, Global Public Health/Chemistry
Sponsor: Dr. Aswin Natarajan, NYU School of Medicine, Pathology

While advances in immunotherapy have led to new treatments for patients with melanoma cancer, many patients still do not respond to treatment due to primary resistance to immunotherapy and adverse events leading to toxicity. A novel target that could improve current immunotherapy regimen is the T cell receptor (TCR) signaling pathway. The TCR serves an imperative role in the adaptive immune system. Located on the surface of T cells, the TCR, which is bound to CD3 heterodimers, is responsible for antigen recognition of peptide major histocompatibility complexes (pMHCs) and signal transduction in T cell immune responses. As recent data have shown a more detailed understanding of extracellular TCR-CD3 interactions, they can be used to engineer a TCR that enhances its binding to the CD3 signaling molecule, which would lead to better T cell functionality. In order to gain a more complete molecular picture of the extracellular TCR-CD3 complex and T cell signaling mechanism, we did a functional analysis of TCR mutants that affect TCR-CD3 interactions. The TCR mutants were produced through random mutagenesis and photo-cross-linking. Our results suggest that certain mutants have the potentiality of enhancing the binding affinity of the TCR-CD3 complex, leading to better overall T cell functionality; however, assay optimization and more experiments are needed to have a clearer understanding of which specific mutants are critical in the TCR-CD3 interaction. The success of this research project is significant in that it will help with understanding more about immune diseases and developing new immunotherapies that can overcome immunosuppression in current therapies.

Making Empathetic Chatbots: Talking to a Machine after You Read Distressing News
Aditya Singhal, Data Science, Psychology
Sponsor: Professor João Sedoc, Leonard N. Stern School of Business, Technology, Operations, and Statistics

The field of Computational Linguistics has made huge strides in the last couple of years, and it is now considered trivial to generate semantically correct English language. Big models trained on much of the internet’s language data can have a dialog with others. But these chatbots are not especially tuned to perceive human emotions. Empathy is an essential part of human communication, and while deep-learning methods have improved in their ability to converse, initial attempts at creating agents which are able to display empathy have not succeeded. In our project, we adapt the state-of-the-art BlenderBot model (a chatbot) with 3 billion parameters using a new dataset called “empathic conversations”. This dataset is constructed to train a chatbot to deal with conversations about difficult topics, such as cancer and gun violence. For implementations in consumer-facing spheres like telehealth, it is necessary for bots to be empathetic and “trustworthy”. Our first results show that the newly trained model is able to converse about such topics in a more empathetic way than the original Blender chatbot. We are currently continuing to fine-tune and adapt the input of the model in order to control the empathy and also relate back to the particular grievous event. We will assess the perceived empathy of our model using both automatic metrics as well as human evaluators using the Amazon Mechanical Turk crowdsourcing platform.

A Novel Form of Masking: Object Substitution Orientation-shifted Masking (OSOM!)
Dillan Spector, Neural Science
Sponsors: Dr. Thomas Baumgarten, NYU School of Medicine, Perception and Brain Dynamics Laboratory; Professor Biyu He, NYU School of Medicine, Perception and Brain Dynamics Laboratory

The content of an image differs from the vividness with which we perceive it. Usually, however, we implicitly summarize both aspects under conscious perception. Using perceptual masking, researchers can distinguish these components and show that a subject can recognize image content without conscious awareness of its presentation. Most masking techniques use a high contrast image that is presented at the target image location after the target has left the screen. Object Substitution Masking (OSM), however, impairs conscious image perception with a mask that consists only of dots that surround and have no spatial overlap with the target image. While this offers exciting applications in neuroscience, the masking effect of OSM is often weak. Here, we propose a new form of masking called Object Substitution Orientation-Shifted Masking (OSOM). While the procedure is similar to OSM, it adds
a shift in the orientation of the surrounding dots that mask the image. Notably, the shifted dots still do not overlap with the image, thereby preserving all benefits of OSM. We measured content and perceptual vividness in an object categorization task in 11 subjects, comparing OSM against OSM and unmasked image presentation. In comparison to OSM, the new form of OSOM significantly impairs both content perception and perceptual vividness. In trials with OSOM, subjects significantly more often used an opt-out option indicating that they did not perceive any target image at all. Interestingly, the OSOM-characteristic orientation shift of the mask was not consciously perceived by the majority of subjects. In sum, OSOM provides a novel and powerful tool to dissociate visual content perception from perceptual vividness.

Can Status Impact How We Perceive Gender? A Novel Approach to Gender Stereotyping
Casey Stern, Psychology
Sponsors: Professor Tessa West, Psychology; Oana Dumitru, Psychology

Historically, women have been considered lower-status than men in most societies with traditional gender structures. A large body of research indicates that despite an increase in the prevalence of equality-centric ideals over time, certain normative gender cues are still associated with this status hierarchy. Lingual cues, for example, have been established as a viable mode of transmission for information about gender and associated status. While the impact of an individual’s gender on others’ perception of that individual’s status has been well-researched, to our knowledge no literature exists on the reverse relationship: how does an individual’s status impact others’ perception of that individual’s gender? We aim to bridge this gap by investigating 885 participants’ ability to infer the gender of their conversation partners in an anonymous online interaction. Prior to the interaction, each participant was randomly assigned either high status or low status by receiving a predetermined “score” on a fictitious test. We hypothesized 1) that low-status participants will be more likely than high-status participants to be judged as female and 2) that high-status participants will be more likely than low-status participants to be judged as male. Intriguingly, we found that participants overall were more likely to rate low-status partners as male.

Neurobiological Changes Evoked by Ketamine in a Mouse Model of Anorexia Nervosa
Rose Temizer, Neural Science
Sponsor: Professor Chiye Aoki, Neural Science

Anorexia Nervosa (AN) is a mental illness with the highest mortality rate but no approved pharmacological treatment. We used the Activity Based Anorexia (ABA) mouse model to study the neurobiology of AN. The Pretreatment. We used the Activity Based Anorexia (ABA) highest mortality rate but no approved pharmacological treatment. This data will hopefully reveal a further understanding of ketamine’s biological action as an antidepressant and potential treatment for AN through further tissue analysis.

The Impact of Motivation Bias on COVID-19 Compliance
Veronica Torres, Global Public Health/Sociology; Katie Mundt, Psychology
Sponsor: Professor Emily Balcetis, Psychology

One year into the COVID-19 pandemic, graphic and intense stories of the virus’s impact continue to dominate the news cycle. Given the increased news coverage of the COVID-19 pandemic, it is important to consider what factors have the potential to influence people’s motivation to follow guidelines to stop the spread of the deadly COVID-19 virus. Extant literature has already established a connection between people’s perceptions in regards to severity of a threat, their sense of control, and their subsequent behaviors. The researchers of this study tested this phenomenon in the context of the unprecedented COVID-19 pandemic, with the intention to inform future policies and practices. In this study, the researchers aimed to investigate the psychological constructs that lead people to deny the severity of the coronavirus and what motivates people to follow guidelines in order to protect themselves and others from harm. In order to do this, they examined the impact of language and reporting styles on the ways in which people perceive news reports through the question: How does the way information is portrayed (severe or moderate threat to human well-being) coupled with people’s beliefs about whether they can control negative outcomes impact their perceptions of the COVID-19 pandemic and their willingness to take action by following guidelines? This study yielded no statistically significant associations between the variables of interest but presents important implications for future research and practice.
Interracial interactions provide a unique opportunity for individuals to decrease outgroup prejudices and promote positive intergroup relations (Pettigrew, Tropp, Wagner, & Christ, 2011). Political identity is a signal of an individual’s beliefs and values, both because it outlines policy interests and cues partisan stereotypes (Iyengar & Westwood, 2015). These stereotypes play out across racial and political lines as individuals tend to believe that white people hold more conservative beliefs, while Black people hold more liberal beliefs (Craig et al., 2020). Additionally, research has found that individuals give more money to co-partisans than racial ingroup members in behavioral measures (Iyengar & Westwood, 2015). However, to our knowledge, no research has considered the function of political identity signaling in interracial interactions. In the current research, we examined white Democrat and Republican political identity disclosure when anticipating a conversation about race. Participants were told they would engage in a conversation with either a same-race (white) or cross-race (Black) conversation partner about a race-related topic. They then were given the opportunity to create a profile that would be shown to this partner and could choose to disclose their political identity. We found that white Democrats disclosed their political identity more than white Republicans. These findings indicate that Democrats are more likely than Republicans to signal their political identity when discussing race, regardless of their conversation partner’s race. These findings are useful in informing how political identity is used across parisons.

Talking about Race: Examining Group-level Goals in Race-related Conversations between Interracial Friends

Jenna Tracy, Psychology

Sponsors: Professor Tessa West, Psychology; Professor Maureen Craig, Psychology

Research has shown that intergroup interactions can foster positive attitudes between members of different racial groups (Pettigrew, Tropp, Wagner, & Christ, 2011). However, majority and minority group members tend to approach intergroup interactions with divergent goals, which can negatively impact their outcomes (Devine, Brodish, & Vance, 2004). Although previous research has considered the goals that people hold in intergroup discussions about race with strangers, little research has examined the goals same-race and cross-race friends hold when discussing race. To determine the different goals that majority compared to minority group members have when interacting with friends, white and Black participants completed a questionnaire assessing their endorsement of six goals—socially connecting, learning, expressing social justice values, defending their racial group’s image, defending their personal image, and desire to challenge—when approaching race-related conversations with same-race and cross-race friends. We found that white participants held more learning goals, $F(1,171) = 7.40, p = .007$, social connection goals, $F(1,171) = 8.98, p = .003$, and social justice goals, $F(1,171) = 4.18, p = .04$, when speaking to an outgroup friend compared to an ingroup friend. Meanwhile, Black participants endorsed lower social personal goals, $F(1,171) = 1.26, p < .001$, when speaking to an outgroup friend compared to an ingroup friend. These findings suggest that when approaching conversations about race, white and Black people hold different goals with same-race vs. cross-race friends.

Understanding Neural Mechanisms Underlying Aggression: The Relationship between the Medial Preoptic Area (MPOA) and the Ventrolateral Part of the Ventromedial Hypothalamus (VMHvl)

Avni Varshneya, Global Public Health/Biology

Sponsor: Dr. Dongyu Wei, NYU School of Medicine, Neuroscience and Physiology

This study seeks to determine the role of the brain’s medial preoptic area (MPOA) in eliciting aggression in mice. The main goal of this project is to investigate the relationship between the MPOA, a region known to stimulate parental behaviors, and the ventrolateral part of the ventromedial hypothalamus (VMHvl), a region of the brain which is known to be associated with aggression. Both these regions are crucial in promoting innate social behaviors. However, the relay between these two loci is not yet clear. Since it has been established that the VMHvl receives glutamatergic (excitatory) information from the MPOA and the MPOA receives glutamatergic information from the VMHvl, there is undoubtedly signal relay occurring between the two regions that must be studied further. This project will explore the feedback loop between the MPOA and VMHvl, specifically how MPOA activation or inhibition can modulate aggressive behavior in mice. Essentially, this is an investigation into the relay mechanism that exists between these two important regions in the hypothalamus which regulate social interactions. Important methods used to investigate this MPOA/VMHvl relationship are behavior tests, brain tissue slicing, and brain scanning imaging. These experimental techniques will give us critical insight into how activation or inhibition of the MPOA hypothalamic region can regulate aggressive behavior and modify signal relay on a neural circuitry level.
Characterizing the Network Connectivity of the Habenula in Cocaine Addiction
Devarshi Vasa, Psychology
Sponsor: Professor Rita Goldstein, Icahn School of Medicine at Mount Sinai, Psychiatry

Emerging evidence implicates the habenula (Hb), a small structure in the epithalamus, as an integral component within the neural circuit mechanisms mediating drug addiction and related behavioral impairments. The Hb, in addition to the ventral tegmental area (VTA) and the anterior thalamus (AT), converge at the anterior limb of the internal capsule (ALIC) which carries dopaminergic projections from the VTA to other forebrain limbic structures. The ALIC underlies the pathophysiology of several psychiatric disorders including addiction and is considered a possible target for addiction treatment. An objective of this study was to establish the specificity of the networks between the ALIC and the subcortical regions VTA, AT, and Hb and to demonstrate how abnormalities in precise neural tracks can be observed, which could aid in treatment for cocaine use disorder (CUD). Individuals with CUD and healthy controls (N=31 CUD, N=28 control) were screened and administered psychometrics. Diffusion MRI was acquired and fractional anisotropy (FA) was measured with seeds in the left and right AT, VTA, and Hb, and with a terminal in the ALIC for CUD and healthy controls. Mean ALIC FA values were reduced in the right AT (p<0.05) and the left and right Hb (p<0.01) in CUD- when compared to CTL and CUD+. The significant results in CUD- but not CUD+ could reflect effects related to abstinence, where deficits in white matter integrity due to CUD are actually improved by drug-taking as a form of self-medication, which might help “normalize” functions that are impaired in addiction. This suggests possible impairments in the white matter microstructure due to demyelination, axonal degeneration, or neurite outgrowth in CUD-.

Learning from Positive and Negative Feedback across Development
Juan Velez, Psychology; Hannah Hamling, Psychology; Lia Washington, Psychology
Sponsors: Professor Catherine Hartley, Psychology; Kate Nussenbaum, Psychology

An individual’s ability to learn from positive and negative feedback plays an essential role in how they assess risks and rewards and make adaptive decisions across the lifespan. However, there are no consistent findings regarding developmental change in responsivity to positive versus negative feedback during learning. The lack of consistency across studies may arise because individuals’ sensitivity to positive and negative feedback may shift flexibly across contexts. In some value-learning contexts, individuals can gain more reward if they weight positive feedback more heavily, whereas in other contexts, individuals can gain more reward if they weight negative feedback more heavily. The goal for this project is to explore whether individuals at different ages differ in how they shift their responsivity to positive and negative feedback based on what is adaptive in a given learning context. Participants (ages 8–25) will complete an online gambling task, in which there will be two blocks. In one block, participants will earn more points if they heavily weight negative feedback, while in the other block, participants will earn more points if they heavily weight positive feedback. Both blocks are necessary to test whether, at different points in development, individuals are biased toward weighting positive (or negative) feedback more heavily regardless of the learning context, or whether there are age differences in the flexibility to adapt learning to different environments. To address this question, we will use reinforcement learning models to characterize differences in learning computations across blocks and across development.

Music and Pleasure in a Social Context
Allison Venz, Psychology
Sponsor: Professor Pablo Ripolles, Psychology

Previous research suggests that listening to music influences pleasure and reward. Nevertheless, there is limited evidence to examine how a shared social context interacts to influence musical pleasure. In this within-subjects experiment, participants (N = 5) listened to fifteen songs in a social group then alone at home. After listening to each musical excerpt, participants provided pleasure ratings. Individual differences in sensitivity to musical reward were analyzed using the Barcelona Music Reward Questionnaire (BMQR; Mas-Herrero et al., 2013). We found that there was an effect of social context so that participants experienced greater pleasure while listening to music in a group than alone. Interestingly, this effect was larger for participants who had greater sensitivity to social musical reward. These findings highlight how musical reward can be influenced by varied social contexts and hopefully sets the basis for future research and for new educational and clinical music-based interventions that take into account the social aspect of music.

Young Children’s Achievement Mobility Beliefs
Miranda Vera, Psychology
Sponsor: Professor Andrei Cimpian, Psychology; Melis Muradoglu, Psychology

Ability grouping—an instructional practice in which students within a classroom are divided into smaller groups based on their academic ability—is common in elementary school classrooms throughout the US. Because this practice makes ability differences salient, children may be motivated to understand and explain students’ placements in them. Specifically, children may attribute placements to internal (e.g., ability) or external
(e.g., help from others) causes. These attributions may, in turn, relate to children’s perceptions of upward mobility between groups. The present study investigates whether attributions for ability differences predict perceptions of upward mobility in a sample of 209 children between the ages of 4 and 9. Participating children were read a vignette about two groups (or two individuals) within a classroom that differed in ability. Children then answered questions that assessed 1) the extent to which they attributed ability differences to internal or external factors (e.g., do they do better in school because their brains work better, or because they have more books at home?), and 2) the extent to which they thought it was possible for low-achieving student(s) to become high achieving. Results suggested that, in general, children’s preference for internal versus external attributions did not relate to their perceptions of upward ability mobility, with one exception: Children who attributed ability differences to the fact that high-achieving students were “born smarter” viewed upward mobility as less possible. This work adds to our understanding of children’s thinking about ability differences in the classroom.

Novel Tumor-specific TCR Discovery through Putative Neoantigen Activation

Eric Wang, Biochemistry
Sponsor: Dr. Iryna Voloshyna, NYU School of Medicine, Pathology

Immunotherapy, the use of the body’s own immune system in combating cancer, has been an area of recent interest in medical research. This project aims to take advantage of a more recent target of interest in the realm of immunotherapy known as neoantigens, by establishing a protocol that is able to elucidate both neoantigen-specific T-cell receptors (TCRs) and neoantigens themselves for develop of efficient immunotherapies. Using a co-culture-based approach involving dendritic cells (DCs), which have been transfected with RNA transcripts that encode the peptide sequences for tandem minigenes (TMGs), and T-cells, both of which were obtained from transgenic mice, we were able to demonstrate via flow cytometry and enzyme-linked immunosorbent assays (ELISA) the activation of said T-cells by gp-100 209(2M) transfected DCs, evidenced by an abundance of cells expressing CD25, an interleukin-2 (IL-2) receptor, and a high concentrations of IFNγ in co-culture supernatant after 24-hour and 48-hour timepoints, respectively. However, the ELISA data also reveals an unusually high concentration of IFNγ for DCs transfected with green fluorescent protein (GFP) RNA transcripts and an unusually low concentration IFNγ for DCs transfected with a TMG control RNA transcript that contains gp-100 209(2M) as well as 11 other control neoantigen epitopes as described in literature. Future iterations of these experiments, therefore, necessitate further amendment to address these extraneous findings so that the established protocols may be transitioned into use for human patient samples.

Socio-economic Instability and Stress-coping Strategies during the COVID-19 Pandemic

Sophia Yufei Wang, Journalism, Psychology
Sponsors: Professor Paul Glincher; Neural Science; Dr. Candace Raio, Neural Science; Dr. Alexandra Mellis, Neural Science

People often adopt stress coping strategies with varying levels of engagement. Some engage in active problem-solving and seek social support facing the stressful situation (“Engagement Coping”), while others may not initiate behaviors that might change the situation or share feelings with others (“Disengagement Coping”). Previous literature has shown that factors like gender, age, and personality predict these coping differences, yet the contribution of socioeconomic factors is unclear. The COVID-19 pandemic provides a unique context for studying how coping strategies relate to socioeconomic factors such as financial instability, which is measured by attitudes towards job prospects and household finance status. Here, we predicted that financial stability would promote Engagement coping by sparing more cognitive resources, whereas financial instability would promote Disengagement coping when cognitive resources are deprived. We deployed a smartphone app to collect weekly or monthly self-reported survey data from a sample of 194 participants. In addition, we analyzed the relationship between physical proximity to COVID-19 health risks and the changes in people’s stress-coping strategies. The study revealed no significant associations between financial instability and changes in coping strategies. However, there was a significant association between physical proximity and changes in coping strategies within the Brooklyn cohort. Therefore, our findings do not lend support to the hypothesis that coping strategies are individually conditioned on financial instability but might suggest that coping strategies are influenced by socioeconomic differences varying between boroughs.

Improved Search Algorithm for Financial News

Tanya Wang, Computer Science, Mathematics; Olivia Zhang, Computer Science, Mathematics
Sponsor: Professor Adam Meyers, Computer Science

In daily life practice, stock-holders are often interested in the reasons behind the change of stock prices. They use this information to decide whether to short or keep longing their stocks, which makes financial news search play an important role in this process. Yet many search engines like Yahoo Finance only implement the simplest question-answering strategy to return articles that just mention the queried company names or tickers. To this end, we apply topic modeling to analyze documents and aim to learn meaningful patterns of words in financial news.
dataset. More specifically, we explore three topic modeling systems: LDA with Bag-of-Words, LDA with TF-IDF, and LDA with PMI. In the BoW system, we create a dictionary with each word as a key and the count of times of the word’s appearance in the training set as the key’s value. In the TF-IDF system, we assign weight to each word in each document and consider the distribution of the word among the entire training corpus, using TF-IDF to represent each document as a vector. In the PMI system, besides assigning weight to each word in a document, we also maximize coherence score among the topic distribution. All three systems turn out to output news texts that better align with our queried company and ticker.

A Cross-cultural Study on Generic Language
Wendy Wang, Psychology
Sponsor: Professor Marjorie Rhodes, Psychology

Generic language refers to abstract kinds, for example, saying: “boys like sports” instead of “this boy likes sports”. Previous research has shown that generic language can influence children’s social categorization (e.g., thinking about other people in terms of their age group, sex, race, etc.; Rhodes, Leslie, et al., 2018). However, most of these studies have focused on English-speaking children. It is not clear if the influence of generic language on children is a universal phenomenon or only a product of the English language. Therefore, the current study aims to replicate the effect of generic language on social categorization in Chinese and English-speaking toddlers. Due to the COVID-19 situation, we plan to use the unmoderated remote research method to recruit 100 English-speaking children and 100 Chinese-speaking children from 28 to 36 months old via our online research platform PANDA to measure if children form social categorizations after exposing to generic language (data collection ongoing). We also want to see if online research methods apply to children as young as 28 months. Results from the current research will examine if the effect of generic language is replicable in both American and Chinese toddlers.

The Development of Gender Disparities among Those at the Very Top
Emily Windsor, Mathematics, Psychology
Sponsor: Professor Marjorie Rhodes, Psychology

This project examines the important question of why gender disparities are stark among those at the very top. While female representation is indeed increasing across various fields (e.g., females hold half of all faculty positions in US institutions), this occurrence drops when examining those at the very top (e.g., females represent only 27% of tenured faculty members; Finkelstein et al., 2016). Previous developmental researchers who have studied this phenomenon tend to focus on gender differences among top performers in academic or cognitive assessments, but no known research to date has directly examined which sociocultural factors contribute to the development of these gender disparities. In the present study (N = 110), we tested how gender differences in adolescents’ willingness to publicize top achievements may contribute to the development of gender differences in willingness to achieve outstanding accomplishments. We found that girls are less willing to publicize their top performance compared to boys, though girls and boys were equally willing to persist for top performance. This study further sheds light on how sociocultural factors shape gender gaps among those at the top and has broad implications for combating gender stereotypes and increasing female representation.

Determining the Role of the IL-17 Signaling Pathway in Epidermal Development
Jill Wisnewski, Biology, Spanish
Sponsor: Professor Shruti Naik, NYU School of Medicine, Pathology

As the interface between our body and the outside world, the skin and the unique community of immune cells and microbiota it contains serve important protective functions, yet exactly how the tissue develops and the molecules which contribute to its physiological strength are not entirely understood. The homeostatic cytokine IL-17 has been recognized as an important regulator of keratinocyte proliferation, wound closure, and antimicrobial defenses at the epidermal layer (Sharp et al., 2005; Jameson et al., 2004). However, overexpressing this pathway can lead to the pathogenesis of inflammatory skin diseases like atopic dermatitis and psoriasis, and its contribution to the early development of the epidermal tissue has yet to be investigated (Cai et al., 2011). This project aims to understand how IL-17 signalling contributes to the development of a healthy skin barrier by progressively measuring and comparing the integrity of neonatal skin via Transepidermal water loss (TEWL) in IL-17 receptor knockout and control mice in order to identify if this pathway significantly contributes to skin development. While previous researchers have reported that a lack of IL-17 signaling leads to increased TEWL and a more damaged intestinal epithelium in an adult inflammatory model, our results show the opposite (Lee et al., 2015). We found that a loss of this signaling pathway leads to decreased TEWL and a stronger epidermal barrier in neonatal skin. Ultimately, by better understanding how a pathologically relevant cytokine like IL-17 regulates the epidermal barrier, we can produce more effective treatments for psoriasis, atopic dermatitis, and other inflammatory skin diseases.
The Role of Retro-transcriptase Activity in DNA Double-strand Break Repair
Julius Wu, Biology
Sponsors: Dr. Alessandra Brambati, Memorial Sloan Kettering Cancer Center, Molecular Biology; Dr. Agnel Sfeir, Memorial Sloan Kettering Cancer Center, Molecular Biology

DNA double-strand break (DSB) repair is essential for cellular survival and maintenance of genome stability. Recent studies have increasingly shown the potential role of RNA in DSB repair. In yeast, it has been shown that RNA can mediate DSB repair by acting as a template in homology-directed repair. It is possible, then, that retro-transcriptase (RT) activity plays a role in DSB repair. However, the factors that underlie this activity remain unknown. We hypothesize that this RNA-templated repair occurs via DNA polymerase zeta (Polζ), which has been previously shown to function in translesion synthesis at sites of DNA lesions. We have developed a “single-stranded RNA repair” (SSRR) system capable of identifying RT-mediated DNA repair in vivo. Using this assay system, we demonstrate that human cells are capable of using RNA to template DSB repair via a homology-directed pathway. This finding is suggestive of a greater role of RNA in DNA repair than previously thought, and implies that RNA-templated repair may be a source of genetic diversity.

In vivo Diffusion Tensor Imaging of Optic Nerve Structure in Experimental Glaucoma
Sarah Wu, Biology
Sponsors: Dr. Muneeb Faiq, NYU School of Medicine, Ophthalmology; Dr. Kevin Chuen Wing Chan, NYU School of Medicine, Ophthalmology

Glaucoma, the leading cause of irreversible blindness, is characterized by degenerative changes in the optic nerve (ON). Here, we investigated structural changes in the ON using diffusion tensor imaging (DTI) in healthy and experimental glaucoma mice. Healthy adult C57BL/6J mice (n=22) and DBA/2J mouse glaucoma model (n=6) underwent DTI using a 7-Tesla Bruker MRI scanner. Imaging slices were oriented orthogonal to the prehiiiasmatic ON. DTI parametric maps including fractional anisotropy (FA), axial diffusivity (AD), radial diffusivity (RD), and mean diffusivity (MD) maps were computed. Manual regions of interest were drawn on the ON and, as a non-visual brain control, anterior commissure (AC) using ImageJ. DTI parametric values were measured in the ON and AC and compared between groups using ANOVA with post-hoc multiple comparisons correction test. p<0.05 was considered significant. FA was lower (p=0.006), while MD and RD were higher (p=0.024 and p=0.005 respectively) in the ON of glaucoma model as compared to healthy mice suggesting possible of loss in axonal strength and degree of myelination in the glaucomatous ON. There was no significant difference found in AD in ON nor between any DTI parameters in AC. Structural alterations in the glaucomatous ON may be detected by lower FA and higher RD/MD in DTI non-invasively. This modality, in combination with ocular imaging and behavioral assessment, can potentially be used to evaluate the relationship between retinal ganglion cell loss and ON structural integrity and decipher the functional significance across age, gender, and genetic background.

Celia Xie, Economics and Mathematics
Sponsor: Professor Shizhu Liu, Mathematics

New-style tea is defined as tea with milk and other toppings. Recently, two Chinese new-style tea brands, Hey Tea and Nayuki, have been preparing for their IPOs (Initial Public Offering). The predicted market values of them, around $2.5 billion for Hey Tea and $1 billion for Nayuki, have astonished many investors and have brought people’s attention to this emerging and booming market. In order to forecast the future growth and trends of the market, I have researched both the microeconomic and macroeconomic factors. The former ones include consumers’ consumption habits, their income distributions, the tea brands’ strategies, and their future plans. The latter ones include the Chinese tea culture background, economic development and GDP growth of China, and political regulations that would affect the food and beverage industry. This research presents a thorough analysis of consumers’ demographics and the whole market. It indicates that the current market size is about $15 billion and will reach $60 billion in a decade. It also manifests the trends of the consumers, tea brands, and policies. The results of this research are of great significance because they provide guidance and insights for local and global investors. Meanwhile, it also offers suggestions for the players in the market. The approaches and methods used in this study could also be applied to analyzing tea markets of other countries, which might benefit the research on the global tea market.

A Computationally Efficient Methodology to Compute Option-adjusted Measures for Bond Futures Contracts
Jinghong Xu, Economics and Mathematics
Sponsor: Dr. Amir Sadr, Mathematics

In a government bond futures contract, the quality option refers to the ability of the short counterparty to deliver any bond from a delivery basket at the future’s settlement price by expiration. Given the uncertainty of prices at the expiration date, it is impossible to assert which bond will be delivered. Therefore, all measures such as price and PV01 need to be replaced by their risk-neutral...
expected values. Previous approaches, by Hemler and Boyle, to tackle the quality option have been focused on setting up the joint distribution of the N bonds in the basket and solving an N-dimensional integral. Our approach is to freeze the yield spread of the delivery basket relative to the current cheapest-to-deliver (CTD) bond and only consider the dynamics of the CTD’s yield. Assuming all other bonds will maintain their original frozen yield spread, we obtained a simplified model in which the yield curve will only experience parallel shifts. In this parallel shift model, there is only one unknown variable, and the N-dimensional problem is reduced to one. This computationally efficient method, which is only based on one volatility parameter, is a direct formalization of the intuitive methodology used by finance practitioners. As such, it can be used as a simple quoting mechanism to calculate option-adjusted values of a bond futures contract based on assumed volatility.

Using Self-organizing Maps to Characterize Inflammatory Responses in Placental Streptococcus Infection

Wendy Yang, Biology
Sponsor: Professor Itai Yanai, NYU School of Medicine, Institute for Computational Medicine

Group B streptococcus (GBS) infection of the reproductive tracts, a defining characteristic of which is placental inflammation, causes 150,000 stillbirths and infant deaths every year (De Paepe, Friedman et al., 2004; WHO, 2017). To learn more about the host response to GBS, the Yanai lab is studying a cross-section of a GBS-infected mouse placenta. I analyzed a spatial transcriptomics (ST) dataset taken from the placenta, which quantifies gene expression, giving values indicating the extent to which selected genes are expressed in each cell on the cross-section (Burgess 2019). I determined that self-organizing maps (SOMs), an artificial intelligence construct that places cells on a grid by their similarity to each other, can accurately sort ST data (Algoritma Academy, 2019). To do so, I confirmed that SOMs visually reproduce the results of hierarchical clustering, a well-established algorithm in RNA-seq data analysis that organizes cells into clusters by similarity (Bock, 2018). I also found that SOMs do not show definitive differences in gene expression between cells of different positions on the cross-section. Though I found no pattern of gene expression by position on the placenta cross-section, our initial comparison of the SOM’s clustering capability with that of hierarchical clustering validates the use of SOMs in processing ST data. This experiment comprises a novel workflow for analyzing such data that can be applied to other disease models, and the data can reveal previously overlooked trends in gene expression upon further analysis. We can use additional methods such as GO-term analysis, which gives the functions of the most highly expressed genes in each cluster, to cross-reference with the SOM (Pomaznoy, Ha et al., 2018). This will provide insight into processes such as the placenta’s inflammatory response to GBS infection and inform the development of therapeutics.

Models, Simulations, and Analysis of Flying Formations of Aerodynamically Interacting Flappers

Qishuo Yin, Mathematics
Sponsors: Professor Leif Ristroph, Mathematics; Professor Carlos Fernandez-Granda, Mathematics

My project—models simulations and analysis of flying formations of aerodynamically interacting flappers, working with Professor Leif Ristroph—contains the following parts: 1) We derive a physics model in which aerodynamic forces include the effect of interaction of each flyer with its upstream neighbor’s wake or flow. 2) We formulate the above as a mathematical model taking the form of delay differential equations linking the flight motions of each member to the earlier motions of another. 3) I formulate a simulation in Matlab capable of numerically solving the above equations for arbitrary numbers of flyers of varying flapping kinematics. I used the ddesd solver in Matlab to solve the delay differential equation systems to generate simulations to describe the motions of different flappers in a group. 4) I test the model in the simple case of two synchronous flappers flying in tandem and compare against earlier experiments from the AML. The measured gap between the two flappers, the speed of the pairs, and the behaviors of the schooling numbers are coherent with the lab experimental data. 5) I test the model for tandem flappers of varying wing motions (amplitudes, phases, frequencies) and compare against other experiments from the AML. The simulations are consistent with the real experiment data. In addition, I also find that faster and strong flapping motion enhance the stabilization of an independently flapping tandem pair.

Adversity Disrupts Infant Rodent Processing of Maternal Odor and Ventral Tegmental Area

Boyi (Nini) Yu, Neural Science
Sponsor: Professor Regina Sullivan, NYU School of Medicine, Child and Adolescent Psychiatry

Adults with early life trauma have blunted reward responses and problems with social reward functioning and addiction (Jedd et al., 2015). Corresponding problems were also identified in the brains’ reward system including the ventral tegmental area (VTA). However, we know little about the reward system in infancy and its response to trauma. Here, using a rodent model, we focus on the VTA in infant rats with adversity-rearing associated with rough maternal care or control care and ask if VTA is a target during the adversity. PN8–12 pups experienced five days of maternal rough handling induced by Scarcity-Adversity Model of insufficient nest building material. Controls
were reared with sufficient bedding and typical maternal care. On PN 28, pups were removed from the nest, injected with 14C 2-deoxyglucose, put into a novel environment and then presented with maternal odor for 45 minutes, and brains processed for autoradiography. Brains were analyzed with ImageJ image analysis. Our results show that pups experiencing Scarcity-Adversity Model of rearing were treated more harshly by mothers compared to control rearing. Image analysis of the VTA, in parainterfascicular nucleus/paranigral nucleus and parabrachial pigmented area subregions, shows that controls demonstrated a decreased response to novelty with maternal presence. In adversity-reared groups, no change of response in VTA is observed in both subregions between when the mother is present and when the pup is alone. This research demonstrates VTA is vulnerable to the impact of early life adversity and may be important in processing the mother and the level of attachment.

**Learning for Yourself versus Learning for Others**
*Cho Laam Yuen, Comparative Literature, Psychology*
*Sponsors: Professor Yaacov Trope, Psychology; Maryam Bin Mershar, Psychology*

Individuals are often asked for advice and even to make decisions on behalf of others. This process requires that one takes into account psychologically distant others in their scope of consideration, effectively removing oneself from their subjective perspective (Fujita, Trope, & Liberman, 2015). Prior research has demonstrated that considering others influences cognition, decision making, and subsequent behaviors (Kray & Gonzalez, 1999; Kray, 2000; Kalkstein, Kleiman, Wakslak, Liberman, & Trope, 2016); but what is yet to be investigated is how initial intention to either learn for the self or others affects how information is processed and subsequently applied. I propose a study to examine the aspects that individuals focus on when learning information for themselves (proself) as opposed to learning information with the intent to inform others (prosocial). Furthermore, I propound that the initial intention to learn for the self or for others will affect subsequent decisions made. I predict that when one is learning information for the self, they will focus on secondary features and, therefore, be less likely to consider highly variable careers for themselves, while I hypothesize that those who are learning for others will focus more on general trends and consider jobs for the self and provide recommendations to others regardless of fluctuation. Findings, implications, and future directions are discussed.

**Response of the Amygdala during Trauma with and without Early-life Adversity**
*Elizabeth Zeldin, Neural Science*
*Sponsor: Professor Regina Sullivan, NYU School of Medicine, Child and Adolescent Psychiatry*

Child maltreatment leads to vulnerability to later-life psychiatric pathology, a diminished self-regulated stress response, and a diminished socially-regulated stress response (i.e., social buffering by a social partner). To better understand the developmental roots of this pathology, we assessed the neurobehavioral response to an acute stressor in infant rats and investigated whether early-life maltreatment by the mother diminished the regulatory effects of social buffering. We know that abuse alters amygdala activity, but the dynamic changes in the functional connectivity of amygdala nuclei are not well-studied. Subjects in two age groups were used to study the effects of maltreatment on pups that are still influenced by social buffering and rats that are independent from the mother. On postnatal day (PN) 18 or PN28, pups received a 0.5mA tail shock with or without the anesthetized mother present. The subjects were injected with 14C 2-deoxy-D-glucose (2-DG), which provided us with brain autoradiographs for functional connectivity analysis. Brain activity was measured using ImageJ. Results showed that in maltreated pups, the amygdala was hyperactive in response to a shock relative to pups that were in the control group. Analysis of amygdala nuclei activity reveals disruption in the functional connectivity between the basolateral amygdala (BLA) and the central amygdala (CeA). These results suggest that early-life maltreatment may hinder the neuroprotective effects of social buffering on the infant brain by impairing the connection between the major input and output nuclei of the amygdala.

**Aromatherapy Provides Anxiolitic Effects to Pre-operative Patients: Borders of Medicine**
*Sarah Ženko, Neural Science*
*Sponsor: Professor Joseph LeDoux, Neural Science*

Pre-operative anxiety appears in patients about to undergo a surgical procedure and has shown to be correlated with worse post-surgical outcomes such as increased post-operative pain, larger analgesic and anxiolytic consumption, lower feeding improvement in the case of children, and more post-cardiac events in the case of cardiac patients (Ferner et al., 2016, Pignay-Demaria et al., 2003, Kain et al., 2006). A treatment that has anxiolytic potential is aromatic therapy, which has been used in a growing number of hospital clinical trials. Suffering from stigma attached to alternative medicine, aromatherapy is not researched enough despite low cost and simple administration. Thus, we performed a literature review of trials looking at the effects of aromatherapy on pre-operative anxiety in patients. Such trials were reviewed for efficien-
Constraining Estimates of Synaptic Strength Changes from Electrophysiological Spiking Data via in silico Simulation

Yunchang Zhang, Mathematics, Neural Science
Sponsors: Roman Huszar, NYU School of Medicine, Neuroscience Institute; Professor Gyorgy Buzsaki, NYU School of Medicine, Neuroscience Institute

The modification of synaptic strength has been postulated to be the neural basis of learning and memory. However, estimation of synaptic strength and its changes from extracellularly recorded spiking data are not trivial tasks. Previous research has shown that spike transmission probability calculated from spiking data can predict monosynaptic connections reliably (English et al., 2017). Furthermore, spike transmission probability correlates with intracellularly recorded excitatory postsynaptic potentials (EPSPs), which are thought to reflect synaptic strength (Jouhanneau et al., 2018). This leads to the exciting possibility that the temporal changes of synaptic strength can be estimated from in vivo extracellular recordings. Following the spike transmission probability research, a Poisson generalized linear model (GLM) has been developed in the lab to capture spike transmission changes from spiking data. To study to what extent and at what time scale the GLM can in turn capture synaptic strength changes, a leaky integrate-and-fire (LIF) neuron model is constructed with tunable synaptic dynamics and background activity. While the efficacy of the GLM is yet to be tested, our simulation of the LIF model has shown that: 1) the trend of the underlying synaptic strength changes can be reflected by the ground-truth spike transmission calculated across trials, and 2) when the postsynaptic LIF neuron is under a regular firing state, ground-truth spike transmission probability stably overestimates synaptic strength. With these observations and the ground-truth dataset, further steps to improve the estimates of synaptic strength changes can be carried out by correcting for the effect of firing regularity and constraining the timescale of the GLM.

Zebrafish: 3D Traction Force Microscopy

Ziyi Zhang, Computer Science
Sponsor: Professor Daniele Panozzo, Computer Science

Traction force microscopy (TFM) is an experimental method to indirectly measure extracellular traction forces from optical images. The cell-generated forces impose micrometer level deformation on cells that can be indirectly captured by confocal microscopes. With prior knowledge of the material stress-strain behavior, it is possible to use the observed displacement to compute the traction forces that induced it. These forces are key in understanding biological phenomena such as mechanical annihilation of cancer cells. We introduce a novel pipeline for TFM that, for the first time, can measure traction forces on live specimens. In collaboration with the NYU Medical School, we are developing an integrated hardware and software pipeline to study cell migration on live specimens, combining microscopy techniques with image processing and finite element simulation, to understand how the migration happens and what factors are guiding it. The core idea is to use a bleached array of dots on the live specimen and track it using a novel image processing pipeline. The project will remove the barriers of TFM and help biologists understand cell’s activity in a larger context.

Belief Polarization and Visual Confirmation Bias in Forensic Science

Shengkang (Tobias) Zhou, Psychology
Sponsors: Professor Emily Balcetis, Psychology; Jennie Qu-Lee, Psychology

Confirmation bias is the tendency for people to incorporate information that supports their original ideas and ignore information that contradicts it, which poses problems for legal decision making. Past research found that conclusions drawn from fingerprints, eyewitness accounts, and even DNA evidence are influenced by confirmation bias. To circumvent confirmation bias and ensure a more just and fair legal environment, legal experts lean on video evidence. Videos are increasing in prevalence in the courtroom. However, to our knowledge, there is limited research that examines confirmation bias in visual attention on dynamic visual stimuli. Moreover, whether video evidence will lead to a less polarized opinion remains untested. This research aims to answer how people’s visual engaging patterns with video evidence indeed yields different legal decisions by examining the correlation between participants’ visual attentional patterns with the change of their opinions on the culpability of police use-of-force. We hope to bridge the gap in understanding whether video evidence exacerbates differences in opinions or creates consensus.

Creation of Nano-pH Sensing DNA Motif

Eric Zhu, Chemistry
Sponsor: Professor Yoel Ohayon, Chemistry

DNA is well known for its double-helical structure, as discovered by Watson and Crick, and for its fundamental role as the “building block” of life. However, by manipulating Watson-Crick base pairing and controlling the sequences of DNA strands, various synthetic DNA structures besides the typical double-helical structure can
be induced to self-assemble via a “bottom-up” approach, which takes advantage of inter- and intramolecular forces to form various nanostructures with great precision and predictability. Overall, DNA nanotechnology takes advantage of Watson-Crick nucleic acid hybridization to form various 2D and 3D DNA lattices that have a variety of biomedical (such as drug delivery) and sensory (such as pH and electrochemical) applications. While various DNA nanomechanical devices have been created including one for monitoring pH in various parts of the cell, there has been a lack of success in generating a pH sensor attached to a tensegrity triangle. The nano-pH sensor generally consists of an i-motif structure that contains long chains of cytosines, while tensegrity triangles can form 3D crystals that can function in protein and drug delivery. In this project, we are attempting to develop a dual function DNA motif that combines the functionalities of a tensegrity triangle and an i-motif device.

BERT, BioBERT, and SciBERT: The TriBERT Evaluation on Biomedical Corpora
Wayne Zhu, Economics and Computer Science; Rahul Das, Computer Science; Forzana Rime, Computer Science
Sponsor: Professor Adam Meyers, Computer Science

We sought to identify the best biomedical named-entity recognition tagger out of three BERT taggers and observe the improvement of an ensemble system, if any, on improving the overall accuracy. We finetuned BERT, BioBERT, and SciBERT on different lengths of NCBI-Disease, JNLPBA, BC4CHEMD, and CRAFT Corpus. BioBERT consistently had the highest f-scores for B-entity, and I-entity tags. Our ensemble system used a voting system and placed greater weight to votes where the f-score for the specific tag chosen was higher. We came to the conclusion that our algorithm for the ensemble system had merit, although the scores achieved were not significantly greater than that of BioBERT and SciBERT. We hope that in the future, researchers will combine high performing named-entity taggers with an ensemble system to improve performance rather than creating new ones from scratch.

Twirling Dynamics and Stable Levitation of Free Hula-hoop on Gyrating Bodies
Xintong Zhu, Computer Science and Mathematics
Sponsor: Professor Leif Ristroph, Mathematics

Toys have been one of the most important sources of inspirations in field of applied mathematics and physics. This research project focuses on dynamics of hula-hoop and studies the twirling dynamics and stable levitation of free hula-hoop on gyrating body. The project first studies the model in two-dimensional space, with a body gyrating along a circular orbit and a hoop rotating along the body. We make assumptions that there would always be a contact point between the body and the hoop and that there is no slip motion between body and hoop. We first use Lagrangian mechanics to derive a numerical solution on Matlab, and we then use the idea of Coriolis force and method of changing frame to derive an analytical solution that is independent of time parameter. We build a hula-hoop robot in Applied Mathematics Lab to conduct experiments. We use three-dimensional printer to print “bodies” in shape of cone, cylinder, and hyperboloid. Both of our results of numerical and analytical solution are consistent with the experiment data. Assumptions regarding with the model are justified by applying motion tracking algorithm onto videos taken by high-speed camera. We finally extend our study results on specific body shapes—cones and hyperboloids—to general body shape study, and derive two conditions that are necessary and required for stable levitation. We arrive at the conclusion that certain curvature is necessary for stable levitation.

An Alternative to Single-qubit Unitary Approximation with Clifford and T Gates
Bob Junyi Zou, Computer Science, Mathematics
Sponsor: Professor Oded Regev, Computer Science

Single-qubit universal quantum computing requires the ability to approximate any 2 by 2 unitary matrix with a circuit comprised of a given universal gate set. This is analogous to mimicking an arbitrary 3D rotation with a set of fixed rotations. We consider the case where the gate set contains Clifford gates and the T gate. Two factors are important to the design of the approximation algorithm: its run-time and the T-count of the circuit found. The classical Solovay-Kitaev algorithm runs in polylog time but does not guarantee to minimize the T-count (Dawson and Nielsen, 2006). The state-of-the-art Ross-Selinger algorithm finds an optimal circuit that contains minimal number of T gates also in polylog time (Ross and Selinger, 2016). We reviewed the Ross-Selinger algorithm and proposed a modification to simplify part of their approach. Specifically, Ross-Selinger splits the task into a search problem and a norm equation problem. We realized that the search problem can be reformulated as standard lattice region search, where one only needs to enumerate all lattice points inside a convex body, which is conceptually and computationally simpler than Ross-Selinger’s geometry-based method.