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INTRODUCTION:

Research as Educational Paradigm

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 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.

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 thirty 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 undertaken in the 2009–2010 academic year. For the most part these abstracts represent research that was presented at the College’s Undergraduate Research Conference held that spring. Some projects were supported by the Dean’s Undergraduate Research Fund, and several also took advantage of research opportunities presented to students who participated in NYU’s study abroad programs. But these abstracts represent only a small fraction of the research undertaken by College students, both as individuals and in groups, under the close mentorship of faculty.

At the start of this issue is the “Faculty Perspective,” in which we publish the remarks delivered by an NYU faculty member at the closing award ceremony of the previous Undergraduate Research Conference. 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
Seryl Kushner Dean, College of Arts and Science
Associate Provost for Undergraduate Academic Affairs
Angelo J. Ranieri Director of Ancient Studies
Professor of Classics
If you are very lucky, resourceful, and receptive, you will work with mentors who will change your life. Sometimes the teachers you least expect, in fields far removed from your ultimate career, will influence your future path. I have been extremely lucky, and I have always sought out older, wiser people who could provide me with guidance and inspiration and serve as models for new ways to craft a life. My mentors changed nearly every aspect of my intellectual life—the way I work, the things I think about, my style of communicating ideas, and the criteria for evaluating my own progress. They also changed my personal life by showing me that a variety of personal choices and lifestyles could support the kind of intellectual life that I admired.

Ansei Uchima was my toughest professor in college. He was a small man in drab sweater vests who hardly talked and rarely smiled. Students called all of the other professors by their first names, but he was always “Mr. Uchima.” At my studio interview, he flipped through my sketchbook without pausing on a single drawing. He said, “No more self-indulgent portraits. You need to look at how things grow.” The next class, he handed me a small wildflower and told me to draw it. He also handed me a postcard with a self-portrait by Egon Schiele, and said, “If you draw portraits, you must draw very well.” For months, at every class, he’d hand me a flower or a plant to draw. While the other students cut etchings and carved woodcuts, I looked at how things grow. After a year, Mr. Uchima had a stroke and was bedridden. Students would go to his apartment in Washington Heights and arrange still lifes for him to look at. “No,” he’d hiss. “Can’t you see the composition? Put that bowl over there in the light.”

Kris Phillips was my most supportive college professor. She could see endpoints for me when I could not see them for myself. I could be a painter, a teacher, a psychologist, or a combination of all three. Kris envisaged me as a sort of Rudolf Arnheim, a former professor at my college who studied the psychology of art. But, I think she’d be pleased at how I’ve turned out. I still worry about visual perception and how things grow, but my path led me from art to developmental psychology. Kris was also my most demanding professor. “That’s a beautiful painting,” she would say, “but it could be better. You can do more. You can try harder.” All of her students—male and female—would do anything to please her. She was gorgeous and sexy, and always in the midst of a complicated love affair, but somehow she always made time for each of us for a special visit to the Frick, a trip to NY Central Art Supply, a dinner, or a quiet talk in the studio.

Charlotte Doyle was like the fairy godmother in Cinderella: tiny, frumpy, eccentric, and capable of engendering tremendous transformations. She believed that learning is an emotional experience, that when you write something for students to read or talk to students in the classroom, you must go to where they are and draw them forward by touching their hearts. One of my jobs during college was to take Charlotte’s notes, written with stubs of yellow pencils on the backs of envelopes and ditto sheets, and type the manuscript for an introductory psychology textbook. I loved visiting her office to get clarifications on her wrinkled bits of writing. She’d sip tea from a jelly jar while unlocking a new aspect of psychology. I also compiled the index. Those were the days before computers and every time I made a mistake, I’d have to begin typing the page again. As a special favor to Charlotte because her clutter bothered me so, I organized her bookshelves and file cabinets. Years later, I tried to give my husband the same favor as a Christmas gift. After a day, he asked me whether for Christmas I could just stop cleaning his office.

Sarah Wilford was the most elegant professor. She was over six feet tall in swishing long skirts and wore her white hair in a Mrs. Robinson-do past her shoulders. She taught us how to read to a class of preschoolers, using verve and emotion to keep them wide-eyed and attentive, holding the book facing out so the kids could see the pictures. She also taught us how to help preschoolers to sit quietly while another teacher read to them: Take an antsy, tired, or distracted child on your lap, but sit very straight so that your body provides only a focus and a frame for the child to control posture independently. “You’re not a cushion,” she’d tell us, “It’s not about you nestling in with a child, it’s about helping children to become independent of you.” Sarah spoiled my perfect GPA with an A- because, as she told me in her richly modulated, elegant voice, if I really wanted a career in early education or teaching, I would need to learn how to criticize and argue with my peers and supervisors without expressing disdain. That blot on my record, she told me, would remind me that my success didn’t depend on other people being stupid.

Ulric Neisser was my official advisor in graduate school, utterly charming, fast talking, and terrifying. Your typical east-coast intellectual with bottle-thick glasses and wild hair. Dick is the most beautiful writer in psychology I’ve ever read. Toward the end of my first year, I asked him to pay for the mailing of a parent feedback letter that described the results of my first experiment. “Gladyly,” he said, “If you pay me a nickel for every word in your feedback letter with more than two syllables.”
I revised the letter and about broke even. Dick is one of the smartest people you will ever talk to. He was famous among the graduate students for being a demanding conversationalist. We never knew which ideas would hold his interest that day or for how long. The trick was to plunge in with all the creativity and wit we could muster, nervously watching Dick’s face for that dreadful glazed expression that meant in a few seconds he was going to stand up from his desk to signal that the conversation had ended. Dick was one of the most generous academics I’ve ever met. He let all of his students chart our own course and supported our efforts with time and money. He happily supported my research on infant crawling and walking even though his specialty was memory and he had made his name studying adult cognition.

Esther Thelen adopted me into her lab for the last three years of my graduate studies. She showed me how to observe how infants grow. It was a bit like drawing flowers. The trick was to note the details while looking past them to see the underlying patterns. The lab was immersed in a massive microgenetic study, collecting kinematic and electromyographic data each week from four infants as they learned to reach and locomote. Esther would lay the tracings in a path that curled around the laboratory floor, with movements in real time nested within movements across the session nested within movements across the weeks. She’d walk slowly alongside the trail of papers, looking intently at the tracings, while the train of graduate students followed behind her like ducklings, waiting for her to discern the patterns. Then she might ask us to represent the data a different way, and we’d begin the slow walk again the next day, with the new visualization of the data. Esther saw infants’ movements the same way that she viewed their learning and development: as improvisations on a theme, endlessly generative and creative, with individual idiosyncratic solutions providing the details that engender the global patterns of change. Esther was stylish and loved to shop. Neck scarves were her trademark, a different one for each outfit. When Esther died of the cancer that destroyed her jaw and neck, her husband gave her students and colleagues the scarves she wore to hide her disfigurement. I have one that I never wear because my husband gave her students and colleagues the scarves she wore to hide her disfigurement.

Karen Adolph is Professor of Psychology and Neural Science. Her research interests focus on infant learning, perceptual-motor development, infant skill acquisition, exploratory activity, and problem solving. Her research is supported by grants from the National Institutes of Health. She has also received numerous other honors including: a James McKeen Cattell Award from the Association for Psychological Science, the Robert L. Fantz Memorial Award from the American Psychological Foundation, the Boyd McCandless Award from the American Psychological Association; and a Young Investigator Award from the International Society for Infant Studies. At NYU she is the recipient of the College’s Golden Dozen Teaching Award and the Department of Psychology’s Distinguished Teaching Award. Professor Adolph is the author of Learning in the Development of Infant Locomotion. She has also published extensively in numerous psychology journals and in the Handbook of Child Psychology, the four volume reference that spans the entire field of child development.
There is today a good deal of confusion about the status of knowledge in the humanities. To some, the admission that we seek only an interpretation seems to allow all kinds of subjective opinion to count as knowledge. Or worse, it seems to endorse the principle that those with the power to impose “their” opinion define knowledge. Nothing could be further from the truth. Interpretation is a form of knowledge, not mere opinion. What distinguishes knowledge, even knowledge that makes no claim to absolute certainty, is evidence and rigorous analysis. That is the meaning of disciplined inquiry in any field.

—Thomas Bender, University Professor and Professor of History

Laughter and Identity: Comedy of Classical Antiquity and the African Diaspora
Katherine Albis, Classics
Sponsor: Professor Markus Asper, Classics

When inquiring about the subject of personal identity, the action (or reaction) of laughter may be a key to discovery. Laughter is often an indicator of personal views and feelings, and can facilitate a sense of belonging to a particular group. Furthermore, laughter constitutes an expression, performance, and edification of personal identity. This project aims to investigate the connection between laughter and personal identity through a collection of comic performance texts and the inferred audience reaction to those texts. In particular, this project places Classical comedy in conversation with comedy of the African diaspora in an effort to elucidate the function of laughter from the perspective of both the marginalizer and the marginalized. Classical comedy may function as a window into the perspective of the marginalizer, whereas comedy of the African diaspora may function likewise for the marginalized (as Classical literature most often does not provide us with the voice of the marginalized). By placing the canonical (Classics) in conversation with the non-canonical (Africana Studies), this interdisciplinary project aims to contribute to Classics in a new way.

Sentimentalism and Consumerism: Constructing Female Identity in Nineteenth-Century Periodicals for Women
Jennifer Altavilla, English
Sponsor: Professor Bryan Waterman, English

This research explores the relationship between sentimental discourse and consumer culture in women’s magazines between the years 1848, the year of the Seneca Falls Convention, which is widely regarded as the beginning of the women’s rights movement, and 1960, the year the Pill was approved by the Federal Drug Administration, which is considered the impetus for the modern women’s liberation movement. It investigates the reasons why women’s periodicals, as nonlinear texts that allow for a great deal of freedom in terms of content and method of reading, were so well suited to transmission of both discourses. It examines how those discourses were interrelated, focusing on how sentimental language was used in advertisements, and how sentimental fiction advocated the purchase of luxury goods, for example. It also examines how that connection shaped the women’s periodical as a literary form and cultural object.

Literary critics, cultural analysts, and women’s studies scholars have largely ignored the relationship between sentimentalism and consumerism in women’s periodicals. There have been studies about the evolution of women’s magazines in the United States, books about magazines as literary forms, articles about the prevalence of sentimentalism in women’s literature, and explorations into the cult of advertising. Still, no work has synthesized these topics, or considered how discourses in women’s magazines helped to shape, or were shaped by, the women’s rights/liberation movement. I renovate the research surrounding women’s magazines by suggesting that they were, and are, complex bodies that manipulate sentimental language and employ the rhetoric of private and public selves associated with sentimental discourse in order to sell products, themselves, and, in the end, ideas of what it means to be female.
The Social Complexities of Refusing Consumption and Permanent Domestication: Tracing Agoraphobia from the late 19th Century to the late 20th Century
Lia Avellino, Gender and Sexuality Studies
Sponsor: Professor Lisa Duggan, History and Social and Cultural Analysis

I examine how agoraphobia, the “fear of the marketplace,” gets diagnosed as a white, middle-class, and most importantly “woman’s” issue. I depathologize the syndrome by locating it in a specific historical moment. I examine the psychological “discovery” of agoraphobia in the late nineteenth century, and how/why it was not widely recognized until the 1970s. With the rise of industrialization, urbanization, and mobile capital/economy, the role of women changed and thus their relationship to public space changed. Through my research, it is evident that agoraphobia is not solely and simply the fear of public space, but rather spaces of consumption; grocery stores, shopping malls, restaurants, hairdressers, and movie theaters are the most common locations where symptoms occur. Agoraphobia is cut through with the vectors of consumption as well as “seeing and being seen” within these consumer spaces. I align the agoraphobic woman with the “hysterical” woman of the 19th century. It is possible to interpret the rise in expressed fear of shopping as a kind of refusal, similar to the refusal of the “hysterical” woman to carry out the activities of her gender roles: house and familial work. The agoraphobic is alienated in relation to the interior of the “home”; she is not performing relational domestic labor as wife, mother, or consumer, but rather is isolated in her own space. In essence the agoraphobe, though feminized by doctors and scientists as possessing “housebound housewives syndrome,” is taking a stance against the role of woman as household shopper.

Literary Containments of Time: An Analysis of Periodization in Things: A Story of the Sixties and Europeana: A Brief History of the Twentieth Century
Nicole Basile, Comparative Literature
Sponsor: Professor Cristina Vatulescu, Comparative Literature

For centuries, the question of how to express time has been a prominent debate for people in fields ranging from history to philosophy and the like. This study concentrates on the way literature has taken this abstraction known as “time” and manipulated it within a tangible concrete text. My focus is on Georges Perec’s Things: A Story of the Sixties and Patrik Ouředník’s Europeana: A Brief History of the Twentieth Century. While Ouředník’s work conducts a macroscopic, historical view of a century, Perec’s novel conversely offers a more microscopic, narratological insight of a decade. I examine both of these authors’ treatment of literary devices: grammatical tense, narrative, tone, description, syntax, etc. Special attention is given to the content of the works, as it acts as a way of containing or replacing periods of time. The validity of “specific” periods and personal markers of time is brought into question when, in Europeana, chronology is thrown into disarray and, in Things, a decade’s generational mentality consumes minutes and years. The juxtaposition of these two contrasting texts works to destabilize further any cemented notion of what it means to mark and label time.

Le Roi Salamandre: Civic Ritual and Politics in Renaissance France
Beau C. Benson, History
Sponsor: Professor Karl Appuhn, History

In 1515, François Ier (1494–1547) was named King of France. His entry into Paris following his coronation was one of the most elaborate that the people of France had ever seen. His crowning, however, came at a particularly unstable moment in the history of the French monarchy, as his predecessors had both died without a male heir, and François himself was merely a distant relative of Philip IV, founder of France’s ruling House of Valois. It was therefore necessary for François to cement both his legitimacy and sovereignty. He did this by creating an aura of stability by utilizing his emblem—the legendary salamander—within carefully constructed and overtly political civic rituals. During the Renaissance, the use of civic rituals as a weapon of propaganda became increasingly popular in order to provide a medium of discourse between the elite and the masses. Witnessed by the nobility, the clergy, and even the peasantry, civic rituals became commentaries on the strength and power of a particular kingdom or empire. By examining the use of the salamander within the royal entries of François, we can understand how civic rituals were shaped and reconfigured to create a formalized answer to a dynastic dilemma of legitimacy. By merging the lore of the legendary salamander with his numerous royal entrances, he was able to make visually bold claims about the nature of his power and his control over his people, thus solidifying his place within history as François Ier, le roi Salamandre.

The Sephardic “Ghetto”: Exploring the Language of New York’s Syrian Jewish Community
Neesa Berezin-Bahr, Linguistics and Anthropology
Sponsor: Professor John Singler, Linguistics

My research focuses on the New York City English spoken by the New York Syrian Jewish community. Through sociolinguistic interviews, I identify linguistic features that distinguish the Syrian Jewish accent from
other New York City accents. A sub-community of Sephardic Judaism, Syrian Jews are an insular group, living in small enclaves, predominantly in Brooklyn. Furthermore, New York’s Syrian Jews often attend the same synagogues and schools, and promote marriage within the community. The speakers I interview are the grandchildren of Arabic-speaking immigrants from Syria. My analysis includes phonetic features that give New York Syrian Jews a distinctive accent. Additionally, they incorporate Arabic lexical items into their vernacular, forming an insider language. The results of my research serve to assemble a more complete picture of New York City English, incorporating the culture and language of the Syrian Jewish community.

All Roads Lead to Rome: Via Dell’Impero and the Manifestation of Fascist Ideology
Cristina Bighi, Italian Studies
Sponsor: Professor Chiara Ferrari, Italian Studies

Via dell’Impero was a road constructed in central Rome under the Fascist party and the dictatorship of Mussolini in the early 1930s. This road was located in close proximity to some of the most important monuments remaining from the ancient Roman Empire, including the Coliseum and the Roman Forum. Fascist ideology embraced the role of Roman identity and the rebirth of “roman-ness.” Via dell’Impero was built as a literal manifestation of these ideologies, not only to showcase the ancient Roman roots of the Italian state, but also to bolster Mussolini’s rewriting of Italian history to fulfill his goals as dictator. This research explores how the Fascist party constructed Via dell’Impero, including their destruction of certain neighborhoods and regions. I demonstrate that through this construction and remodeling of the city of Rome, Mussolini used the city and Via dell’Impero to recreate a history which fit the needs of his campaign, and to showcase the importance of Roman identity.

Crushed Hopes, Rebuilt Lives: Central European Attorneys and Physicians Start Anew in the United States
Logan Booth, History
Sponsor: Professor Marion Kaplan, Hebrew and Judaic Studies and History

In 1933, the Third Reich ascended to power in Germany and imposed draconian measures against Jewish professionals with the intent of economically disenfranchising Jews from German life. The two groups targeted to the greatest extent were those who held the highest status in German professional life—attorneys and physicians. Disbarring Jews from the practice of law and medicine was seen as an essential step in realizing Hitler’s vision of a Fatherland embodying Aryan ideals. Nevertheless, such action prompted many Jews to immigrate to the United States. While a significant number were able successfully to resume their professional practice in the United States, an equal number were forced to abandon their careers as doctors or lawyers. This study elucidates the factors that led to this disparate outcome and attempts to provide a rationale for why some Central European Jewish attorneys and physicians were able to “start anew” while others, whose hopes had been crushed with the rise of Nazism, could not. Using records compiled from various immigrant aid and relief committees, as well as the personal correspondence of individuals and organizations which facilitated the emigration of Central European Jews, I determine that access to institutional aid, difficulties imposed by language barriers, and the degree to which an individual had to reeducate himself to meet the American standards to practice law and medicine were the most significant factors in determining whether one would be able to transition his profession to the United States. Furthermore, by incorporating the personal accounts of immigrants, I demonstrate the degree to which prevailing attitudes in the United States also played a pivotal role in determining the likelihood that an immigrant would succeed in America.

Becoming Visible: Defastenism and the Struggle of Irish Visual Artists to Be Seen
Rachel Broderick, English
Sponsor: Professor John P. Waters, Irish Studies

In a dizzying haze of performance, passion, anger, and booze, the first native school of visual art emerged in Ireland in 2003. Spearheaded in Dublin by the obsessive artist Gary Farrelly and co-founded by Ben Mullen, “Defastenism” became an artistic ideology as well as a cultural movement. Something exciting in Irish art was finally being generated—something not just visual, but visible. This visibility was the most important feature of Defastenism in its relationship to the larger context of Irish art. The struggles of these artists to become visible—why they did it and how they actually succeeded—form a narrative that not only yields insight into the immense trouble that Irish visual art faces today, but also provides the first tenable blueprint for solutions tailored to its unique situation. Beyond these lessons, an inquiry into Defastenism provides a concrete portrait of the way that national cultural expression can be observed in the visual arts. It presents an avenue for criticism that focuses on the cultural context of the production, rather than just the product. To contextualize my study of Defastenism, I conducted interviews with a variety of Irish visual artists, curators operating in Dublin, and academics at University College, Dublin, the National College of Art and Design, and Trinity College. I visited museums from the Royal Hibernian...
Academy to the Irish Museum of Modern Art as well as small, not-for-profit galleries like ThisIsNotAShop, Green on Red, and Four. My survey of the critically-neglected field of Irish visual art opens up the possibility for international discussion and non-expert interest.

Hybridizing Fictions: James Joyce, Flann O’Brien, and the Modern Irish Literary Identity
Rachel Broderick, English
Sponsor: Professor John P. Waters, Irish Studies

What is Irish literature? Text with kick. No scenes of tea being delicately sipped in the drawing room, no countryside sprawling with verdure. Dear, dirty Dublin layered a unique and glorious grime onto English Modernism. And the muck was more than a matter of literary hygiene—it was a matter of cultural identity. Overshadowed by the London literary sphere, pre-industrial Dublin of the early twentieth century embodied the frustrated status of its Celtic-Irish writers. The problem of colonization was immense, and reached into every sector of Irish life, from politics to economics to literature. *Ulysses* (1922), Joyce’s epic masterpiece, and *At Swim-Two-Birds* (1939), O’Brien’s meta-fictional magnum opus, chart the course of a solution to this problem—in English prose. It is a solution that had a second authority to confront: ancient Greek convention. Through close study of these two novels as well as first-hand research I conducted on the O’Brien manuscripts at the University of Texas, Austin, I have found that the initial hybridization of ancient Greek convention and modern Irish landscape in the English language triggers a proliferation of stylistic hybridization that allows a Celtic Irish literary identity to emerge. The confrontation of this authority through parody in particular breeds complex hybridizations of language, narrative, and genre. Beyond the level of form, even biographical reality and fiction are hybridized. This protean and idiosyncratic identity is characterized by a high degree of authorial self-reflexivity, swashbuckling grammar, linguistic acrobatics, a penchant for the absurd, and a disregard for the boundary between fiction and nonfiction.

From Old Time to Audio Blogs: Communal Longing and Urban American Musical Nostalgia
Joshua Cahan, Music
Sponsor: Professor J. Martin Daughtry, Music

Described as a longing for lost time or place, nostalgia has had a long history in American urban musical trends. From Irish immigrants longing for their homeland to revivalists in Chicago forming a folk music school where amateurs learn in a social setting, this analysis describes ways in which urban musical nostalgia in America has developed from a cathartic image of home to a symbolic cultural commentary. Based on ethnographic and historical research, this research on old time music and modern traces of the urban folk music revival provides insight into the dynamics of American musical nostalgia in the twentieth and twenty-first centuries. Using Svetlana Boym’s frame of reflective nostalgia, I outline the evolution of old time music and the Old Town School of Folk Music as part of a trajectory that now places high importance on communal production and oral tradition. I then explore the expansion of folk music on the Internet, a development that would appear to contrast with the folk music community’s focus on face-to-face interaction. Lastly, I discuss a number of parallels that link the urban folk revival with an emerging and influential Afro-soul revival, focusing on nostalgia’s potential to engage in social commentary and provide a model of musical community in the digital age.

Bad Virtue: The Apotheosis of Seneca’s Medea
Masha Carey, Classical Civilization and Economics
Sponsor: Professor Peter Meineck, Classics

Although the plays of Seneca the Younger, statesman, philosopher, and tutor to the infamous Nero, are often reviled as bombastic imitations of Greek masters, it would be unwise to dismiss so easily this example of Latin poetry from the early Roman Empire. Seneca often borrows the barest outlines of a plot from his Greek predecessors to recreate the plight of Oedipus or that of Medea, yet his plays remain overwhelmingly Roman in their concerns in that they speak in Roman terms and behave with Roman norms. Medea, in particular, is defined by the ultimate Roman quality—*virtus*, the most important value that permeated the Roman people throughout the Republic and the Empire. Seneca, a man who lived through the birth of the Empire and died shortly before the last of the Julio-Claudians, offers the play as an exploration of the power and critical evolution of *virtus*, as well as a potent warning. When men desert their *virtus*, the world literally turns upside down and the line between real and unreal blurs in a resultant apocalypse. Rather than disappearing, misplaced *virtus* becomes so powerful that it can literally destroy reality and the gods themselves.

The Changing Face of the Pontianak: Contextualizing Malaysian and Singaporean Urban Legend through Historical Fact, Local Film, and Fiction
Charmaine Chua, International Relations
Sponsor: Professor Judith Miller, French

To the average tourist, Singapore and Malaysia are visions of modernity and Westernized windows into the rest of South East Asia. In my second paper on the Pontianak, I show how local film and fiction of the two regions have protected and promoted folktales that can be traced back to
animistic beliefs of the Malay Archipelago. I propose that urban legend is shaped by social history so that the function of the female vampire, the Pontianak, alters to serve the society in which she is found. After examining Singaporean and Malaysian Pontianak stories for consistency and context, I classify her portrayal into four main types. Using ethnographies of the region, I first establish the “Original” Pontianak which existed prior to colonization. Next, via the collection of ghost story compilations from the colonial and post-colonial time period at the Singapore National Library, I identify the “Colonial” Pontianak. With the advent of the cinema, Pontianak movies appear within the horror genre and peak during the Independence movement. The hype of the “Independence” Pontianak then fades into the ever-present “Urban” Pontianak. Through interviews with Singaporean and Malaysian locals, including famous playwright Jonathan Lim, I catch glimpses of the Pontianak with a national identity, whose changing persona has helped her to outlive war, strife, governmental regulation, and modernization.

“Much More Than We Imagine”: Bishop Jaime Martínez Compañón and His Early National Imagining
Felipe Cole, History
Sponsor: Professor Sinclair Thomson, History

In a 1782 letter to the parish priests of Trujillo, Peru, Bishop Jaime Martínez Compañón wrote: “I am persuaded that within this diocese we have much more than what we imagine, and that a distinct and thorough knowledge of it could be of great utility.” In this, his third year as Trujillo’s prelate, Compañón had also begun the first leg of his visita throughout his bishopric. On that journey, Compañón would amass an unprecedented collection, Truxillo del Peru, cataloging the flora, fauna, and human settlements surrounding Trujillo in over 1,372 watercolor paintings. Throughout his tenure as bishop, Compañón proposed a social and economic program that would draw together the natural cornucopia of Trujillo and Bourbon economic thought into engines for the common good of the crown and its colonial subjects. I argue that Compañón’s project embodied a limited and unique national imagining, based on reordering colonial societal relations and modes of production to suit a common, proto-national good that would have extensively restructured the Spanish empire’s grip on the productive lives of colonials.

Ernest Pignon-Ernest in Naples: Site-Specificity and Citation
Chad Córdova, Art History and French
Sponsor: Professor Elizabeth C. Mansfield, Art History

French contemporary artist Ernest Pignon-Ernest (b. 1942), largely unknown outside of Europe, creates site-specific interventions in the urban environment of the street. Developing his approach in France before exploring cities in other countries, from the outset Pignon-Ernest’s method has entailed the strategic placement of images aiming to tap into and uncover the history and memory of a specific site. This research focuses on Pignon-Ernest’s work in Naples, his most extensive intervention, which began in 1988 with successive interventions throughout the nineties. Through recent photographs of Pignon-Ernest’s Neapolitan sites, this research explains Pignon-Ernest’s intervention by examining the relationship between each image and its specific urban context. Adding further complexity, Pignon-Ernest’s images in Naples were all either inspired by or direct citations of the work of Baroque painters. Thus, issues of citation work in Pignon-Ernest’s work is also discussed in relation to theories of citation in art and literature.

Long-Form Reporting: Urban Ecovillages
Maggie Craig, Journalism
Sponsor: Professor Brooke Kroeger, Journalism

Urban ecovillages are not all that sustainable, they are probably not going to save the world from climate change, and they never really reach the vision of utopia that they like to preach. Conflict and disagreement are ever present, and gentrification is always a problem. That said, in some ways city ecovillages are positively affecting the environmentalists who join them, the cities they are a part of, and the environmental movement as a whole. To study urban ecovillages in a way that would allow me to portray their significance through the medium of magazine-style journalism, I traveled to Los Angeles Ecovillage, Columbia Ecovillage in Portland, Oregon, Ganas Ecovillage on Staten Island and Green Village Philadelphia. By living at the ecovillages in Los Angeles and Portland, I was able to immerse myself in villagers’ daily life and get a clearer picture of how these villages work. My research focuses not only on ecovillages as a growing trend in the environmental movement, but also on the writing process itself, and how my method of immersion journalism shaped the way I was able to present my findings.

A Reconciliation of Value Pluralist and Value Monist
Aspects of Nietzsche’s System of Values
Kaitlyn Creasy, Philosophy
Sponsor: Professor John Richardson, Philosophy

Friedrich Nietzsche once called his biggest philosophical undertaking a “transvaluation of values”: that is, an examination of traditional morality and the system of values it provides, followed by a presentation of a drastically new system of values. One of the most crucial elements of this
“transvaluation” is the idea that there can be more than one correct value for individuals to hold depending on both the type of individual (whether she is a Nietzschean master or Nietzschean slave) and the individual herself. Although Nietzsche insists that he is a value pluralist, it still seems that there are underlying aspects of value monism—the idea that there is only one correct value that everyone should hold—which feature prominently in his system of values. Though Nietzsche never claims to present value monist aspects in his system of values, the extremely high value he places on both the will to power and the Übermensch seem to indicate that he does indeed believe in one particular, most correct way for individuals to live. This is a major problem, for if these aspects truly indicate a kind of value monism, then they contradict Nietzsche’s claim to be a value pluralist. In my research, I explain how these two contradictory aspects can be reconciled, while still keeping with the spirit of Nietzsche and his system of values.

Picking up the Pieces: From Fragmentation to Living Tradition
Dale Eadeh, Classics
Sponsor: Professor Joy Connolly, Classics

Despite the ostensible context it has provided, attribution of the fragmentary Satyricon to the “historical” Petronius has introduced elements extraneous to the composition. Rather than poring over meager “historical” references to identify Petronius, I turn to ekphrases in the cena Trimalchionis. By applying Foucault’s theory of the author to the Satyricon, an author is identified through purely internal analysis, situating Petronius not in “reality” or “history”—dubious Classical constructs, founded in other texts—but within narrative paradigms. Encolpius’ and other characters’ perceptions of ekphrases are a model for the reader’s perception of the Satyricon; the Petronian perspective is situated in the milieu of nigh-omniscient background voices, while Encolpius’ ignorance mirrors the reader’s confusion. This internal analysis is applied to a modern fragmentary work, Coleridge’s “Kubla Khan,” with revelatory effect; examining the letter in which it is contained exposes “fragmentation” as fabrication. By construing fragmentary works as epitomes of fiction—being juxtapositions of fictional conceit upon the inherently unrealized nature of fragmentary works—and transitioning to details within the Satyricon, I construct a methodology more widely applicable to works of questionable authorship or context: one which seeks to defend their vulnerabilities against the imposed interpretive tradition New Historicism sought futilely to neutralize.

Capturing Authenticity in Modern Writing
Alex Edelman, English and American Literature
Sponsor: Professor Darin Strauss, Creative Writing

When J.D. Salinger died earlier this year, there was a national outpouring of grief for an author that millions insisted had connected with them on a deeper level. It was written, over and over again, that Salinger’s 1951 novel Catcher in the Rye, and its main character, Holden Caulfield, had captured the voice of a generation. Caulfield’s voice, though entirely fictional, seemed entirely authentic, and resonated in a very real way with readers both young and old for more than a half century. In the fifty-nine years since Catcher in the Rye was published, the challenge of capturing authenticity on the page has been addressed in new and exciting ways by authors like David Foster Wallace and John Updike, who geared their writing styles towards best communicating the most precise and distinct feel and emotion of place and voice for the benefit of the reader. Using the work of modern writers and contemporary reviews of and ruminations on the work of Wallace, Updike, and others, I examine the specific challenge of replicating environment and voice, the difficult process of writing authentically, and the paramount importance of capturing realism in prose.

An Interpretive Analysis of Maro Douka’s Fool’s Gold
Afrodite Fountas, Hellenic Studies
Sponsor: Professor Liana Theodoratou, Hellenic Studies

In Maro Douka’s work, Fool’s Gold—a novel set during the coup d’etat of 1968 to 1974 in Athens—Myrsini Panayotou, a young Athenian university student, narrates her involvement with the underground resistance and the bloody events of November 17, 1973, when tanks were used to evict students from the Athens Polytechnic. At its core, Maro Douka’s work is about an impressionable young girl’s search for her identity, as well as her country’s identity. Though the work is fictional, it is based on Douka’s personal struggle to come to terms with the traumatic experience of repression. More importantly, it seeks to reflect the “soul” of her generation. Through a close reading and textual analysis of Maro Douka’s Fool’s Gold, I capture Douka’s interpretation of identity and voice, connect her interpretation to the socio-political significance and legacy of the period, and add my own understanding of the power of memory and its influence over Greece’s national consciousness.

The Extended Self
Chris Frank, Philosophy
Sponsor: Professor J. David Velleman, Philosophy

In their 1998 paper “The Extended Mind,” philosophers Andy Clark and David Chalmers argued that ordinary physical objects can, under the right circumstances, become
France’s social ills and nationality crisis. This discourse define the marginalized and multi-ethnic working-class suburbs—identity centers on economically depressed, socially

Sponsor: Professor Frédéric Viguier, French

Jane Fuerst, French and Economics

Les Engraineurs: “Les médias, on n’y croit pas.”

Jane Fuerst, French and Economics

Sponsor: Professor Frédéric Viguier, French

Mounting debate regarding modern French national identity centers on economically depressed, socially marginalized and multi-ethnic working-class suburbs—the banlieues. Media and political actors increasingly define the banlieue and its population as the crux of France’s social ills and nationality crisis. This discourse has crystallized around the disadvantaged youth of the banlieues. Both the most affected by persistent structural unemployment and zero-tolerance policing, these young people have also ignited a series of national riots since the 1990s. These riots, combined with the problematic social and political environment, have resulted in a reductive and exaggerated representation of the banlieue in French politics and media. These sensationalized stereotypes are further inflated due to the lack of voice coming from these marginalized places. This inquiry’s focus is les Engraineurs, an organization that teaches banlieue youth how to write and produce films. Based in a Parisian banlieue, the organization promotes a different representation of the banlieue, particularly from the mouths of its stereotyped youth. This inquiry examines how this organization and others like it combat dominant representations of the banlieue, reveal unique perspectives, and construct proper identities. Through analysis of the organization’s films, this inquiry found that these negative stereotypes are first appropriated and then disrupted through three thematic strategies: humor, representation of the everyday, and creative use of space and location. Employing these treatments, les Engraineurs succeed in reapropriating and reframing banlieue identity, thereby critiquing political and media stereotypes and offering a more nuanced representation of the banlieue.

The Communication Gap: A Case Study of Accommodative Teacher Talk in a New York City High School

Alexandra Furukawa, Linguistics

Sponsor: Professor Gregory Guy, Linguistics

Fundamental differences between teachers and their students, including age and personal background, among other factors, require teachers constantly to bridge communication gaps in the classroom. How do teachers use speech as a tool to bridge these gaps? In this case study of two high school teachers in a New York City charter school, teachers’ accommodative language was observed and analyzed in order to answer this question. In a predominantly black neighborhood and school population, the influence and importance of African-American vernacular English was a key factor in accommodative teacher-student rapport building. The two teachers were found to converge to their students’ language—on phonological, lexical, morphological and stylistic levels—in dynamic ways and to varying degrees. The students had overall positive opinions of these teachers, and had an appreciation of the teachers’ self-proclaimed, conscious efforts to use and shift their language toward positive ends in the classroom. This study aims to serve as a precursor to future studies of potential correlations between teacher accommodation of student speech and student success/achievement levels.
Love and Persuasion: Reading Scenes of Erotic Abduction and Marriage on Attic Vases  
*Megan Gannon, Art History*  
*Sponsor: Professor Joan Breton Connelly, Classics*

Ancient images of erotic abduction, regardless of their physical or graphic severity, make modern viewers uncomfortable because of the uncertainty they cast over the consent of women—the concept around which most legal systems model their laws about rape and sexual assault. A woman’s consent in antiquity, however, was a much different concept than it is today. To establish consent was not the responsibility, or even the ability, of the woman, which may raise more disturbing questions about the perception of female free will. I consider women’s status in ancient Athens—their legal and social ability and their roles in marriage—against their representation in nuptial and abduction iconography in Greek vase painting of the Archaic and Classical periods. I also discuss some of the changes that occurred in this iconography through the late fourth and early third centuries B.C.E. to offer a new interpretation about the relationship between bridal attendants and the personifications of the Meidian circle.

The Introduction of Syphilis into Hawai’ian Society and the Devastation It Wrought: The Re-Shaping of a People, their Land, and their Culture from 1778–1900  
*Chelsea Garbell, Steinhardt School of Culture, Education, and Human Development*  
*Sponsor: Professor Richard Hull, History*

Until 1778, Hawai’i lay as an untouched paradise with a population estimated between 200,000 and one million people. For thousands of years the native Hawai’ians had lived in relative peace and prosperity, free of the major infectious diseases that burdened other parts of the world. Theirs was an open and accepting culture, both in regards to family life and overt sexuality. But with the advent of the white man, the monumental differences between European and Hawai’ian ideas of sexuality allowed for a deadly exchange of syphilis, leading to an eventual devastation of the Hawai’ian population. Such extreme decimation brought on by syphilis allowed foreign entities to influence the course of Hawai’ian history, and effectively to shatter traditional Hawai’ian culture. The syphilis epidemic that struck Hawai’i is an excellent model with which to gauge the similar effect the Europeans had in other parts of North America throughout the fifteen to nineteenth centuries. It illustrates the connections between a disease, its encounter with a virgin population, and the subsequent upheaval of social structure. Through careful study of the Hawai’ian encounters with Europeans, we can gain a greater understanding of how deadly epidemics played a principle role in the European colonization of the New World.

At-Home Support of Dual-Language Development  
*Sponsor: Professor Lourdes Dávila, Spanish and Portuguese*

At-home academic and linguistic support is a large contributor to the success of student learning in a dual-language environment. It can be a challenge for students who live in monolingual homes to receive the support necessary to be successful in dual-language programs. The students in many dual-language programs come from an array of backgrounds, making the demographics very diverse, but also contributing to the difficulty of having access to resources necessary to provide this support. This project aims to compile resources for at-home support that are easily accessible to families regardless of circumstance. It focuses on providing resources for students in dual-language programs for English and Spanish, who come from primarily English-speaking homes. The resources are meant to take advantage of the diverse cultural offerings of New York City and provide access to support that an English-speaking home might lack.

The Syllabic Status of Italian Prevocalic Glides  
*Anna Greenwood, Linguistics and Romance Languages*  
*Sponsor: Professor Maria Gouskova, Linguistics*

This study explores the phonemic and syllabic nature of the glide sounds (“y”/“w” of “you”/“win”) in Florentine Italian. Syllables have internal structure, and each language has rules defining possible syllables. Glides vary cross-linguistically: in some languages, they are more consonantal and occupy the syllable beginnings (e.g. Russian), whereas in others, they are more vocalic and belong to the middle (e.g. English). Italian glides are ambiguous. They arise immediately adjacent to a vowel, but the pattern of when they will surface is not entirely predictable. Phonologists have yet to come to an agreement about whether glides constitute their own group of phonemes (“underlying glides”) or arise only at the conjunction of two true vowels (“surface glides”). My research explores previous positions on Italian prevocalic glides and supplements them with original data from speakers of the Florentine dialect. I hypothesize that glides should be considered a separate class of phonemes, and that underlying glides will show different patterns of formant transitions from surface glides. If so, underlying glides should occupy the beginning of the syllable, and surface glides plus the adjacent vowel should occupy the middle. Understanding the phonemic status of glides will provide further insight into how Italian syllables are structured.
CONADEP and H.I.J.O.S.: A Comparison of Two Vehicles of Memory after the Dirty War in Argentina
Alexandra Hancock, Spanish
Sponsor: Professor Jill Lane, Spanish and Portuguese

The issue of how to deal with the damages of the past and move forward as a nation has been central in the years following state-sponsored terror in Argentina known as the Dirty War (1976–1983). Despite vast research dedicated to Argentina’s official effort at memory, the state-appointed National Commission on the Disappeared (CONADEP) and their report Nunca Más (Never Again), little has been done to analyze the impact of what I argue are more inclusive social vehicles of memory, primarily the work of the human rights group Sons and Daughters for Identity and Justice against Oblivion and Silence (H.I.J.O.S.). By examining the works of memory and justice theorists, and gathering insight from interviews with an active member of H.I.J.O.S, I compare CONADEP and H.I.J.O.S. in terms of how their perspective on memory differs and how that affects the justice they seek for the enactors of clandestine acts of torture. Given the establishment of legal impunity in what Diana Taylor describes as a “percepticidal culture,” I discovered the importance of a more dynamic and inclusive social memory in Argentina that challenges the official recollections of CONADEP, but also the urgency for the cold, hard facts presented in Nunca Más to work in conjunction with more fluid models of embodied memories in fostering justice and ultimately the hope that abuses of this magnitude will never again happen in Argentina.

Explicaciones Rabínicas: The Kabbalah as Key to Borges’s Conception of Language
Ernest Hartwell, Spanish and Religious Studies
Sponsor: Professor Lourdes Dávila, Spanish and Portuguese

I analyze the frequent reference to the Kabbalah in Borges’s short fiction in respect to its contribution to the exploration of the possibilities and restrictions of language that is present throughout the Argentine author’s writing. I examine the kabbalistic texts he cites, exploring the problems that they propose with regards to the role of language in creation and creation in scriptural interpretation, citing Scholem and Wolfson and directly analyzing passages from the Sefer Yetzirah and the Zohar. Additionally, I articulate a close reading of “El Aleph” in which I explore the relationship between vision, memory, and language in mystical experience, citing the writerly text theory of Barthes and Derrida’s conception of the Archive and drawing parallels with Borges’s “La escritura del dios” and “Funes el memorioso.” I also propose a mystical reading of “La muerte y la brújula” which explores the kabbalistic mode of textual interpretation with regards to Benjamin’s “Task of the Translator,” drawing parallels to “Tlön, Uqbar, Orbis Tertius” and “Pierre Menard, autor del Quijote.” Finally, I trace the trajectory of these references to the Kabbalah throughout these stories, exploring on a larger scale what Borges interpreted the value of the kabbalistic hermeneutical scheme to be in his “interesting” conception of language.

No Man’s Land: Old Age and Violence in Two Argentine Novels
Ernest Hartwell, Spanish and Religious Studies
Sponsor: Professor Lourdes Dávila, Spanish and Portuguese

I discuss the representation of the violent treatment and deaths of elderly men in two Argentine novels: Diario de la guerra del cerdo by Adolfo Bioy Casares and Tierra de exilio by Andrés Rivera. I argue that the violence is not restricted only to the scenes which depict the fight between old and young men, but rather is present throughout each of the two novels; it is present in the literary structure and in the manner in which the language that depicts this conflict and the actual bodies involved in the clash interact. In Rivera’s novel the conflict is personal, the external actions only reiterate the internal violence related to old age. In Bioy’s novel, the war is obscurely allegorical; the psychological stakes of the fictional violence reflect and refract the psychological stakes of the fiction. My research is organized in five general parts: the definition of old age, the role of marginalization in the process of definition, the presentation of death, the representation of the body, and the implications on the role of literature in political-scientific issues of the body. I analyze the manner in which each novel defines old age and the stakes of this linguistic definition on the lives of those involved in the conflict. In this section, I cite the critical work of Gabriel Giorgi. I show how the act of classification demonstrates how growing older is a multi-faceted marginalization; one becomes not only distant from society (production, politics, sexual norms) but also from his or herself (old age as the dissolution of identity). I explore the concept of the body as the bio-political battleground, calling upon the theory of Agamben, Foucault, and Jeffrey Jerome Cohen.

Urban Renewal: Washington Square Southeast Slum Clearance Project
Xiaoyue Hu, Urban Design and Architecture Studies
Sponsor: Professor Mosette Broderick, Art History

Under Title I of the National Housing Act of 1949, the federal government initiated public-aided housing
programs, generally known today as urban renewals, on a nationwide scale. Most urban renewal projects in the 1950s and 1960s failed, however, to fulfill their objectives and caused enormous losses. Considering their massive impact, little research has been conducted on the projects. This paper aims to take an initial step toward evaluation of the history by examining one Title I project in New York City: Washington Square Southeast Slum Clearance Project. WSSSCP tore down 191 non-slum buildings and converted nine small blocks into three superblocks. Moreover, it forced 1100 business and 132 families to move out without paying suitable compensations. Moreover, a considerable part of the project was devoted to construction of non-affordable buildings; such practice was against the standards of Title 1 projects. The entire site was sold shortly after completion to NYU for private use. WSSSCP provided a great bargain for one private institution at the expense of a sustainable neighborhood. Three types of losses caused by WSSSCP—architectural, economic, and social—are examined in this research.

**Rosario Ferré: Works for Children and Children in Her Works**

*Jasmine Huerta, Spanish*  
*Sponsor: Professor Lourdes Dávila, Spanish and Portuguese*

This project focuses on the work of the Puerto Rican writer Rosario Ferré. I explore two of her children’s stories (Arroz con leche and Pico Rico Mandorico) as well as two of her short stories for adults (Amalia and La muñeca menor). In a world where children’s stories are expected to be light and uplifting, Ferré’s stories tend to be dark, following the tradition of the Hoffmann tales. I compare and contrast her short stories intended for children and the children in her stories intended for adults. In addition to having elements of Sigmund Freud’s idea of the uncanny, Ferré’s children’s stories have themes similar to her works for adults. Rosario Ferré’s stories aimed at adults have recurring feminist and anti-patriarchal themes. They discuss the social hierarchy in which women find themselves, what is expected of them by society, the forced sexual bondage often experienced by women, their status as sexual objects, and how knowledge may be lethal.

**Tradition and Modernity in Spanish Gastronomy**

*Catalina Iannone, Spanish*  
*Sponsor: Professor James Fernandez, Spanish and Portuguese*

In studying Spain’s conflicted relations to Europe and modernity, it is particularly useful to focus on cooking. Spain’s avant-garde cooking movement, recently developed most notably in the Basque country and Catalonia, reflects these conflicted relations and the associated split between national and regional cuisine. Debates rage about maintaining tradition while making modern strides in the kitchen; Spain’s recent shift from a rather isolated, conservative society to a fully integrated member of the European community has served to heighten these debates. I propose that a nation’s cuisine is a projection of the nation’s culture, and as valuable to understanding its culture as an artifact or art form. I look into three recurrent topics in debates about Spain’s relation to Europe and modernity: 1) gender and the proper roles of men in women in Spanish society; 2) Spain’s “territorial administration”—the links between Spain’s different regions and its former colonies on the one hand, and the nation’s national identity on the other; and 3) whether national identity can be conjugated with cosmopolitan or foreign influences, such as the international dominance of French cuisine in the past two centuries.

**Establishing a Female Canon: The Voices of Alfonsina Storni and Alejandra Pizarnik**

*Anna Sophia Irvin, Romance Languages*  
*Sponsor: Professor Gabriel Giorgi, Spanish and Portuguese*

This research explores the work of two female Argentine poets, Alfonsina Storni (1892–1938) and Alejandra Pizarnik (1936–1972). I investigate their notable roles in the evolution of the poetic traditions of their respective times, focusing on their distinct usages of the “yo-poético,” or the poetic speaker. Through both styles—the more consistent and accessible voice of Storni’s poetry, compared to the indirect and elusive voice of Pizarnik, which is constantly seeking to name the ineffable—their work functions as a voice for the generally silenced struggle of the autonomous woman. Drawing from various schools of feminist literary theory I examine how the knowledge of self and of world is expressed through both poets’ work. Briefly taking into account the biographies of both authors, as internally related to their poetry, I seek to understand how these daring women came to establish a uniquely feminine poetic voice that deals with such themes as femininity, feminism, independence and dependence, along with expressions of self-exploration and the discovery of a certain multiplicity of self.

**Mental Causation and the Mind-Body Problem**

*Robert Joynt, Philosophy*  
*Sponsor: Mr. David Barnett, Philosophy*

Mental causation is an important aspect of the mind-body problem. Giving an adequate account of how of it constrains acceptable positions on the issue. For example,
the way the worry about how non-extended Cartesian minds could affect extended bodies (and the more sophisticated pairing problem) helped defeat Cartesian dualism, so too I hope the Exclusion Argument can shed some light on some of the accepted positions on the mind-body problem today, especially functionalism. Jaegwon Kim argues in his “Mental Causation in a Physical World” that functionalism fails to offer an acceptable characterization of mental properties (though perhaps of mental concepts), because of its inability to cope with an argument like the Exclusion Argument. In this paper, I question his assumption about how the diversity of physical realizers in a functionalist characterization of some mental property or kind (e.g. pain) implies diversity with respect to their causal properties so heterogeneous as to be unable to form an acceptable, well-defined property. I instead argue that, given the holistic way in which functionalism defines mentality, the causal diversity Kim decries is irrelevant to cases of mental causation.

The IRGC: A Revolutionary Institution in Post-Revolutionary Iran
Rebecca Karasik, Middle Eastern and Islamic Studies
Sponsor: Professor Arang Keshavarzian, Middle Eastern and Islamic Studies

In 1979, the Constitution of the Islamic Republic of Iran allocated a single article to the establishment of the Islamic Revolution Guard Corps (IRGC). The members of the institution were designated as the “guardians of the Revolution and its achievements.” Since then, scholars and observers have analyzed the exponential growth of the IRGC in the economic, political and cultural sectors. The Revolutionary Guard is now considered by some to be a powerful, monolithic institution, with strong personal ties to both the Supreme Leader Ayatollah Khamenei and President Ahmadinejad. Through my analysis of actions and statements of the Revolutionary Guard, I conclude that the Revolutionary Guard is neither monolithic nor has it seen a linear rise to power. I review crucial moments in post-revolutionary Iran in which the IRGC has shown itself to be internally fractionalized. These moments show that this IRGC continues to debate and reinterpret not only its own function within the power structure of Iran, but also the definition of the Islamic Republic itself.

Child Stars in Transition: Shirley Temple and Michael Jackson
Emily Katz, Tisch School of the Arts
Sponsor: Dr. Andrea McKenzie, Expository Writing

Shirley Temple and Michael Jackson were two of the best known child stars in the world. Temple was the youngest person ever to win an Academy Award; Jackson was the youngest person ever to record a number one single. Although both had incredibly successful childhood careers, Temple retired at the age of 21, while Jackson was able to maintain his success into adulthood. Why did Jackson succeed where Temple failed? What career moves did each make that either worked or didn’t work according to audiences of the times? My research reveals that the culture of the time period of each child star—the Great Depression for Temple and the end of the Civil Rights movement for Jackson—affected their careers. Marketing, too, affected their transitions as each performer “trademarked” a type of singing and dancing. Temple’s appeal, her childlike cuteness, was embraced by a depressed America, while Jackson’s seemingly adult understanding of lyrics and dance moves was embraced by a newly racially integrated America.

“All that Space”: Philip Johnson and the Elmer Holmes Bobst Library
Alexander Kauffman, Art History
Sponsor: Professor Carol Krinsky, Art History

The potential for a monumental interior space was Philip Johnson’s primary architectural concern when he designed the Elmer Holmes Bobst Library (1964–1973) at New York University. Whenever the 150-foot high interior court was questioned in NYU’s planning meetings, Johnson would threaten to quit the project. Invited to design the library by university president Dr. James Hester, Johnson knew that the university was depending on him to attract publicity and major gifts from donors. Drawing from the Joseph J. Roberto/Office of the University Architect Collection of New York University Archives, this research charts Philip Johnson’s emergence as the library’s chief architect. Johnson’s idiosyncratic design is examined in the context of his theories of architectural history and urban preservation. Considering Johnson’s own writing and newly published interviews, along with the correspondence and meeting minutes in the NYU Archives, I conclude that the open-atrium design, though detested by architectural and library consultants, was conceived by the architect as a response to the loss of monumental architectural spaces in New York City.

Philosophical Foundations for the Biological Hierarchy: Realism, Pluralism, and Okasha’s “Evolution and the Levels of Selection”
Diana Klopsis, Philosophy
Sponsor: Professor Laura Franklin-Hall, Philosophy

What kinds of units are being “selected” by natural selection: organisms, groups, genes, or a combination of these? Answering this question involves a mixture of empirical and conceptual issues. I begin by discussing one
philosophical debate under the broad heading of the “levels of selection question,” namely the issue of “realism” vs. “pluralism” about the levels of selection. I then use the realism vs. pluralism debate as a lens through which to examine Samir Okasha’s work on the levels of selection. Okasha is a realist who aims to give a causal interpretation of the levels of selection. As such, I review the factors involved in Okasha’s depiction of multi-level selection as a causal process. Importantly, Okasha argues that consideration of “the major transitions in evolution” provides good evidence for higher-level selection, such as group selection, in the past, and thus evidence for realism about the levels of selection. I conclude that despite his arguments concerning the “the major transitions in evolution,” Okasha does not provide any novel arguments in favor of realism. Moreover, the pluralist thesis remains a tenable option for describing even these “major transitions.”

Free Indirect Discourse in Flaubert and James
Diana Kole, Comparative Literature
Sponsor: Professor Jacques Lezra, Comparative Literature

Precision of style was of crucial importance to both Flaubert in Madame Bovary and James in What Maisie Knew, and each used a particular narrative style—free indirect discourse—to inhabit their respective protagonists’ interiorities. By employing free indirect discourse to present their characters’ respective interior lives, Flaubert and James present narratives at a lesser degree of mimetic removal from these subjective perceptions, disguising narratorial mediation. The erasing of explicit reporting tags and the use of the French imperfect tense and the English past progressive, common tense shifts in free indirect discourse which serve falsely to expand and compress narrated time, allow the authors to present their protagonists’ perceptions as representations of reality within each novel. Flaubert and James slide in and out of free indirect discourse, using appropriation of characters’ lexicons and sacrificing sophistication of language for accuracy of a character’s particular representation. The necessary construction of these literary techniques, though they serve as an attempt to efface the narratorial and authorial presence, in fact point out their own fictionality, creating not pure mimesis but a blend of mimetic and diegetic impulses.

Public Spectacles as Expressions of the Life of a Nation: Mexico City 1910 and 1968
Ana Isabel Lagos, Metropolitan Studies
Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies

The Centenario in 1910 and the 1968 Olympic Games were two celebrations that took place in Mexico City in the twentieth century. The Centenario was the 100-year celebration of the independence that was celebrated at a time of economic growth and a stable political situation in which Porfirio Diaz had been president for about three decades. The 1968 Olympic Games were hosted in Mexico City despite a general skepticism of a developing country being equipped to host the Games; at the time Mexico was struggling to industrialize and the political climate was tense due to student demonstrations in Tlatelolco. The two celebrations functioned as public spectacles that expressed the life of the nation in specific historical contexts in Mexico’s capital city. The narrative conveyed through the celebration of the Centenario served to construct a national identity, while the narrative of the Olympic Games served to display Mexico City as a global city. This study shows how two public spectacles in the same city at different times were able to reinforce national centrality and sovereignty while still being shaped by historical specificity.

Madam President, Sir: Forms of Address in Fictional Outer Space
Isabel Lane, Russian
Sponsor: Professor Louise Vasvari, Linguistics

Battlestar Galactica, a television show that aired on the SciFi channel from 2003 to 2009, centers on a military and civilian command structure in fictional outer space. This command structure includes women in positions of power and must use forms of address accordingly. This is also an element of the television program Star Trek: Voyager, a program similar to Battlestar Galactica in setting and content, that aired on UPN from 1995 to 2001. The forms of address used in both television shows are standard English terms, but their use is sometimes non-standard in relation to women, especially those in powerful positions. In my research I looked at a number of terms that are used by characters on the television show as forms of address: “Sir,” “Ma’am,” “Madame,” first names, and titles for military rank. Through this research I attempted to ascertain whether the use of “sir” is an acceptable substitution for a gender-neutral form of address for women. Though perhaps not ideal, “sir” is a vital part of command systems, especially in an extremely stratified system like the military, both fictional and actual. Other information has also been drawn from texts relating to issues of gender and language, specifically forms of address for women. In addition, information about actual American military practice pertaining to the address women of high rank has also been collected.
Recreating Velázquez: Gonzalo Cienfuegos’s Las Meninas
Abigail Lapin, Spanish and Art History
Sponsor: Professor Jordana Mendelson, Spanish and Portuguese

Gonzalo Cienfuegos (b. 1949) is a contemporary Chilean artist who mixes appropriations of paintings from the art historical past with contemporary imagery from modern life and scenes from the Chilean landscape. In his first series of appropriations from 1978 to 1979, Cienfuegos created three paintings and two drawings that referenced explicitly Diego Velázquez’s Las Meninas. In his recreations of Velázquez’s most famous painting, Cienfuegos studies the idea of a painting within a painting, of the interaction of realist styles with what he calls “absurd” objects. The original imagery is placed in new contexts that actively connect both the contemporary Chilean artist and his art historical predecessor. In this series, he uses his vast imagination to create a painting that visually interprets Las Meninas through a Chilean viewpoint that is both individual in its motivation and national in its staging. Cienfuegos draws upon his own subjective view of the painting and its more general significance as a representative work from Spain’s Golden Age, a period of time that connects Cienfuegos’s appropriations with Chile’s colonial past. The Chilean iconography, the landscape, and the figures’ different appearance all demonstrate the artist’s desire to link his own work to Chilean identity and heritage. I argue that Cienfuegos tests the boundaries of art history and joins objects, styles and ideas that usually clash in a balanced and playful composition. The paintings and drawings invite the viewer to join his conversation with the past, and in turn bring the pictorial traditions of Europe into dialogue with contemporary Chilean art and culture.

Problematic Alliance: The United Irishmen, Wolfe Tone, and Revolutionary France, 1795–1798
Deirdre T. Lyons, History
Sponsor: Professor John Waters, Irish Studies

My historical research focuses on the alliance formed between United Irish revolutionaries and the French Directory from 1796 to 1798. After careful negotiations with Wolfe Tone (a United Irish leader), the Directory sent two expeditionary forces to Ireland in 1796 and 1798 with the ultimate aim of separating the island from Britain. Traditional historiography has claimed that the Franco-United Irish alliance made practical and ideological sense in the 1790s. My research questions this framework that has long guided academic discourse. By using the diaries and writings of Wolfe Tone, I argue that the Franco-United Irish alliance was forged against a myriad of contradicting revolutionary ideologies. Furthermore, I approach this topic through the lens of pan-European, trans-Atlantic events in the late eighteenth century in order to complicate my understanding of the nature of this alliance. My preliminary conclusions are that, even before the disastrous attempts of the French to send expeditionary forces to Ireland in 1796 and 1798, the relationship formed between the Directory and the United Irishmen was tense and problematic.

The Integration of Chinese and Western Musical Traditions in Tan Dun’s Ghost Opera
Melissa Magrath, Music
Sponsor: Professor Stanley Boorman, Music

The important Chinese composer Tan Dun incorporates Chinese elements from his heritage in his music, along with Western classical and experimental musical techniques. In order to understand his musical aesthetic and his use of Chinese elements, it is necessary to view his music as a product of his life experiences. He spent his childhood in a rural area of the Hunan Province in China during the Cultural Revolution, where he was exposed to the rich folk music culture. As a teenager he spent a few years in a Beijing Opera Troupe, before being admitted to the Central Conservatory in Beijing at the end of the Cultural Revolution. Later, he moved to New York City where he lives and works today, and was introduced to the avant-garde music scene. Each phase, especially his exposure to Chinese traditions, had a significant influence, all of which can be seen in a central work, the Ghost opera. Written for string quartet and pipa, it includes a Chinese folk song, a Bach prelude, chanting monks, and performers playing stones and bowls of water. My research shows how Tan Dun molds these elements together to create a unique sound that is his own.

Annapolis: Sustainable Planning 360 Years in the Making
Emma Marconi, Urban Design and Architecture Studies
Sponsor: Professor Jon Ritter, Art History

In the coming decades population increases threaten to overwhelm urban environments. As a result, it is necessary to understand the strengths and weaknesses of existing cities, such as Annapolis, Maryland, in order to properly retrofit and build for the future. In order to develop sustainable solutions, we can evaluate the urbanism, the historic preservation, and the historic construction methods and materials of Annapolis. Arguably, the most important preserved aspect is the urbanism of Annapolis, which utilizes several key components of sustainable planning, including reducing vehicle travel and promoting compact and mixed use development. Furthermore, the city’s historic preservation, which includes the
adaptive reuse of buildings, saves natural resources, such as raw materials, energy, water, petroleum, and labor, required to build new structures. In addition, many of the structures that have been preserved are sustainable for their construction. These buildings employ local materials with low embodied energies, thick insulating walls, window shutters, and floor plans that enhance day lighting and air ventilation. Understanding these practices as utilized within the historic downtown of Annapolis provides us with better tools to retrofit existing town centers for sustainable future growth.

The Musicality of Immortality: Configurations of the Aeolian Harp in James Joyce’s Ulysses
Matthew Margini, English
Sponsor: Professor Abby Bender, Irish Studies

James Joyce’s Ulysses is a monument to literary modernism’s most eclectic, encyclopedic tendencies: the impulse to assemble a vast collage out of other people’s stuff. But the Aeolian Harp, a musical metaphor from the Romantic period, is the kind of complex ingredient that speaks volumes beyond the logic of sheer all-inclusiveness, proving that Joyce was always thinking about writing as a means to transcendence. Named after Aeolus, the Greek god of wind, the harp, a wooden block with a few strings on it that would be “played” by the passing breeze, was a modest tchotchke that enjoyed a spot on many English windowsills during the late eighteenth and early nineteenth centuries. But it became a central metaphor of the Romantic poetic tradition, celebrated by poets such as Coleridge and Shelley as a perfect image for the way knowledge, imagination, visionary experience—poetry itself—could flow over the human mind and resonate forever. My research demonstrates the ways in which Joyce uses the harp to engage in intertextual dialogue with these very different literary predecessors. First, I focus on the chapter “Aeolus,” a narrative of useless newspapermen in which Joyce presents the harp as a device of epistemological pretention. Knowledge, he implies, is not the unified Voice of God, flowing over all of us; it is a whirlwind of fragmentation. In “Sirens,” however, a chapter in which Joyce self-consciously tries to create his own musical symphony, the harp returns as a kind of divine preservative: a means by which Joyce’s words can become a “stony effigy in frozen music,” divinely—and paradoxically—enduring.

Männlichkeit: The Male Body in the Art of Franz von Stuck
Janel Feliz S. Martir, Art History
Sponsor: Professor Elizabeth Mansfield, Art History

The visual representation of the male body preoccupied Bavarian artist Franz von Stuck (b. 1863). After the Franco-Prussian War of 1871, a Prussian-dominated German Empire was born under the diligent direction of prime minister Otto von Bismarck. By constructing visual narratives of masculine display and dominance often replete with nationalistic and militaristic significance, Stuck responded to the ideological needs of the new German Empire. Adding further complexity, Stuck articulated a mode of masculinity premised on the reclamation of a classical past. His work reveals a cultural nostalgia for a lost Arcadia populated by centaurs, fauns, and nymphs. This study investigates the relationship between Stuck’s construction of a mythologized male body and German nationalism. While much analysis has been devoted to Stuck’s images of female forms, a sustained evaluation of his approach to male form and his expression of a German masculinity has not been attempted until now. By analyzing the relationship between war, masculinity and nation within the German Empire, I demonstrate that Stuck constructs a form of male heroism that symbolically defines masculinity through both violence and rationality, an incongruous combination that typified late nineteenth century German expansionist policies.

Interdisciplinary Action: The Convergence of a Misconstructed Reality with Itself
Shivam Mathura, Undeclared
Sponsor: Professor Friedrich Ulfers, German

One normally associates the word “language” with the notion of communication; sometimes unknowingly disregarding the idea that language is also used to interact with one’s own thoughts. This project considers the perspective that language is necessary and possibly prior to our conceptualization of reality. It explores the convergence of modern science and literature in the twentieth and twenty-first centuries to demonstrate how our perception of reality, as characterized by language, is imprecise. If the language we use is fundamental to our view of reality, and the language itself is inherently flawed in its metaphorical, representative nature as deconstruction suggests, then we question the very basic essence of intellectual discourse. This project further examines how those post-classical scientific discoveries like the theory of relativity and the advent of quantum theory, and modern and post-modern literary works like The Waves by Virginia Woolf and The Unbearable Lightness of Being by Milan Kundera, ask questions of these mythological and philosophical underpinnings, and posit solutions and suggestions to this problem that constitute a paradigmatic shift of worldview.
Trapped in the Closet: Privacy and Power in James Baldwin’s Longer Novels
Jessica Matuozzi, English
Sponsor: Professor Phillip Brian Harper, English and Social and Cultural Analysis

My paper addresses the management of secrecy, the execution of surveillance, and the contestation of privacy within James Baldwin’s three longest novels: Another Country (1962), Tell Me How Long the Train’s Been Gone (1968), and Just Above My Head (1979). I argue that secrets do not protect the privacy of the individual said to hold them; instead, they legitimize continual infringements of privacy, as they produce the desire to monitor, gossip about, and otherwise harass the person in whom they supposedly reside. More precisely, secrets function as the disciplinary technologies through which subjects are rendered more or less vulnerable to surveillance, and non-normative subjects—for instance, people of color and queers—receive the most scrutiny in this system of investigative operations. I outline four ways in which secrets facilitate incursions on privacy. First, the secret invites a proliferation of discourses and knowledges, rather than marking, as is commonly thought, the silence and ignorance that constitute the outer limits of discourse and knowledge. Second, the labeling of situations as “open secrets” enables those who purport to be “in the know” to arrogate control over the one who is “known” even as they claim to respect his or her privacy. Third, the secret, as it lends an aura of rarity and significance to the “truth” it covers over, proves a liability to the autonomy of the individual who holds it. Finally, labeling certain aspects of an individual’s identity “secret” allows the depoliticization, trivialization, or disavowal of these aspects.

Morgan v. Collier: The Debate on the Indian Reorganization Act
Edward I. Maxwell, History and German
Sponsor: Professor Maria Montoya, History

Appointed Commissioner of Indian Affairs by FDR in 1933, John Collier sought to enact legislation that would be a break from the U.S. government’s previous Indian policies. Collier imagined the Indian Reorganization Act as a positive departure from the government’s previous Indian policies of allotment and assimilation. The IRA meant to empower Native Americans as members of distinct communities, not as individuals, enabling them to reorganize around new tribal constitutions and economic goals. Collier hoped that these provisions would help the Indians preserve their heritage against further dissolution, but he and the IRA were not without opponents. Specifically, I studied the criticisms of Jacob C. Morgan—a very vocal Navajo Indian and member of the Navajo Tribal Council. Analyzing his and Collier’s publications on the IRA, I determined their specific points of disagreement. I also closely reviewed Collier’s and Morgan’s autobiographical works in order to discern each man’s personal motivations—values, goals, or ideals—that would have affected his opinion of the Indian Reorganization Act. An analysis of their ideological disagreement complicates the historical understanding of the Navajo referendum, contextualizing the Navajo rejection against a backdrop of social discourses that involved modernists, anti-modernists, assimilationists, traditionalists, cultural pluralists, and social Darwinists. Collier was convinced in his belief that the resurrection of traditional Native American communities was the only way to reverse the cultural bankruptcy Indians had endured. Morgan, however, saw U.S. citizenship and the adoption of White American culture as the only viable path to progress for Native Americans.

Constructing Reality: The Value of Translation in Light of the Sapir-Whorf Hypothesis
Timothy McEniry, Undeclared
Sponsor: Professor Friedrich Ulfers, German

In his essay “The Relation of Habitual Thought and Behavior to Language,” published posthumously in 1956, linguist Benjamin Lee Whorf concluded through research into the Hopi language that “our own concepts of ‘time,’ ‘space,’ and ‘matter’” may not be “given in substantially the same form by experience to all men,” but rather are “in part conditioned by the structure of particular languages.” This hypothesis—that fundamental components of formal thought may be inherent to, and therefore dependent on, a given language or language group—is in many ways counterintuitive. Quite contrary to the prevailing belief in an objective reality that influences thought, and (by extension) language, Whorf’s hypothesis suggests that it is rather language which gives rise to thought, which in turn determines a subjective reality. This study evaluates the validity of Whorf’s linguistic relativity principle by considering Dan Everett’s research into the Pirahã language as well as Whorf’s own Hopi example. I structure this evaluation around an exploration of selections from the work of the postmodernist writer Jorge Luis Borges, whose ideas I place in context with linguistic relativism in order to consider the possibility, and difficulties, of meaningful translation.
Cicero the Advocate: Strategy in the Roman Courtroom  
Rachel McEvoy, Classics  
Sponsor: Professor Michael Peachin, Classics

Cicero often strays from the legal matters involved in his court orations. An analysis of his speeches reveals three topics that he commonly covers in addition to the legal facts of a case: social status, morality, and politics. Sextus Roscius was charged with parricide. In defending him, Cicero cites plays that illustrate the virtues of farming. Though these hardly get at the issue of whether Roscius killed his father or not, Cicero uses the stories to paint a positive moral picture of Roscius, who diligently tended his own land. Cicero also stresses the dignity of both Roscius and his father due to their time spent mingling with nobles. This would resonate with a Roman audience that made many significant value judgments based on the social status of an individual and his associates. In the same oration, Cicero warns that if the jury sides with the prosecution, they will have inaugurated a crueler version of proscription. In making this clearly political argument, Cicero works up much negative sentiment toward the plaintiff by aligning him with the horrifying effects of Sullan proscriptions still fresh in Roman minds. Though seemingly superfluous to settlement of a dispute involving a matter of law, I argue that well-established standards of social status, morality, and politics were in fact highly relevant when attempting to persuade a Roman jury. The significance of these extra legal issues reveals a process of determining guilt or innocence that is less an issue of the black and white legalities of the matter at hand, than an evaluation of how a case plays out in the context of Roman values—and the rhetorical presentation of those values.

Social Variation in the Pronunciation of /r/ in Glasgow, Scotland  
Shannon Mooney, Linguistics  
Sponsor: Professor Gregory Guy, Linguistics

My study examines the use of variant acoustic realizations of the /r/ phoneme in the English of Glasgow, Scotland. I conducted sociolinguistic interviews with young adult speakers from working class backgrounds. The main focus of my study was the social significance and usage of the variants. The interviews addressed the context of networks and communities existing in the city, providing perspective on the language attitudes and social identities of this group. The speakers show pronunciation differences associated with gender and aspirations that suggest conclusions about how they use /r/ pronunciation as a medium through which social identity can be presented. The goal of this study is to show the process of language change through the lens of social stratifications within a community. Though there is a prestige dialect for the Glaswegian speech community as a whole, there is also prestige and pride associated with the dialect unique to the particular social class to which one belongs. The results of my research have a dual nature: one part phonetic data analyzed for acoustic variation between speakers and between formal and informal registers in individual speech using Praat; the other part a social analysis of a class-stratified community qualified by sociolinguistic interviews with members of that community.

Literature and Crisis during the Reign of Æthelred ‘Unræd’  
Leonard Neidorf, English  
Sponsor: Professor Haruko Momma, English

The reign of Æthelred ‘Unræd,’ from 978 to 1016, is regarded by historians both medieval and modern as one of the darkest periods of English history. Yet despite the incessant turmoil and calamity, a great deal of literary activity managed to take place: a significant proportion of the surviving Old English corpus was either composed during this period or survives solely in manuscripts that were written out during it. Surprisingly, the two features that distinguish the reign of Æthelred—its literary output and its national crises—are not usually considered in relation to one another. Scholars have tended to consign literature to the monastery and crisis to the court. It is the aim of this thesis, however, to suggest that literature and crisis were intimately linked; that as the latter grew worse, it provided an impetus to production of the former. I argue, moreover, that the continual success of the Viking invasions produced a cultural atmosphere that was characterized by a search for alternatives and a vigorous examination of English policy and identity. To show how particular texts participated in this process of searching and examination, I divide my thesis into three sections. My first section, focusing on the writings of Wulfstan, Archbishop of York, argues that the Viking invasions led Wulfstan to turn increasingly towards the Anglo-Saxon past for answers—even the past represented in imaginative literature. I begin by delineating the contours of his relationship with the past, piecing it together from various strands in his corpus, and then I offer a new reading of the Sermo Lupi ad Anglos, suggesting that it contains a call to return to the values of the past. The second section considers the ways in which Beowulf would have been highly resonant and politically relevant during the reign of Æthelred, through its combination of heroic and elegiac material as well its representation of an invaded kingdom. The third section discusses The Battle of Maldon and the new vision of English identity the poem offers. I read the Maldon poet’s representation of Byrhtnoth as a re-evaluation of the Christian/heathen
dichotomy: faced with an insurmountable heathen other, the poet calls for the appropriation of ‘heathen’ behaviors never before integrated into Christian English identity. As these cases show, solutions were being sought, alternative codes of behavior were being considered, new exemplars were being offered, and English identity was being re-evaluated—and it was in vernacular literature that these processes were able to work themselves out.

Writing My Novel
Liam O’Brien, English
Sponsor: Professor Jonathan Safran Foer, Creative Writing

Creative writing minors at NYU are expected to take a certain number of workshops to fulfill the sixteen required credits. What they choose to take from these workshops once they are finished varies as it can be a matter of personal preference. Every writing student, however, who truly yearns to become a professional and published writer is confronted by similar doubts and intimidation. How will I make money? Where should I send my material? Is it luck, talent, both, or neither that truly matters? The one certainty we cling to is that to be a writer, you have to write. This project was an exploration of this conclusion; specifically, devoting the summer to a writing project I have worked on for a number of years, namely a novel that chronicles the lives and comings of age of three friends whose lives begin to unravel after they witness a horrific and unexplained crime. The goal of this project was simple: I, having fulfilled my creative writing minor, was to create my own full-time schedule and approach to this project, unencumbered by prior commitments, avoiding distractions and doubts as much as possible. Given this freedom, I wrote more than 100 new pages, fully fleshed out the novel’s structure and arc, and came to a greater understanding of these characters with which I have worked for so many years.

Meaning Skepticism and Lewisian Reference Magnetism
Adam Paris, Philosophy
Sponsor: Professor Crispin Wright, Philosophy

This research examines the tenability of an externalist response to Saul Kripke’s argument for the conclusion that our words have no determinate meaning. Kripke’s argument can be framed as a challenge: If the speaker’s expression, $E$, means $M$ determinately, then, in principle, one could provide a set of non-semantic facts in virtue of which $E$ means $M$ rather than any one of the other meanings compatible with the speaker’s mental states and linguistic behavior. I briefly review Kripke’s arguments for the conclusion that none of the facts about the speaker’s behavior or psychology settle what she means by an expression $E$, and hence, $E$ means nothing determinately. I examine the tenability of David Lewis’s “reference magnetism” as a response to Kripke’s challenge. According to Lewis, the correct meaning or referent of an expression will hinge on facts external to the speaker—facts about the referents themselves. The facts that determine reference are facts about a referent’s “naturalness”. After discussing Lewis’s theory of naturalness that undergirds the entire project of reference magnetism, I cite three major difficulties with the project. I conclude that Lewisian reference magnetism fails to meet Kripke’s challenge and avert meaning skepticism.

Rethinking Nazi Art: A Case Study of Ludwig Hohlwein
Alexandra Polson, Art History
Sponsor: Professor Pepe Karmel, Art History

Modern art has long been associated with the left. Avant-garde, freethinking artists are supposed to create art for social justice and democracy, while old-fashioned artists support fascist, politically oppressive, and narrow-minded values. Art produced under the National Socialist regime has universally been deemed kitsch without artistic merit, a retreat from the advances of modernism and abstraction. Scholars have recognized the links between Italian Futurism and Fascism, but only recently has Nazi art been re-examined, as scholars have discovered veins of modernism running through Nazi imagery. Art historical examinations of painting, sculpture, and architecture have elucidated modernist elements and tracked their evolution, but the vast mass of Nazi propaganda posters has been excluded from reexamination. Although the propaganda posters designed by Russian Constructivist artists have been treated as beacons of modern design and illustration, their German counterparts are still relegated to “low art” status. The juxtaposition of text and illustration in these posters makes them a rich site for the study of modernist imagery and modern thought, including Nazism. Through visual and iconographical analysis of three posters designed by the internationally renowned German designer Ludwig Hohlwein (1874–1949), I show how modernist design principles played a surprisingly important role in National Socialist Modern propaganda.

From Miracle to Crisis: Mexican Cinema and the Construction of National Identity in the 1940s and 1970s
Kate Richardson, Spanish
Sponsor: Professor Jill Lane, Spanish and Portuguese

In the 1940s Mexican politicians sought to modernize the country’s economy and society through the use of import substitution industrialization and the construction of
a unified national identity. Integral to this process was the state-supported Mexican film industry, which made films that reinforced and celebrated national symbols to create a sense of common identity. By the late 1960s, however, social injustice was growing despite the economic boom known as the “Mexican Miracle” and the state’s desire to project an image of Mexico as a modernized country without social conflict took a tragic turn when hundreds of student protesters were massacred by government agents during a 1968 protest in Mexico City. My research concerns the relationship between political power, the construction of national identity, and cinema in Mexico during two periods of marked social and economic transition: the 1940s and the 1970s. I conduct my analysis by comparing two films from the 1940s—Río Escondido and Nosotros los pobres—with two films from the 1970s—Canoa and Mecánica nacional. A comparison of these films in terms of form and content shows how Mexican identity was renegotiated and redefined as a fractured, imperfect concept by national cinema in the wake of flawed modernization and political violence.

Antonio López García: Realism in the Age of Abstraction and Modernity
Hannah J. Roberts, Art History
Sponsor: Professor Elizabeth Mansfield, Art History

After political and economic isolation, the Spanish government in the 1950s began to focus on its role in the international community. In order to appeal to the United States, UNESCO, and the United Nations and convey an image of modernity, the government used abstract art that applied new modes of representation. Spanish artist Antonio López García was overlooked because his Realist art did not conform to the government’s agenda. Through visual analysis of López’s still life paintings of ordinary objects, I demonstrate that he incorporates elements of past Spanish painters such as Diego Velázquez, but also finds the mystery and abstraction of reflection that ask the viewer to look closer at the everyday world. Rejecting the Spanish government’s trend to look exclusively at modernity, López looks unflinchingly at the world around him with an admiration of the history that has created it. His real, everyday scenes, far from being old-fashioned, are a avant-garde look at reality in an age that considers abstraction as the “modern” approach to art.

An Investigation of Word-Internal Syllabification in Moroccan Arabic
Amanda Rysling, Linguistics
Sponsor: Professor Adamantios Gafos, Linguistics

In Moroccan Arabic (MA), clusters of one, two, and three consonants are permitted in every position of a word. Because previous work has thus far focused only on consonants at word edges, the patterns discovered may be interpreted as properties of word edges, and not onsets or codas themselves. Data were collected from four MA speakers via Electromagnetic Articulometry (EMA), which tracks the movement of small pellets attached to articulators of interest during speech. Two hypotheses about the prospective structural nature of the onset in MA were contrasted in their predictions about patterns of temporal organization. These differed in stating either that the MA onset may be composed of a single consonant only, or that multiple consonants can participate in a complex onset, designated the simplex onset hypothesis and the complex onset hypothesis, respectively. The time intervals between landmarks in each cluster were found to either increase or remain constant with the number of consonants in the cluster in a manner consistent with the single-consonant onset hypothesis. On the basis of these, it was determined that MA follows a structural organization consistent with single-consonant onsets only.

The Battle for Socrates’ Succession: Diogenes the Cynic’s Abuse of Plato
Caleb Scholle, Classics
Sponsor: Professor Phillip Mitsis, Classics

I argue that Diogenes the Cynic’s abuse of Plato, recounted by the biographer Diogenes Laertius, is not, as scholars have generally assumed, a mere literary invention. Rather, Diogenes’ abuse provides us with a record of an historical philosophical rivalry between Plato and the earliest Cynics. By examining the substance of his abuse of Plato, Diogenes’ motivations become clear, for these are not random attacks on a prominent public figure, but rather a concerted and systematic effort to denigrate a philosophical rival. I focus on one major theme of Diogenes’ abuse: Plato’s vanity, for Plato is portrayed by Diogenes Laertius as shamefully engaging in the pursuit of luxury. Thus, Plato becomes the anti-type to the Cynic, who coolly restrains himself from material pleasures. Diogenes, who lives a philosophically pure ascetic life, as Socrates did, abuses Plato as a means of establishing philosophical supremacy. By abusing Plato, Diogenes brilliantly sets forth the tenets of Cynic philosophy and establishes himself as the pre-eminent philosopher in Athens—the rightful heir to Socrates’ legacy.

In My Flesh Shall I See God: The Corrupted Body and the Individual in the Works of John Donne
Emily Sheeler, English
Sponsor: Professor John Archer, English

In 1612, John Donne published two lamentations over the death of the young Elizabeth Drury, “The First
Anniversary” and its sequel “The Second Anniversary.” Often read as texts only connected through their subject, the two have been considered expressions of sadness at the loss of Elizabeth, a reason for Donne to explore the theme of death, and examples of “the traditional opposition of soul and body.” That the two poems have most often been read as separate works points toward the trend in theory which considers Donne’s writings as disparate entities, not adhering to a central theme. This study examines an overarching tendency toward considering the relationship between the body and the soul as seen through various examples of Donne’s writings. Using sermons as well as poetry, I determine that Donne’s writings are most often occupied with the theorizing of the body and the soul in relation to the individual. Through use of violent and grotesque imagery, Donne provides a view of the relationship between the body and the soul as complex as well as essential to the formation of an individual in the absence of God’s voice and aid.

Comparativism: Literary Linguistics

Gabriel N. Slamovits, Self-Designed Honors Major—Linguistics and Literature
Sponsors: Professor John R. Costello, Linguistics, and Professor Friedrich Ulfers, German

This research shows that linguistic analysis constitutes a crucial component of literary interpretation. Language, the key element of the traditional text, is the primary means of human communication. In order to communicate, we tie language to the realm of binary logic, giving each word univocal meaning. Literature, however, utilizes metaphorical language, which is detached from binary logic. Consequently, literary analysis has often focused on “translating” literary language into logical, conventional terms. My research shows that this approach is no longer appropriate, since the “linguistic turn” of the twentieth century showed that all language is inherently metaphorical. It is, therefore, imperative to pay attention to metaphorical language in literary works, particularly in translated works, which often disregard much of the metaphor present in the original. This study showcases three methodological approaches, highlighting the ways that linguistic analysis can serve as a literary tool. The first method of analysis examines a literary work through the lens of historical linguistics. A second method compares language systems, emphasizing how differing means of expression impact the thinking of those who utilize that particular language. A final method examines how the understanding and, consequently, the use of a given word changes over time in the context of the historical, sociological, and political factors that lead to such changes. This research has significance for improving cross-cultural linguistic exchange within the context of globalization.

Queering the Women’s Tennis Association: Interrogating Gender Performance at the Highest Level of Female Competition

Anita Stahl, Gender and Sexuality Studies
Sponsor: Professor Gayatri Gopinath, Social and Cultural Analysis

Tennis is unparalleled in giving women the opportunity to gain fame and fortune through athletic performance. Because competing as a professional athlete runs counter to notions of normative femininity, the players, the tour and the sponsors are invested in carefully policing gender performance, bolstering feminine players while demeaning and punishing those who will not conform. The first case considered is the rivalry between Martina Navratilova and Chris Evert. Evert’s hetero-feminine image was dichotomously created against superior player Navratilova’s, who was known for her masculine appearance and open homosexuality. These early gendered and sexualized types became visible again in 1999 when Amelie Mauresmo came out of the closet in the face of criticism about her muscular appearance. Her homosexuality served to compartmentalize deviant sexuality; her coming out of the closet neutralized other players’ queer potentiality by concretizing gayness on her body. Ten years later the fallout of a controversial U.S. Open match between Serena Williams and Kim Clijsters revealed the deep racial tension that exists in the sport and is tacitly tied to Williams’ perceived aggression and alleged masculine physical presence. While the WTA and advertisers carefully craft sellable, feminine images of their star athletes, critics and competitors shame players who dare strive to be anything else.

Concrete Poetry: From the Dualistic to the Dual in de Campos

Jacob Steinberg, Spanish
Sponsor: Professor Friedrich Ulfers, German

In the field of post-structuralist linguistics, Jacques Derrida introduced a radically altered perception of reality, particularly in his work La Dissémination, where, departing from the examples of Plato’s pharmakon and Mallarmé’s hymen, he creates a dual worldview where opposites are intertwined and inseparable. On the semiotic level this amounts to accepting the relatedness of traditionally thought positive and negative values in language. The research attempts to locate the twentieth century concrete poetry movement in Latin America within this post-
structuralist dual worldview. Departing from established research that responds to concrete poetry’s defiance of the arbitrariness of the linguistic sign, this project takes into account the Brazilian Noigandres movement, particularly the work of Augusto de Campos and his “equivocábulos.” The goal is to reread these works beyond the mere playfulness of their language as texts representative of their authors’ worldviews. The playfulness present in this poetry is not merely a fanciful experiment with words, but rather fueled by an intuitive perception of the world that is thus structured on dualisms instead of dualities.

Kassandra and the Wolf: A Study in Language
Lemonia Stroubos, Hellenic Studies
Sponsor: Professor Liana Theodoratou, Hellenic Studies

Writing in the context of state censorship is often a risky and complicated gesture. This can be seen in Greek literature written during the military dictatorship of 1967–1974, and perhaps particularly in the case of Margarita Karapanou and her first novel, Kassandra and the Wolf. This research examines how writing as a woman under the shadow of dictatorship influences Karapanou’s language. I contend that such language portrays a different means of measuring what it means to be human and of overcoming the limits on self-expression under censorship. In particular, by associating maternity with creativity, Karapanou offers us a lens through which we might negotiate censorship in the name of invention. As such, censorship is addressed not simply through the rejection of borders and limitations on meaning. Ultimately, Karapanou revises language itself and the systematic manner in which all of us read and write.

The Black Death and the Jews: A Story of a Naturally Occurring Disease as an Instrument of Anti-Semitism
Andrew Tepper, History
Sponsor: Professor Richard Hull, History

In 1348 a disease began to spread throughout the European continent. This disease, known as the bubonic plague or Black Death caused by the microorganism Yersinia pestis, decimated Europe’s population. Historians estimate that up to half of Europe’s population died during this time; the plague left an enormous mark on European society. As no one could explain the origin or cause of the plague, many people accused the Jews of being the cause and purveyor of the disease. This study traces the spread of the disease and its implementation as a vehicle and fomenter of Anti-Semitism. I demonstrate through some Christian and Jewish accounts of the time and historical analysis that the Jews, a small minority in European society, were as affected by the plague as their Christian neighbors. By looking at Christian attitudes toward the Jews during this time and previous centuries, I determined that these accusations stemmed from deep seeded religious tensions and economic resentment towards the Jews.

Hume’s Views on the Psychology of Causation and Their Disagreement with Contemporary Psychological Research
Eric V. Tracy, Philosophy
Sponsor: Professor Michael Strevens, Philosophy

Hume, in his Enquiry Concerning Human Understanding, argued for the claim that we have no idea at all of causality. Put another way, Hume thought that we never actually represent in our minds a causal relation out in the world. In his 1994 paper, Leslie argues that, in light of experimental data, it seems that we not only have a representation of causation at our disposal, but that this representation is innate and is accompanied by innate information processing mechanisms. In this paper, I briefly summarize Hume’s argument for the conclusion that we have no idea of what he calls “necessary connexion.” I then briefly explicate Leslie’s conclusion about the perception of causal relationships. Having displayed both positions, I attempt to determine whether or not there is genuine disagreement between the two, and, if there is, precisely what they disagree about. The research concludes with an examination of whether or not, if there is genuine disagreement, Hume’s views can be rescued so that they are consistent with Leslie’s experimental results and subsequent conclusions.

“Terrestrial or Cosmic Ideas”: Theologics and Thomistics in Messiaen’s L’Apparition de l’Église Éternelle and Debussy’s La cathédrale engloutie
Adam Waller, Music
Sponsor: Professor David Butler Cannata, Temple University

Olivier Messiaen’s (1908–92) L’Apparition de l’Église Éternelle (1932) and Claude Debussy’s (1862–1918) La cathédrale engloutie (1910) are unique in the musical canon for their depiction of a church that appears (and disappears?). Apart from this overarching shared image, the sources from which this image is drawn are actually quite different: Messiaen was a devout Catholic, and this piece, like almost all of his work, was inspired by Catholic theology; Debussy’s piece, on the other hand, was inspired by the Breton legend of the mythical city of Ys. Despite these programmatic distinctions, the musi-
In the global, capitalist modernity of South Korea, immensely popular Korean television dramas of the hallyu, the wave of Korean popular culture across Asia, display important insights into a contemporary identity that is both cosmopolitan and distinctively Korean. Female protagonists of dramas such as Boys over Flowers (2009) and Shining Inheritance (2009) undergo what Haiyan Lee has termed the “Cinderella Moment;” protagonists are transformed from low-class girls into worldly women who enjoy lavish, “Western” lifestyles. Instead of viewing these moments as exclusively Western transformations, however, my research considers these moments in light of gender and class issues in Korea. By establishing specific types of beauty, wealth, worldly success, and femininity as uniquely Korean, Korean dramas locate Korean identity in educated, urban, and upper-class society. As popular Korean television dramas sweep across Asia, the values that are depicted through female protagonists become translatable into a larger Asian identity. Korean television dramas, rather than merely copying the West, affirm both tradition and dynamic cosmopolitanism in gendered and class-specific Korean identity.

Theorizing Authenticity in American Idol
Shendi Xu, English
Sponsor: Professor Crystal Parikh, English and Social and Cultural Analysis

What does it mean to be called an “authentic” person, singer, performer, and/or show participant in the popular reality television show American Idol? First identifying several narrative strands the show continues topropound, this project critically considers the designation of authenticity in a historical and cultural moment in which performance has been linked more to persona than to the personal, and in which the rapid rise of professionalization and the career anxiety it has induced has driven young artists toward deploying social media tools to self-promote, rather than wait for “discovery” to occur. Taking several case studies from the show, the project demonstrates what the researcher believes to be the show’s project—the preservation of a version of homely Americanism and American identity—while the use of interviews and other outside materials adequately contextualizes the “idol journey” to exist merely as a subset of contestants’ larger creative and professional lives and endeavors.

Korean Television Dramas: Implications for a Contemporary Korean Identity
Lindsey Yoo, East Asian Studies
Sponsor: Professor Rebecca Karl, East Asian Studies and History

When situated in the global, capitalist modernity of South Korea, immensely popular Korean television dramas display important insights into a contemporary identity that is both cosmopolitan and distinctively Korean. Female protagonists of dramas such as Boys over Flowers and Shining Inheritance undergo what Haiyan Lee has termed the “Cinderella Moment;” protagonists are transformed from low-class girls into worldly women who enjoy lavish, “Western” lifestyles. Instead of viewing these moments as exclusively Western transformations, however, my research considers these moments in light of gender and class issues in Korea. By establishing specific types of beauty, wealth, worldly success, and femininity as uniquely Korean, Korean dramas locate Korean identity in educated, urban, and upper-class society. As popular Korean television dramas sweep across Asia, the values that are depicted through female protagonists become translatable into a larger Asian identity. Korean television dramas, rather than merely copying the West, affirm both tradition and dynamic cosmopolitanism in gendered and class-specific Korean identity.

Mozart Transcriptions
Jae You, Music
Sponsor: Professor Stanley Boorman, Music

Most people today feel unnecessarily distant from classical music. This project aims to lessen the emotional gap by transcribing six works of Mozart to the most democratic instruments of our time; two electric guitars and one electric bass guitar, the most common form in which people jam casually. The transcribed works are the Marriage of Figaro Overture, the Magic Flute Overture, Symphony No. 25 in g minor, two arias (Deh vieni alla finestra and La ci darem la mano) from Don Giovanni, and Eine Kleine Nachtmusik. The selected pieces offer a variety of orchestral music: symphony, opera, overture, and serenade. All are musically supreme, well-known, and not technically demanding for an intermediate amateur player. They do not require any special equipment other than guitars and amps. Numerous minor changes are introduced to the original music for it to work with totally different instruments. Many notes are carefully given up due to the reduced texture. The attack, dynamics, and register are adjusted if necessary, the original musical ideas are preserved as intact as possible. Players of the transcriptions will be able to relish Mozart’s unsurpassed sense of direction and balance.

The Individual Versus his Community: Identity Formation through Sociability from Schleiermacher to Simmel
Margarita Zeitlin, German and Linguistics
Sponsor: Professor Elke Siegel, German

At the turn of the nineteenth century, German theologian and philosopher Friedrich Schleiermacher (1768–1834)
undertook the task of answering how it is that man goes about developing his identity. In his seminal essay “Versuch einer Theorie des geselligen Betragens” (“Toward a Theory of Sociable Conduct”), Schleiermacher posits that it is through the art of conversation, through free exchange and interaction with others, or sociability, that one begins the arduous journey of identity formation. He maintains that successful sociability demands the search for commonality by putting the individual up against the group; once this shared space is found, one can evince facets of one’s individuality. Not a century later, German sociologist Georg Simmel (1858–1918) returned to the problem of identity formation. In the steps of Schleiermacher, Simmel also concluded that group participation is vital to the development of the individual. Instead of searching for the communal space, however, Simmel stipulated that identity is evinced only from within, through the uniqueness of the individual as compared to the group: “an individual life grows from its own roots, responsible to itself alone.” It is evident that the German conception of identity underwent a fundamental shift over the span of the nineteenth century. It is my goal to underline those differences and attempt to clear the brush of contradictions that populate this field of thought, emerging with a clearer idea of what it means to be “me.”
The central concern of the social sciences is people. Social scientists try to understand what motivates people’s behavior, how people interact and communicate in society, how they produce and distribute goods and services, how they govern themselves, how they create norms, institutions, cultures, and languages, and, in turn, how these institutions and cultures shape their thoughts and their actions. The vast scope of this inquiry, aimed at understanding human behavior and the functioning of our societies, requires a variety of diverse perspectives and approaches. The methodologies of the social sciences range widely from ethnographic studies to historical investigation, formal and mathematical modeling, survey techniques, and statistical analyses of data.

—Jess Benhabib, Paulette Goddard Professor of Political Economy

SOCIAL SCIENCES

The Effect of Heritage Language Teaching on the Academic Success of Immigrant Students
Hana Abul Husn, International Relations
Sponsor: Professor David Stasavage, Politics

Integrating immigrants into a new community is an increasingly important concern for politicians, economists and members of society alike. A vital part of integration begins with the education of immigrant students within their host countries. Heritage language teaching has gradually made its way into policymakers’ agendas and schools’ curriculums as a seemingly effective method of bringing immigrant students towards greater academic success. The data for this research was extracted from the Programme for International Student Assessment (PISA) 2003 datasets. Using a multiple regression consisting of four subject areas measuring academic achievement as dependent variables, two heritage language programs as treatment variables, and measures such as the index of socio-economic status, immigration status and language spoken at home for control variables, this study reaches a counter-intuitive conclusion. In all cases but one, the results showed a negative correlation between heritage language teaching and the academic success of immigrant students, roughly half of which were statistically significant at the 99% confidence interval.

Convergence of Private and Public: The Effects of Sexual Scandal on Political Productivity
Ann Nichole Agravante, Politics
Sponsor: Professor Rebecca Morton, Politics

Sexual scandals have become a dominant feature of political life. Thus, it is necessary to question the effects of scandal and its subsequent media onslaught on political efficacy and job performance. Existing studies have found that public trust in government is significantly tied to congressional scandals, more so than allegations of presidential misconduct. This study operationalizes several metrics of congressional productivity, including the proportion of roll call votes and bill sponsorship numbers from 1990 to 2010, in order to compare the productivity levels of congressmen who have been involved in sexual scandal and those who have not. Among the productivity metrics measured, sexual scandal demonstrates a significantly positive relationship with sponsored bill quantities and a significantly negative relationship with co-sponsored bill quantities. Given the vulnerability of the bill (co)sponsorship and passage process to political and public sentiment, these findings emphasize the primacy of public trust and political reputation as a function of productivity. While declined cooperation from fellow representatives can significantly lower acceptance of a congressman’s request for co-sponsors status, in addition
to support for his legislative proposals, public disfavor and declined trust that stem from scandal can translate to fewer votes and ultimately, electoral defeat. Therefore, political productivity metrics more sensitive to trust, credibility, and reputation factors, are significantly and adversely affected in the event of a sex scandal.

Effects of Planning to Implement Goal-Setting Strategies on Drinking Moderation
Maryann Aita, Psychology
Sponsor: Professor Gabriele Oettingen, Psychology

Alcohol consumption is a serious concern on many college campuses, and resources for students who wish to moderate their drinking are not always readily available or affordable for them. Previous research has shown that self-regulation can be an effective tool in helping people increase physical activity, achieve interpersonal goals, and decrease smoking. Among the myriad self-regulation strategies, one planning strategy known as implementation intentions, has been studied in the context of alcohol consumption. Implementation intentions have previously been studied in combination with mental contrasting, a goal-setting self-regulation strategy. These strategies, though previously studied in combination, have never been combined as a strategy for drinking moderation. This study combines implementation intentions and mental contrasting as a new self-regulation strategy for college students to reduce alcohol consumption. In addition to the combination of these strategies, we studied the effects of mental contrasting alone (without implementation intentions), as well as the effects of using no specific strategy. Preliminary results have indicated that the combination of implementation intentions and mental contrasting has a greater effect on drinking moderation than mental contrasting alone; mental contrasting, however, was still more effective than using no specific strategy, which showed no decrease in alcohol consumption. Though our analysis is not yet complete, we expect that the combined strategy is more effective because participants using implementation intentions, a planning strategy, will use the mental contrasting exercise more frequently, thus making them more successful.

Hasidic Rebels: Accounts, Commitment, and Identity
Chloe Anderson, Sociology
Sponsor: Professor Ruth Horowitz, Sociology

In this ethnography, I assess a group of Hasidim living “on the fringe” of a Hasidic community in Brooklyn, NY. This group participates in secular culture for various reasons and I analyze the reasons they provide for this behavior. Two distinct pathways of rebellion emerge—that in which rebellious activities are used for thrills and as ends and that in which such activities are used as means of exiting the community. In my analysis, I question Erving Goffman’s (1967) description of action as correlating with risk and being used as an end, for oftentimes the Hasidim engaging in the riskiest behavior are those using their behavior as a means of permanently leaving the community. While risk and action are correlated, high risk does not always entail action. In the latter portion of my paper, I provide several explanations for how these Hasidim—both thrill-seekers and departure-seekers—choose between opposing commitments, and how the rebellious activities in which they partake reflect these choices. Here, I discuss Howard S. Becker’s (1960) notion of side bets and find that the departure-seeking pathway consists of a continuous shifting of side bets outside of the Hasidic community as a means of “coping,” in the words of Goffman. This process is also characterized by deep religious questioning. Regarding the thrill-seeking pathway of rebellion, I use Rosabeth Moss Kanter’s (1968) distinction between mortification and surrender in a utopian community to reveal how the thrill-seeking behavior functions as a de-mortifying process in which the individuals involved create private identities.

Choosing Post-Conflict Justice: Are There Key Factors that Determine the Type of Justice Implemented in African Conflicts?
Sara Atalay, International Relations
Sponsor: Professor Alastair Smith, Politics

The implementation of transitional justice after a conflict, be it trials, reparations, or truth commissions, has become more and more common as a method to resolve societal cleavages caused by the terrors of battle. This trend is even more important in Africa, given the extreme frequency of conflicts on the continent. Though there have been studies analyzing the effectiveness of transitional justice in creating a lasting peace, the question of why certain types of transitional justice are chosen for particular conflicts has not yet been analyzed. This study hopes to answer that question by using a logit model of analysis to determine the likelihood of transitional justice being implemented following a conflict given the presence or absence of particular factors.

Neural Correlates of Impaired Fear-Processing in Posttraumatic Stress Disorder
Christopher R. Bailey, Psychology
Sponsor: Professor James Murrough, Mount Sinai Hospital

Posttraumatic stress disorder (PTSD) is a chronic and disabling syndrome that develops in a subgroup of individuals exposed to trauma. A salient clinical feature of PTSD is impaired fear processing; the underlying neural pathophysiology...
of this impairment is, however, incompletely understood. In this fMRI study, 14 women with PTSD and 20 psychiatrically healthy women took part in a threat of shock paradigm. Participants were instructed to expect a mild electric shock when presented with a “threat cue,” but no shock when presented with a “safe cue.” Both groups showed increased activation during the “threat” compared to “safe” condition in a network of brain regions implicated in fear processing including prefrontal cortex (PFC). Specific PFC activation was observed in precentral gyrus, inferior frontal gyri and anterior cingulate gyrus. Between-groups comparisons revealed reduced activation in the PTSD group compared to the healthy controls within distinct regions of PFC, parahippocampal gyri and insula. This study revealed dysfunction within fear-processing circuitry consistent with previous research. Furthermore, our finding of attenuated insula activation in PTSD may suggest impaired awareness during threat. Given the lack of efficacious treatments for PTSD, these results provide possible neural targets that could be modulated to alleviate PTSD symptoms.

The Influence of Movie Critics on Taste Judgments
Jonathan Bain, Psychology
Sponsor: Dr. Pascal Wallisch, Center for Neural Science

Although film critics provide ample information about movies, little is known about the impact of their ratings on the opinions of individual moviegoers. How much, if at all, does a critic’s judgment of a film influence the assessment of an ordinary moviegoer? In this study, we asked participants to indicate how much they liked particular movies, and also presented them with a critic’s rating for each movie. We varied the presentation of the critic’s rating: Sometimes we presented the rating of a critic they had previously identified as reliable; sometimes we presented that of an invented critic; and sometimes we did not present any information from a critic. Additionally, we varied the value of the presented critic rating by ±1.5 stars (-1.5, -1, -.5, 0, +0.5, +1, +1.5). Our results show that the participants’ ratings are influenced by the rating of a critic, but that it does not matter if the critic is real or invented. These findings suggest that film critics do bias the judgments of ordinary moviegoers.

Categorical Perception in Causal Learning
Rebecca Bainbridge, Psychology
Sponsor: Professor Todd Gureckis, Psychology

Learning causal relations between events (i.e., X causes Y) often requires not only learning the contingency between items but also the categories of causes and effects. One well-known consequence of category learning is that following learning, people tend to view members of a category as more similar to one another, and members of different categories as less similar. This effect is known as categorical perception. Little work has explored the relationship between causal learn-
ing and categorical perception. In this experiment, we tested participants’ initial ability to discriminate between items (computer generated shapes of “amoebas” and the “minerals” they produce) and then again after they learned categories of the causes and effects. We predict that participants will show a decrease in discrimination within categories and an increase in discrimination between categories after learning. These results would indicate that the categories formed during causal learning can also influence lower-level processes related to the perception of objects. The results will give new insight into the influence of top-down conceptual knowledge on lower-level perceptual processes.

**Monetary Unions: Interest Rate Preference Divergences and Impacts**  
*Benjamin Bierwirth, Economics*  
*Sponsor: Professor Ricardo Lagos, Economics*

The European Central Bank (ECB) uses the Taylor rule as a basis to determine the short-term interest rate in the European Monetary Union (EMU). The goal of the Taylor rule is to minimize the divergence in inflation and output from the desired values. The current equation employed by the ECB weights the preferred interest rate simply by relative GDP in the EMU. This paper proposes to alter the Taylor rule slightly, incorporating a weight for divergence. This will change the final interest rate only slightly, following its relative impact on countries. The goal of the paper is to achieve a potential pareto improvement in the long run, EMU-wide, by helping more volatile economies stabilize, as far as output and inflation are concerned.

**Federalism and Interstate Nonpoint Source Pollution in the Upper Mississippi River**  
*Samantha Caravello, Environmental Studies*  
*Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies*

Although the Clean Water Act has been highly successful at reducing water pollution from point sources such as industrial facilities, it has been less effective at reducing pollution from nonpoint sources, such as runoff from agricultural fields. Agricultural runoff in particular has led to widespread water quality deterioration; the most recent EPA National Water Quality Inventory found that 44 percent of assessed river and stream miles in the U.S. are impaired, and agricultural activities are by far the leading source of these impairments. My research sought to determine the reasons behind the disparity in success between Clean Water Act efforts to reduce point source and nonpoint source pollution. I examined this problem specifically in relation to agricultural nutrient pollution in the Upper Mississippi River Basin, which leads to interstate water quality problems and environmental deterioration along the river and in the Gulf of Mexico. My research found that the difficulties in addressing nonpoint source water pollution can be traced back to U.S. federalism, which led to the division of regulatory power between the federal government and the states, creating a tense atmosphere that promotes conflict rather than cooperation on pollution control policies. My research also examined human conceptions of the natural world, concluding that dividing nature into political boundaries that do not correspond to ecological boundaries creates additional power struggles which further complicate resource management.

**Monkeying Around: Brachiation in Human Adults**  
*Gladys Chan, Psychology*  
*Sponsor: Professor Karen E. Adolph, Psychology and Neural Science*

We examined human brachiation—swinging arm-to-arm under overhead supports. Despite extensive literature in non-human primates, human brachiation has never been described. Thirty-three adults (ages 17 to 45) swung along “monkey bars” in weekly sessions over five months. We analyzed the spatiotemporal features of their gait patterns. As in bipedal locomotion (walking, running, hopping, skipping), we observed a variety of bimanual gaits, characterized by different patterns of handholds (including ricochetal “leaping,” hopping, and spinning). The most common gaits were “marking time” (where each bar is grasped twice, like an infant descending stairs) and alternation (where each bar is grasped only once, as in walking). Marking time and alternation were qualitatively different. In alternation, the arms moved twice the distance for each step and were in the air more than twice as long. Consequently, participants allocated a greater proportion of the gait cycle dangling from one arm. The progression from marking time to alternation to skipping bars while alternating therefore required participants to overcome increasing difficulty due to the necessity of supporting the body with one arm for a greater amount of time. Moreover, participants did not appear to compensate for that time by moving the opposite arm faster.

**Effortful Control in Children with Temper Outburts**  
*Jenny W. Chan, Psychology*  
*Sponsor: Professor Aleta Angelosante, NYU Child Study Center*

The inability to regulate behavior may be related to the onset of severe temper outbursts. While outbursts are considered a normal part of development, some children exhibit more severe and problematic outbursts than others. One possible factor for this disparity is individual differ-
ences in temperament, more specifically, a construct of temperament known as effortful control. Effortful control is the ability to suppress a dominant response and activate a subdominant response. This study sought to evaluate the levels of effortful control in children with temper outbursts and typically developing children ages 5 to 9.9. Two behavioral tasks assessed children’s level of effortful control: (1) Tapping Task, and (2) Gift Wrap & Delay Task. Overall, children in the Temper Outburst group performed worse on the Tapping Task than their typical peers, \( t(66) = 1.95, p = .05 \). Performance on the Gift Wrap & Delay Task did not yield statistically significant results. This suggests that children with temper outbursts exhibit lower levels of effortful control in situations where more immediate suppression of a dominant response and activation of a subdominant response is required and less cognitive mediation is involved. These results may have implications for the understanding of children with temper outbursts and may shed light on strategies for temper outburst reduction.

The Monopoly Bank Model and Equity Markets

*Vera Chau, International Relations and Economics*

*Sponsor: Professor Jonas Prager, Economics*

This research proposes a model for analyzing the relationship between the banking sector and equity markets in which the banking sector is seen as monopolistic. Under a monopoly bank model, the stock market introduces competition into the banking sector which could make the market for loans more efficient. The empirical tests conducted indicate that stock market growth increases the amount of credit that the banking sector is willing to lend, decreases the lending rate (or price on those loans) and decreases the intermediation spread, a characteristic that is indicative of a monopoly. Although the central focus of this analysis is on stock markets, additional tests run on the private bond market indicate that it has the same effect of increasing efficiency in the banking sector. Finally, this research shows that the positive effects of the stock market are even larger in countries outside of North America and Western Europe. While there has been significant academic concern that dysfunctional stock markets could be especially harmful for the local banking sector in these regions, this research shows that stock market growth actually makes the banking sector more efficient in these regions.

China’s One Child Policy and the Missing Women

*Elisa Chen, Political Science*

*Sponsor: Professor Rebecca Morton, Political Science*

As gender disparities around the world narrow in face of globalization, China continues to lag behind. A key factor in revealing the degree of a country’s gender disparity lies within its sex ratio at birth. If the sex ratio at birth for a country is greatly skewed towards favoring male babies, then it must be the case that there is son preferencing in the country. While cultural factors are responsible for contributing to son preferencing, there must be a reason why China’s gender disparity is more troubling than countries of similar cultures. The answer to this puzzle lies within China’s One Child Policy. This policy aggravates gender disparity by widening the gender gap, as witnessed through sex ratio at birth. While the presence of the policy proves to be statistically significant in contributing to gender disparity, other variables such as women’s economic and political rights prove to be insignificant. This indicates that even if China is able to heighten the status of women in both its economic and political spheres, as long as a one child policy is present, there will always be a significant gender disparity in the sex ratio at birth.

Job Corps Program Outcomes in the Context of the Labor Market

*Leah Clark, Economics*

*Sponsor: Professor Matthew Wiswall, Economics*

The mission of the federally run Job Corps program is to assist disadvantaged youth to become “more responsible, employable, and productive citizens.” The program, though very costly, is consistently funded due to the political need for a response to problematic youth unemployment and historically positive program evaluations. A follow-up evaluation commenced in 1993, however, concludes mixed program impacts, and fails to explain why Job Corps works for some participants but not for others. Current recommendations for youth labor market programs stress the importance of job placement, but Job Corps emphasizes education and training and generally leaves the task of finding a job to the participant, who potentially faces a very difficult labor market. This research breaks down Job Corps outcomes by characteristics of the state labor markets in which participants seek employment. The study aims to compare the effect of Job Corps on individual outcomes to the effect of state labor market conditions on the same individuals’ outcomes. The possibility that Job Corps participation alters the effect of the labor market on an individual is also tested. This study concludes that Job Corps’ impact is fragile and likely insufficient given the magnitude of the problem of disadvantaged youth unemployment, particularly given the population’s economic vulnerability.
The Impact of Fluctuations in Consumer Confidence on Future Household Consumption as Measured by Variance in the Index of Consumer Sentiment

April Collaku, Economics
Sponsor: Professor Ahu Gemici, Economics

Consumer behavior and the role that consumer attitudes play in the economy has been a subject of great interest to economists, policymakers, journalists, and financial analysts. This research examines the effects of volatility in consumer sentiment on future household consumption, as measured by the variance in the Reuters/University of Michigan’s Index of Consumer Sentiment (ICS). Though previous research has focused on the ability of the aggregate ICS measure in forecasting consumption, past literature has not considered the impact that variability within quarters and among different groups of people may have on consumption decisions. Variance within the survey, however, can capture fluctuations in optimism or pessimism that is not reflected by the index, and may be necessary to better predict consumption growth. Using regression analysis, this research tests the impact of variability in consumer sentiment responses on total consumption, consumption of nondurables, durables, and services. While the results show that variability in consumer confidence improves the ability to forecast consumption, particularly the consumption of services, the inclusion of this measure only modestly improves the ability of traditional macroeconomic variables to predict household consumption.

Would You Rather . . . ?: Anxiety Reduction in Interracial Interactions

Jennifer Colna and Sarah Gordon, Psychology
Sponsor: Professor Tessa West, Psychology

How can we reduce anxiety involved in interracial interactions? We propose that learning ways in which you are indirectly similar to a future interaction partner will reduce interracial anxiety. Black, white, and Latino undergraduates answered six “Would-You-Rather?” questions, interacted with a cross-race or same-race partner, and then answered questions regarding the interaction. Participants in the experimental condition received their partners’ answers to the “Would-You-Rather?” questions, and could therefore gauge similarity. Participants in the control group did not receive this information. Dyads that received partner information reported lower levels of anxiety and rated the interaction higher on rapport measures than did dyads that did not receive the information, suggesting that similarity on simple measures can be powerful enough to overcome racial boundaries.

¿Kindergarteners have tarea? A Summary and Analysis of Homework in PS163’s Dual Language Kindergarten Curriculum

Jessica Combs, Spanish and Linguistics
Sponsor: Professor Maria de Lourdes Dávila, Spanish and Portuguese

To the shock of many, five year olds throughout New York City have nightly homework assignments; dual language kindergarteners are no exception. This research is based on my experiences as an intern in a dual language kindergarten class at PS163, where 90 percent of the school day is conducted in Spanish with the goal of contextually teaching Spanish and English to a linguistically diverse group of students. According to school guidelines, all kindergarteners (both dual language and monolingual) are to complete 15 minutes of homework and 15 minutes of reading with parents nightly. There is a gap in dual language literature regarding homework at the kindergarten level, while the literature on homework does not address dual language education. My research attempts to bridge that gap through examining parent and teacher attitudes on homework effectiveness, individual student literacy scores, and assignments given over the course of the 2009–2010 school year.

Vocalizations: Determining Which Convey Meaning

Elizabeth Crecca, Psychology
Sponsor: Professor Athena Vouloumanos, Psychology

Compared to other vocalizations, spoken language allows speakers to convey a range of meanings. An experienced communicator recognizes that words express commands, intentions, and explanations, yet coughs, sneezes, and sniffles are usually disregarded as noise. Novice communicators may not make this distinction. Children’s processing of speech has been linked to their verbal proficiency, thus having a larger vocabulary may correlate with infants’ understanding that spoken words are communicative whereas nonverbal human vocalizations are not. To test this, twelve-month-olds watched an actor try to achieve a goal. Unable to fulfill her goal, she said a novel word or cleared her throat to a second actor who then fulfilled the first actor’s goal. We measured the magnitude of infants’ looking times to the goal-consistent outcome in the different vocalization conditions. Infant looking times were then compared to their vocabulary as measured by the MacArthur vocabulary checklist. Although infants’ vocabulary comprehension correlated with their production, the positive correlation between infants’ vocabulary and their understanding that spoken words are communicative did not reach statistical significance. Therefore, the size of an infant’s vocabulary...
is not indicative of his or her understanding that spoken words are communicative whereas nonverbal human vocalizations are not.

Where Does the UN Intervene?
Isha Dandavate, International Relations
Sponsor: Professor Alastair Smith, Politics

The United Nations Security Council is responsible for issuing mandates to deploy peacekeeping interventions in civil war-torn countries. The Permanent Five members of the Security Council hold the power to veto any proposed intervention and thus are the subject of this research. I seek to understand if there are factors beyond the characteristics of a crisis that lead P5 members to support or prevent the deployment of peacekeepers. This research explores how the political and economic relationships between the P5 members and the target countries impact the probability of UN intervention in a civil war. I use alliance similarity, voting affinity, and total trade as determinants of the relationship between the two nations. The findings indicate that as the economic relationship between the P5 members and target countries strengthens, the likelihood of UN intervention increases. The impact of political relationships, as reflected in the data analysis, is inconsistent and requires further research. The results of the research support previous claims that the United Nations decision-making process is based upon factors beyond humanitarian impulse.

Foreign Ownership and Wage Premia in Indian Manufacturing
Nandinee Das, Economics
Sponsor: Professor Daniel Yi Xu, Economics

Trade liberalization reforms of 1991 brought about an increase in Foreign Direct Investment (FDI) and foreign owned firms in India. The policies increased the allowance of FDI in firms and decreased restrictions for opening plants in almost all manufacturing industries. Such firms are found to pay higher wages than their domestic counterparts in other developing countries. This research finds evidence of a Foreign Ownership wage premium in the Indian Manufacturing sector during 1996 to 2006. The wage premium was found to be increasing and becoming more significant with time. The paper also analyzes the probable theories behind the wage premium and rejects the bargaining approach. The results enable us to better understand the circumstances and consequences of the premium.

Transparency in Microfinancial Disclosure
Sampoorna Dasgupta, Economics
Sponsor: Professor Shing-yi Wang, Economics

The advent of information technology and electronic banking has changed the landscape of microfinancial reporting. In the past decade, researchers and practitioners have come together to share information about the financial and social performance indicators of microfinance institutions (MFIs). This information is made available through the Microfinance Information eXchange (MIX) for international investment funds and private donors to analyze before deciding which MFIs to invest in. Transparency in disclosure policies is viewed as an antecedent to trust and investor confidence in the microfinance arena. This study uses the tallied numbers of financial and social performance indicators disclosed by MFIs from 1995 to 2007 as a proxy for transparency. The relationship between the level of transparency in an MFI’s disclosure policies and the amount of funds it receives (reflected in the size of its gross loan portfolio) is quantified. This study also investigates whether the relationship between transparency and the gross loan portfolios of MFIs is stronger than that between gross loan portfolios and country-level variables such as the national per-capita income and the level of corruption in the country that the MFI is located in. The analysis developed in this study addresses whether transparent disclosure policies are as important as country-level variables in the development of the microfinance industry and the amount of funds received by MFIs.

World Wide Organization of Organic Farms (WWOOF) and the Struggle of Small, Organic Farms in the United States
Patricia Delgado, Journalism and Sociology
Sponsor: Professor Brooke Kroeger, Journalism

Small, organic agriculture is struggling for economic viability. WWOOF presents a possible means of survival. What started in England in 1971 as a way for city dwellers to get back to nature and work on organic farms is now world-wide. WWOOF USA began in 2001 and since then has grown to more than 1,000 host farms, with 8,000 active members. WWOOF travelers typically work five days a week, six hours a day in exchange for farm-fresh food and lodging. Yet there is ample opportunity for exploitation. Farmers have been known to ask for over 30 hours of work a week in exchange for one meal a day and space to pitch a tent. Other farms, however, offer a community living-space and seek to share ideals as well as resources. WWOOF USA is little known outside of the organic community, yet the movement grows steadily, helped by both the economic downturn and heightened...
environmental awareness. WWOOF provides small farmers with temporary economic relief but will it help sustain them in the long run? This study is based on an examination of farms in New Jersey, Long Island, Texas, and California. Findings suggest that while WWOOF does give farms much needed aid, it doesn’t make enough of a difference to keep the farm financially sustainable.

Mapping the Milkshed of New York City
Hilary Dennis, Environmental Studies
Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies

In December 2009, under the pall of climate change, New York City released a report detailing development of the city’s regional “foodshed” as a way to reduce greenhouse gas emissions associated with food production and to secure a stable food system for a future with less petroleum. While milk production is vital to the state’s economy, small-scale dairy farmers are being forced out of work as a result of current policy, demand for cheap milk and the prominence of large corporations in the market. Consumers should be made more aware of the sources of the city’s milk supply so that consumption of more locally sourced milk can be encouraged, both to revitalize this key sector of the state’s economy and to reduce the city’s carbon footprint. My current NYC “milkshed” map, which represents the plants that process twenty different brands of milk sold in Lower Manhattan, does not exhibit the locations of those plants’ supply farms, as they are protected under proprietary law; hence, my map is incomplete and my research is ongoing. However, my inability to reconstruct a complete picture of the milk supply chain poses a larger criticism about where we stand as consumers within the greater industrial dairy system, and how our lack of knowledge is quite possibly causing the rapid depletion of small, sustainable farms.

Is there a Cigarette Pack Size that Minimizes Smoking?
Andrew J. Diaz, Stern School of Business
Sponsor: Professor Adam M. Brandenburger, Stern School of Business

This research intends to determine if a causal relationship exists between cigarette pack size and consumption. While people often purchase paper towels and toilet paper in bulk, they typically purchase cigarettes by the pack. This implies that changing the pack size may impact consumption. A reduction in pack size might have a few important effects: 1) it becomes more of a hassle to consume cigarettes for an adult, and exponentially harder for illegal users; 2) a person does not keep an active tally of the number of cigarettes left; instead a person anchors to the pack for consumption habits. This research suggests that there is a pack size that could minimize smoking.

To determine this pack size requires further research, but this paper provides a foundation upon which to expand.

Control of Spontaneous Trait Inferences at Encoding
Nate Drix, Psychology
Sponsor: Professor Jim Uleman, Psychology

Can people control something they are unaware they did in the first place? This study investigates whether people are capable of controlling the formation of spontaneous trait inferences (STIs). Spontaneous trait inferences are unconscious inferences people make about others. To quantifiably measure control, this experiment adapted the process-dissociation procedure (PDP) to a paradigm that tests for such unconscious inferences. To measure STI formation, participants were first shown faces paired with behavioral statements about that person and then tested to see in which instances they formed STIs. From these data and the PDP model’s formulae, participants’ amount of control was calculated. Results showed participants do indeed exhibit a degree of control ($M = .141, p < .001$) over whether or not they form STIs. This finding supports the notion that control can exist even in an unconscious and mostly automatic phenomenon. More importantly, this finding may act as a basis for new research on implicit biases, suggesting that the formation of unconscious biases may be preventable rather than merely treatable.

Speaking Up: A Comparative Study of Verbal Participation in a Montessori School and a Public School
Michelle Dugan, Anthropology
Sponsor: Professor Eric Hoenes del Pinal, Anthropology

Linguistic anthropologists working in educational settings have often noted that schools are arenas in which people’s ideas about language, or language ideologies, are developed and in which language plays a particularly strong role in forming students’ social identities, peer networks, actions and worldviews, often with social implications extending far beyond the classroom. This study compares students’ verbal participation in two classrooms with very different educational and linguistic ideologies— third grade classrooms at Public School 51 in New York City and a Montessori school in Massachusetts. It shows that students’ willingness to speak in class as well as their evaluations of their peers’ participation demonstrate distinct understandings about the importance of participating in class. While both sets of students regard verbal participation as a social performance and a sign of one’s social identity, they diverged in how that relationship is constituted. Central to this difference are
the various ways that students understand verbal participation as a relative sign of intelligence, knowledge, and competence. I argue that this difference is strongly linked to the structures of participation mobilized by educators to manage the classroom in these two settings, and that this may have consequences for children's educational futures.

The Effects of Exchange Rate Policy on the China Trade Balance
John Ellwanger, Economics
Sponsor: Professor Zhanwei Vivian Yue, Economics

During the past 30 years China has experienced an average GDP growth rate of 9.9 percent a year. One significant component of China’s GDP growth has been exports. One factor affecting exports, both in China and in any country, is the country’s exchange rate. For over a decade China maintained a fixed dollar pegged exchange rate, changing to a managed floating exchange rate in July of 2005. This study examines the statistical relationship between the exchange rate and the China trade balance during the dollar pegged currency regime from 1994 to 2005. In particular, this research examines China’s ten largest trading partners and examines evidence of the J-curve, using a model that includes foreign exchange and money market activities by the central bank. This aspect allowed the exchange rate to remain fixed; many previous papers have failed to address this.

Conceptualizing Community: Practical, Logical, and Theoretical Flaws in Obscenity Law’s Miller Test
Rachel Fried, Sociology
Sponsor: Professor Ruth Horowitz, Sociology

The current method of determining whether or not an expressive work, such as a pornographic film, is obscene is referred to as the Miller test. In obscenity cases, jurors are asked to determine “whether ‘the average person, applying contemporary community standards’ would find that the work, taken as a whole, appeals to the prurient interest” (Miller, 1973). Jurors are thus expected, without any outside evidence, to determine: what the contemporary standards for pornography of their community are; who the average person in the community is; whether the average person would think that the film violates those contemporary community standards; and whether the average person would think that the film appeals to a prurient interest in sex. This study challenges the assumption that individuals are capable of answering the questions posed by the Miller test. I interviewed in depth 22 participants, 21 of whom had watched all or most of a 33-minute, hardcore pornographic film. My questions were designed to elicit two things: participants’ conceptions of their communities and their hypothetical answer to the Miller test’s first prong. Participants’ conceptions of their community—even when in the same jurisdiction—were varied, as were their descriptions of the “average person” in it. I conclude that the Miller test is not one which individuals can easily apply to hardcore pornographic films such as the one viewed by my participants. I further conclude that the Miller test is flawed practically, logically, and theoretically.

Eyes on the Prize: Head-Mounted Eye-Tracking of Children and Adults during a Natural Task
Larissa Gabelman, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

Visual information is necessary for planning and executing adaptive motor actions. In most studies of visually guided actions, however, participants' movements are highly constrained. Head-mounted eye-tracking provides an alternative by allowing unrestricted movement of the entire body. Previous research using head-mounted eye-tracking showed that adults fixate on objects immediately before reaching for them. The current study expands on previous work by comparing adults to six- to eight-year-old children making a sandwich. Across age groups, participants fixated goal objects more frequently when executing object reaches (e.g., moving a lid to a jar) than hand reaches. Children, however, were more likely than adults to begin fixations after the hand had already begun moving toward the goal object. This study aims to further our knowledge of how vision guides everyday reaching movements.

Fovea to Periphery: The Developmental Progression of Visual Guidance during Obstacle Navigation
Larissa Gabelman, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

Visual information about the location and dimensions of obstacles is critical for navigation through a complex environment. We examined changes in natural patterns of visual guidance of obstacle navigation throughout the lifespan. Six 14-month-old infants, six four- to eight-year-old children, and eight college-age adults wore a head-mounted eye-tracker as they walked through a large playroom cluttered with obstacles, furniture, and toys. All participants moved rapidly: adults weaved between barriers and over obstacles, children jumped and ran, and infants toddled from toy to toy. All participants spontaneously navigated obstacles of their own choosing. How was this accomplished? Adaptive
locomotion in adults did not require obstacle fixation: Adults fixated only 32% of obstacles. Children used fixations more often (59% of encounters), but still navigated adaptively without fixations 41% of the time. Infants, however, fixated obstacles during 72% of encounters. They even maintained fixation at the moment the foot contacted the obstacle, a strategy no child or adult ever employed. Under conditions approximating the everyday environment, adults and children guide locomotion quickly, effortlessly, and adaptively using visual information from the periphery of their eyes. In contrast, toddler infants often fixate obstacles, suggesting that the exigencies of modifying gait and planning their next step demand visual attention.

**Operation Impact: Militarized Policing in Jackson Heights, Queens**  
*Andres Garcia, Latino Studies  
Sponsor: Professor Alfonso Gonzales, Social and Cultural Analysis*

The militarization of policing is occurring in neighborhoods and regions across the globe. Drawing on interviews and community meetings in Community Board 3, Jackson Heights, Corona, Elmhurst, and East Elmhurst, Queens, I analyze how different sectors of civil society and the state justify militarized policing in post 9/11 New York. This justification of militarized policing occurs through a defense of the New York City Police Department’s Operation Impact. This analysis of the defense of militarized policing via Operation Impact is placed within a larger framework of global capitalism and policies of neo-liberalism. This framework allows us to understand the relationship between militarized policing and racialized sectors of labor. Militarized policing through Operation Impact fits into a larger trend of punitive solutions to social problems that arise out of global capitalism and neo-liberal policies. This article concludes that the different sectors of society being studied do, in fact, defend militarized policing through Operation Impact, for different reasons, and, in turn, maintain the conditions for the reproduction of these racialized sectors of labor and global capitalism.

**Did She or Didn’t She? The Issue of Marital Name Choice Across Two Generations: 1964–1983 and 2000–2009**  
*Jennifer Gerdes, Sociology  
Sponsor: Professor Ruth Horowitz, Sociology*

Focusing on marital name choice, I conducted and analyzed 24 in-depth interviews with women whose first marriage took place between 1964 and 1983 and between 2000 and 2009. Across the two generations, women who changed their name also changed the rationale for their decision, whereas women who keep their names did not change their rationale. Older women who changed their names felt that it was their only choice. Instead of focusing on choice, younger women who changed their names and both younger and older generation women who kept their names used discourses about the meaning of marriage to explain their decisions. Younger women who changed their names used a discourse of togetherness, while both younger and older generation women who kept their names used a discourse of separation to explain their decisions. I also find that women who keep their names have a stronger emotional investment in their decision and accompanying rationale than do women who change their names. I argue that the different emotional investments are because keeping one’s name continues to be viewed as the unconventional choice in our society.

**Do Gestures Speak Louder than Words for 11- and 12-Month-Old Infants?**  
*Dabina Gim, Psychology  
Sponsor: Professor Athena Vouloumanos, Psychology*

Humans communicate with gestures and words. Gesture such as pointing to an object allows viewers to directly observe the physical relationship between pointing and the referent object. Does pointing indicate a referent object more transparently compared with speech for infants? To test this, 11- and 12-month-olds (N=32) watched an actor repeatedly interact with one of two objects. Subsequently, the actor could not reach the target so she pointed or verbalized to another actor. If gesture more directly indicates an object than speech, infants should expect pointing to result in the selection of the target. Consequently, infants should be surprised when pointing is followed by the selection of the non-target. As predicted, infants look significantly longer when pointing was followed by a non-target outcome than when speech was. This suggests that infants interpret pointing as indicating the target—since gesture directly establishes the physical relationship between the target and the actor. These findings support that gesture is more effective in expressing concrete and observable relationships than speech.

**Promoting Sibling Bonds: An Intervention for the Prevention of Youth Aggression in Foster Children**  
*Lauren Gonzales, Psychology  
Sponsor: Professor Oriana Linares, Mount Sinai Adolescent Health Center*

Children placed in foster care are considered a high-risk population for the development of aggressive
behavior both towards sibling and non-sibling peers, given the difficulties that accompany familial and environment changes at such young ages, as well as the particular conditions under which the changes were made. For those children with histories of neglect and abuse, the time spent in foster care can serve as an important period for the prevention of further development of aggressive behaviors. This study focuses on the importance of sibling relationships in building prosocial as opposed to aggressive behaviors as well as creating the optimal foster care environment for those families in which the end goal is reunification. The Promoting Sibling Bonds intervention program was developed to take advantage of these relationships in a structured treatment environment. In Phase 1 of the study, we will adapt the program to the specific target population of foster children. Phase 2 will then compare changes in child susceptibilities including physiological (saliva cortisol levels) and psychological factors (emotion dysregulation) as well as sibling relationship quality and parenting techniques between two conditions: those receiving usual foster care, and those assigned to the Promoting Sibling Bonds program in addition to usual care. Proposed findings include improved sibling relationship quality as well as lower aggression levels in foster sibling pairs assigned to the intervention treatment.

**Impacts of Anxiety on Peripheral Vision**

*Elizabeth Grand, Psychology*

*Sponsor: Professor Denis Pelli, Psychology*

With many objects in our field of view, it is often difficult to detect one object when many others surround it. Critical spacing is known as the minimal center-to-center distance from a peripheral target object to a surrounding object that a person needs to correctly identify this target. Critical spacing is not static, and can be influenced by various factors, such as familiarity and color. In a separate yet related area of study, researchers have noted a decrease in one’s peripheral visual field under stressful conditions. The present study attempts to connect these previous research findings by examining the effects of anxiety on critical spacing. Participants completed computer-based visual crowding tasks under baseline and stressful conditions, and using this data, their critical spacing for both conditions was measured. Results indicate that critical spacing was not impacted by anxiety; there was no difference in critical spacing measurements between baseline and stressful conditions. This finding bridges the gap between two lines of peripheral vision research, and further contributes to the existing literature on critical spacing. Additionally, the study provides insight into the various ways emotion may, or may not, be able to influence vision.

**Do Infants Understand the Communicative Role that Speech Plays in Human Interactions?**

*Jennifer Grasso, Psychology*

*Sponsor: Professor Athena Vouloumanos, Psychology*

Children come to learn that humans use speech as a form of communication during social interactions but the way in which they arrive at this understanding is unclear. Infants discriminate between different types of vocalizations that humans make but do they understand that different vocalizations can elicit different responses during social interactions? To test this, six- and twelve-month-old infants viewed scenes of two actors (a speaker and listener) interacting with two objects, and with actors either producing a novel speech sound or a non-speech vocalization. The direction of infants’ eye gazes during and directly after the different vocalizations was evaluated. If infants understand that speech conveys information between two people, then we predict that they will alter their gaze between the speaker and listener in the speech condition but not in the non-speech condition. Although infants shifted their gaze equally between the actors in the speech and non-speech condition, infants looked significantly longer at the speaker in the non-speech condition. Twelve-month olds shifted their gaze between the actors more than six-month-olds. These results suggest that infants in their first year of life may still be developing the understanding that speech can elicit responses in the listener.

**Corruption and Electoral Volatility in Western and Eastern Europe**

*Rebecca Greenberg, Politics*

*Sponsor: Professor Rebecca Morton, Politics*

For decades, political scientists have been using the Pedersen Index to study electoral volatility. The Pedersen Index measures electoral volatility between subsequent elections using vote share data. Powell and Tucker (2009) break volatility down into subparts, type A volatility and type B volatility. Type A volatility measures change in vote share created by the entrance and exit of parties into the political arena, while type B measures volatility caused by changes in vote share for existing parties. This study aims to investigate the relationship between corruption and type A and type B volatility in Western and Eastern Europe. It also attempts to develop an alternative measure of corruption when dealing with voting behavior. I find strong evidence that corruption is related to type A volatility in Western Europe.
**A Flaw of the Human Motor System**
*Allison Greene, Psychology*
*Sponsor: Professor Mike Landy, Psychology and Dr. Todd Hudson, Psychology*

Human survival depends on adapting to a constantly changing environment. We plan our motor movements to achieve specific goals, and we modify our movements to counteract forces such as gravity that impede those goals. However, the human motor system is inherently imperfect; every movement we make is prone to small, unpredictable errors. Adapting to these motor errors by counteracting past errors on future movements is disadvantageous, because the size and direction of one error provides no information about the size and direction of a subsequent error. Thus, adapting to motor errors adds variance to the motor system and decreases motor accuracy. Our study investigated whether the motor system demonstrates adaptation to motor error. In a reaching task, participants repeatedly moved their fingers from a starting position to a target position. Participants adapted to motor errors by counteracting past errors on subsequent movements. These data reveal a flaw of the human motor system: humans do, in fact, adapt to motor variance. Adaptation is crucial for human survival, but the human motor system fails to account for the disadvantage of adapting to natural human motor error.

**Language Ideologies of Generation-1.5 Filipino Americans**
*Victoria R. Grefiel, Anthropology*
*Sponsor: Professor Eric Hones del Pinal, Anthropology*

While there are 1.4 million Filipino-born immigrants currently living in the United States, making this one of the fastest growing immigrant groups, Filipinos tend to be under-studied and under-represented in America’s immigration history. This invisibility is partly due to the Philippines’ unique political, economic, and historical relationship with the United States and partly due to Filipinos’ apparent ability to enter America’s society and workforce seamlessly as English-speaking, college-educated professionals. In this study, I examine the language ideologies of Filipino Americans who immigrated to the United States before the age of 13—known as “generation-1.5 immigrants”—to uncover how their attitudes towards English and Filipino languages shape their sense of ethnic identity and American citizenship. Based on interviews with adult generation-1.5 Filipino Americans and participant observation with a Filipino family whose children were born and initially raised in the Philippines, this research investigates how young Filipino Americans’ ideologies are shaped by family, peers, media, and the wider social environment. I identify several trends, including parental enforcement of native language communication at home and code switching to English, to suggest that generation-1.5 Filipino American identity is shaped by the ability to strategically accommodate and negotiate two socio-cultural systems through bilingual language use.

**Racial Stereotypes in Academic Evaluations**
*Jessica Grogan, Psychology*
*Sponsor: Professor Joshua Aronson, The Steinhardt School of Culture Education and Development*

We set out to determine whether or not people asked to make academic judgments about an ambiguous test performance would incorporate stereotypes about race into their evaluations. We hypothesized that evaluators would give a lower grade to an oral test attributed to a black student than to a white one because they would incorporate negative stereotypes about the intelligence of African Americans into their opinion of the test performance. We found that evaluators gave equal evaluations to black and white students when asked to assess a percentage grade to the test performance or grade level to the student. Participants then rated the black student more positively than the white student when asked about social and academic characteristics.

**La Familia: A Study of the Parent-Child Relationship among Colombian Immigrant Families Living in Jackson Heights, New York**
*Natalia Guzman, Anthropology*
*Sponsor: Professor Renato Rosaldo, Anthropology*

Colombians represent the largest South American immigrant population in the United States. Jackson Heights was chosen for its role as a place of destination for Colombian migration since the 1960s. I look at the family in an attempt to understand how newly arrived immigrants integrate into their new environment. This ethnographic study explores the parent-child relationship through the lens of upbringing within Colombian immigrant families. Through semi-structured interviews with eight parents and five children, I investigate the predominant qualities which characterize the upbringing of children and, in turn, the children’s impressions of being raised in the United States. Among the most frequently raised topics by parents was the emphasis on talking with children as a means of instruction and trust-building. I also discovered that the most salient aspect of children’s experience as they are raised in the United States is the curtailment of the “play freedom” they had experienced in Colombia, which now often involves a process of negotiation with parents. There is also an unspoken agreement between parents and children that expects each child to be a successful student.
The Fear of Loss: How Induced Arousal Influences Decision-Making under Risk
Jeffrey Hamilton, Psychology
Sponsor: Professor Elizabeth Phelps, Psychology

Emotions play an important role in the anticipation and processing of economic loss. Patients with cortical damage to areas important to the experience and regulation of emotion demonstrate diminished arousal to loss, and unusual choice patterns compared to normal participants. In healthy participants, shifts in loss aversion correlate with shifts in physiological arousal. The effect of induced emotions, like fear, on economic choice remains unclear, however. The present study is one of the first to examine directly how induced physiological arousal influences loss aversion. Participants were given thirty dollars and asked to make decisions between a risky gamble and a guaranteed alternative. There were also two conditions. In one condition, participants heard an auditory tone between trials, which sometimes ended with electric shock. In the other, there were no tones or shocks. We expected that physiological arousal would be higher in the condition with shock, relative to the condition without shock, and that an increase in arousal would increase loss aversion. Results showed two separate effects. First, increasing arousal significantly increased risk aversion. Second, contrary to our original expectations, increasing arousal significantly decreased loss aversion. These results build upon previous correlational studies by identifying physiological arousal as a causal factor in how we assign value to a risky situation. Findings also indicate that fear exacerbates behavioral biases to avoid, and makes us less sensitive to what we may lose.

Examining the Intersectionality of Race, Gender, and Class in Brazil
Rachel Hsiung, Gallatin School of Individualized Study
Sponsor: Professor Juan Corradi, Sociology

Race relations in Brazil and the United States are often compared, partially due to the countries’ similarity in size and economic growth, and partially due to what many see as a Brazilian “racial democracy” that the United States ought to aspire to achieve. Gender inequality and marginalization of gender non-normative individuals further complicates how we understand inequality in Brazilian society. This research uses the theory of intersectionality, a term coined by Kimberle Crenshaw, to demonstrate how and why recent programs and policy changes in Brazil to mitigate social inequalities have fallen short. Intersectionality is a sociological theory that suggests that the classically constructed categories of discrimination—such as race, gender, sexual orientation, and class—are not independent forces. Rather, they are coinciding forces that actually reinforce one another and intersect uniquely with different populations. Taking advantage of the conceptual framework provided by the theory of intersectionality, I conclude that recent Brazilian policies, such as the Lei Maria da Penha and the US-inspired model of affirmative action in universities, have been ineffective in dealing with the most marginalized Brazilian populations who are multiply marginalized by their gender, skin color, and socioeconomic class.

Sitting Pretty: Development Behavioral Flexibility in Sitting Infants
Lisa Hurwitz, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

Behavioral flexibility, modifying ongoing actions in response to novel constraints, is imperative for adaptive motor control. This study investigated behavioral flexibility in infant sitting, a fundamental and ubiquitous motor skill. The primary aim was to examine infants’ abilities to maintain a sitting posture in response to varied changes to their bases of support. Twenty-two six- to nine-month-olds sat on an adjustable tilt-board, which sloped forward, backward, and sideways at increasingly steep angles. Overall, infants kept balance on the steepest slopes in the forward direction, on moderately steep slopes in backward, and on shallow slopes in sideways. Infants frequently anticipated each adjustment by proactively leaning their torsos into the apparatus. In each direction, infants reactively leaned their torsos in response to the change in slope after each adjustment, moving their bodies in the direction opposite to the slope. Infants rarely used their arms to supplement their balance. Regardless of age or sitting experience, all infants adapted their sitting posture to maintain balance, suggesting infants acquire behavioral flexibility as they learn to sit independently. Behavioral flexibility is integral to motor skill acquisition, even throughout early infancy.

Off the Grid: Tracking Infants’ Real-Time Exploration
Samira Irvani, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

This study examines how infants explore a novel environment. Seven newly walking 13-month-olds and seven 19-month-old experienced walkers were video-recorded freely exploring a large playroom with their caregivers for ten minutes. Each video was digitally overlaid with a computerized grid: a transparent checkerboard that sectioned off all obstacles and surfaces in the room. With a
frame-by-frame marking method, I tracked infants’ paths across the grid in real time. Additionally, each caregiver’s path was coded to see how their movements related to that of their infant. Results show that all infants, regardless of experience, explore at least half of the room, and the areas visited most frequently and longest are those containing obstacles and equipment that offer changes in height and texture. In the quality of their exploration, however, infants show significant age differences: experienced walkers spend less time stalling (traveling fluidly from one area to the next) and will return to spots they have already visited much more frequently, supporting evidence that 19-month-olds walk more than 13-month-olds overall. Experienced walkers are also less reliant on their caregivers, whose paths diverge from theirs, rather than remaining consistently joined as with the inexperienced infants.

Identifying Trade without Text: The Case of the Black Storage Jar in the Indus
Ajay Kailas, Biology
Sponsor: Professor Rita P. Wright, Anthropology

The earliest traces of civilization on the Indian Subcontinent was the Indus Valley Civilization. It was centered mostly in the western part of Indian Subcontinent and flourished around the Indus River Basin. Although the Indus Valley script still remains undeciphered to the present day, there are still other ways to indicate trade. One of the most popular ways is through ceramics. The Indus people traded with multiple regions, including the Arabian Peninsula. In this trade network, they produced a type of ceramic known as black storage jars. Black storage jars are relatively large pieces of pottery that were thought to have been carried on ships and contained liquids. This project seeks to identify the origin of such jars through petrographic analysis of thin sections.

Does Democracy Matter? The Evolution of German Health Before and After Unification
Yasmin Karimi, Politics
Sponsors: Ms. Shaghayegh Harbi and Dr. Ward Regan, Liberal Studies Program

The twentieth anniversary of the fall of the Berlin Wall witnessed an overwhelming reinforcement of democratic superiority and ideals from democracies themselves. Anecdotes of suffering endured under East Germany’s communist state littered historical accounts of the event as a warning against future non-democratic regimes, and a reprimand of current non-democratic states. The personal suffering that occurred due to German division, particularly with respect to the physical barrier that immobilized many interpersonal relationships, is irrefutable, although the assumption that the German Democratic Republic was a detriment to its citizens is surprisingly unfounded. Despite democracy’s status as the most revered regime type in the world today, there is an astounding lack of factual evidence supporting its superiority, while rhetoric and personal opinions often plague the ideological battle between democracies and non-democracies, leaving little room for constructive and informed debates. Focusing on East and West Germany before and after reunification of the German Democratic Republic and Federal Republic of Germany, this study examines whether oppressive regimes create biologically and psychologically unhealthy societies. This study seeks to identify a causal relationship between regime type and societal health in an attempt to legitimize the claims of democratic, or non-democratic, superiority. Using an independent retrospective data analysis of statistics from the World Health Organization databases in concurrence with prior specialized studies, the research demonstrates how German reunification had little statistically significant effect on the health of East and West German societies before and after reunification. Findings indicate that democratic regimes are not necessarily superior to non-democratic regimes in terms of societal health, and greater attention must be paid to the topic globally in order to make a fully conclusive argument.

A Day in the Life: Opportunities for Learning in Everyday Activity
Jennifer Kung, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

The first two years of life are characterized by rapid and remarkable learning. Infants acquire language and motor skills, and learn about properties of the physical and social world. Previous research on infant learning relied on highly constrained laboratory tasks; surprisingly little is known about real-world opportunities for learning. Moreover, research is separated by content domain: different studies focus on learning language, motor skill, physical knowledge, and social cognition. But in the real world, inputs for learning about various domains can occur simultaneously. In an intensive case study, I documented real-world opportunities for learning by videotaping a single infant’s entire waking day, one day per month, for his first 18 months of life. Using a time-sampling method, one of every five minutes was coded frame-by-frame to determine time spent locomoting, manipulating objects, and hearing language. Opportunities for learning were frequent: The infant spent 52% of his waking day contacting objects, 19% hearing language, and 13% actively locomoting.
Crucially, inputs for learning did not occur in isolation: 15% of the time (21% of input) involved simultaneous inputs from multiple domains. This demonstration of concurrent opportunities for learning will constrain future theorizing about infant learning.

**Planting Seeds of Lost Knowledge and Reaping the Moral Benefits: An Anthropological Analysis of Memoirs about Eating Locally**

*Rachel Kurtz, Anthropology*

Sponsor: Professor Susan Carol Rogers, Anthropology

My thesis is an anthropological analysis of a selection of contemporary memoirs by persons who have made a commitment to eat locally. I focus on how these writers attribute moral value to their food, their lifestyle and their books about these. I argue that the memoirs detail a personal transformation that takes the shape of a rite of passage as defined by anthropologist Victor Turner: the authors separate from the industrial food system; pass through a *liminal stage* of consuming both local food and knowledge about local food consumption and production; and finally become *reincorporated* into a counter-culture of local eaters by producing and sharing local food as well as knowledge about it. In the course of self-consciously constructing a moral system, many of the authors parallel their new commitment to a religious conversion, thus providing another useful paradigm for their progression from one state of being to another. Additionally, I analyze how the authors create moral equivalencies among apparently disparate food practices. My focus on memoirs offers a unique contribution to the anthropological study of local food and more generally to our understanding of how people attach moral value to consumption and production practices.

**Inequity in the Chilean Health Care System from 2000 to 2006: Comparing the Public and Private Care Systems**

*Birgit Leimer, Economics and Romance Languages*

Sponsor: Professor James Macinko, The Steinhardt School of Culture, Education, and Human Development

Countries choose a system of health care/health care insurance they believe most appropriate to support a healthy population in which inequality in health, due to social determinants, is reduced to a minimum. In the Chilean case, a dual system was implemented during the military government of Augusto Pinochet (1973–1990) which created a public system, FONASA, and a private system, ISAPREs. Since the transition to democracy in 1990, Chile has implemented a variety of reforms to regulate the private system and to improve both access to and quality of care. This research looks at the population’s actual and predicted demand of health care services, measured in terms of general practitioner visits, specialist visits, or days of hospitalization. It further divides the population into ISAPREs beneficiaries and FONASA beneficiaries to see if a difference in terms of actual and predicted demand exists. The difference between actual and predicted demand is the health equity index, a measurement of the amount of health inequity present, with a score of zero being a perfectly equitable system in which actual and predicted demand coincide. Looking at the trend of inequity of health care over time, 2000–2006, allows for an evaluation of the overall trend of health care in Chile as a whole as well as within each system. As found in other countries, general practitioner visits are the most equitably distributed health care service, but more concentrated among the poor. GP visits seem to be oscillating around equity, with a slight trend toward higher inequity in ISAPREs beneficiaries. Higher income groups have larger than necessary shares of specialist care. Specialist visits, out of the three health care services, is the area most inequitably distributed. Hospitalizations are also more concentrated among the poor and tended to improve in inequity in 2003 but fell back to 2000 inequity levels in 2006.


*Sarah Lensing, Politics and Economics*

Sponsor: Professor James Ramsey, Politics

Often referred to as the headless fourth branch of government, administrative law is a hybrid between constitutional and statute law. It began to develop in the late nineteenth century as a counter movement against corporate capitalism which at the time was seen as an economic problem. Beginning with the railroad industry, administrative agencies developed in the form of regulatory organizations. The Interstate Commerce Commission (the first of these agencies) was created in 1887 as a way to prevent large shippers from creating unevenness in state railroad regulations and from creating dramatic increases in prices. This started a radical movement against corporate capitalism, which led to the creation of several other regulatory agencies concerned with monitoring the actions of big businesses. The agencies that were created during this time period formed what can be thought of as the roots of a growing form of regulation. Since the formation of the ICC, the legal consciousness of administrative law, meaning the role of the state that lawmakers were aware of, has shifted from a private focus (on corporate organizations) to a public focus. Using a randomly generated sub-sample of U.S. appeals cases from 1945–1998, I develop a methodology to categorize and
code types of “legal consciousness.” In addition, I conduct an empirical analysis on case participants including judges (their opinions) and lawyers involved to gain an understanding of the forms legal consciousness can take as well as an implicative path as to where legal consciousness might be heading in the future.

The Effect of Time of Day on eBay Auctions
James Lou, Economics and Mathematics
Sponsor: Professor Charles Wilson, Economics

Items being sold at auction on eBay, the world’s largest online marketplace, receive a disproportionately large percentage of their bids in the final hours or even minutes before the end time of the auction. eBay auctions are essentially second price auctions, auctions in which the winner of the auction pays the bid of the second highest bidder (in eBay’s case, a small increment is added), and one’s true bid on eBay is always hidden, with the displayed price being the second highest bid plus an increment. This behavior is thus somewhat puzzling in light of theory that says that bidders should simply bid their true valuation of the object, with the time of the bid not mattering, but it is possible that late bidding arises from bidders’ desire to avoid committing money to an auction they might not win, rendering themselves unable to bid on other auctions without risking winning two of the same item, or simply from the fun derived from winning an auction in the final hours or minutes. I postulated that since people prefer to bid on items close to the ending time, an item would generally sell for more if the auction close time were set during a high traffic time of day. To test this, I sold a series of identical board games on eBay, with some auctions ending at 8 A.M. (a low traffic time) and some ending at 10 P.M. (a high traffic time). The results showed that ending the auctions at 10 P.M. did have a positive effect on the sale price compared to the lower traffic time of 8 A.M., but this was mostly offset by the negative effect of more competitor items being sold in the evening as opposed to the morning. This negative effect seemed to come entirely from competitor items ending at an earlier time, suggesting that perhaps ending the auctions at an earlier time in the evening, for example at 7 P.M., might possibly result in higher average sale prices.

About Face: Changes in Heading Direction as Infants Spontaneously Transition between Crawling and Sitting Postures
Adam Lurie, Psychology
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

Infant locomotion is typically studied as an action already in progress. Natural locomotion, however, is book-ended by stops and starts to and from stationary positions. This study documented the frequency and form of infants’ spontaneous postural transitions during hands-and-knees crawling. Coders scored crawling and sitting behaviors of twenty infants (eight to twelve months of age) from three video datasets: structured locomotor assessments with infants crawling on a narrow path to a goal (n = 10), free play sessions in the laboratory (n = 5), and free play in the home (n = 5). In all three locomotor contexts, infants spontaneously sat during at least a quarter of crawling bouts. Transitions to a sitting posture often turned infants’ bodies 60°–150° away from the original path of progression, causing subsequent crawling bouts to be offset up to 90° in heading direction. What causes the about face? Infants’ leg configurations during crawling may affect the direction of sitting transitions. Although infants may transition from crawling to sitting postures to gain a better vantage point for visual exploration of the environment, accompanying body reorientations may influence the routes that infants traverse, in turn, constraining perceptual exploration.

Navigation through Simple Terrains
Soumya Maddula, Psychology
Sponsor: Professor Lawrence T. Maloney, Psychology

Optimal navigation is necessary for any species to be evolutionarily competitive because it allows for efficient hunting, gathering, and foraging and ultimate survival. Human beings specifically understand how to trade off between effort and accuracy when making simple motor decisions, but no experiments have investigated how we navigate across rocky, dangerous, or even swampy terrain—all of which incur cost. This study investigates whether humans know how to take the least costly path across terrain in a digital video game involving simple terrains which cost the participant a specific monetary cost. Translating navigation into an economic model, we were able to see the use of specific heuristics in path-planning decisions. When we introduced changes in the size and position of the terrain, we also noticed an increase in performance as pay-off became higher. By examining human navigation decisions, we hope to contribute to research in unmanned artificial intelligence based vehicles and robots, which develop models based on human navigation strategies.

Tolerance of Muslims and Facets of Religiosity in Europe
Elizabeth Maroney, International Relations
Sponsor: Professor David Stasavage, Politics

In recent years, debates over growing Muslim populations in European nations have grown louder and more combative, with some arguing that such a devout popula-
Regulating the Effects of Transference
Jaime Marrus, Psychology
Sponsor: Professor Susan Andersen, Psychology

The social-cognitive model of transference lies in the activation and application of significant-other representations in memory. When a new person encountered happens to bear a minimal resemblance to a significant other, the representation of this significant other is triggered and subjectively applied to the new person, frequently resulting in the creation of false-positive memories and leading to a variety of cognitive, affective, motivational, and behavioral effects. Research indicates that these memories occur despite awareness of transference and motivation to prevent it from occurring. The aim of the present study is to identify the conditions that may enable people to prevent transference and to explicitly investigate whether leading individuals to use implementation intentions (if-then plans) as a strategy might enable them to regulate the influence that their significant-others have on their interpersonal life. Participants learned about three targets, one resembling a significant other, then completed a lexical decision task to assess accessibility of the significant other representation (i.e., that transference occurred with the significant other target). Next, they adopted a simple goal intention, an implementation intention, or no strategy before completing a memory test containing some representation-consistent features that were not learned about the target. Results indicate that although transference occurred across strategy conditions, individuals in the implementation-intention condition did not display the typical transference-related memory effects. This research is the first of its kind to demonstrate that the effects of transference and thus the influence of significant others on interpersonal relationships can be regulated with an intentional strategy.

The Emerging Anglo-Saxon States: An Analysis of Warfare and Relevant Displays of Status
Alyxandra Mattison, Anthropology
Sponsor: Professor Pamela Crabtree, Anthropology

The goal of this research is to exemplify the importance of warfare in Anglo-Saxon archaeology. The theme of war pervades almost all aspects of Anglo-Saxon life including economics, religion, social dynamics, and technology. The research focuses on the interpretation of archaeological evidence of warfare to determine whether the Anglo-Saxon kingdoms of England developed into states prior to the Viking attacks and Norman Conquest. The evidence is interpreted based on Childe’s model of a state. Historical writings provide the basic chronological framework into which the archaeological evidence fits. The material evidence for warfare is comprised mostly of burial analysis, as burials provide material weaponry as well as information regarding the life and social status of the individual. Data from settlements is also pertinent, particularly evidence of royal centers and ironworking craftsmanship. Three exemplary kingdoms are discussed: Wessex, Kent, and Sussex. Wessex demonstrates the progression to statehood and Kent the failure in the struggle to statehood though remaining an independent polity. Sussex is eventually absorbed into Wessex. The final state of each of these kingdoms is directly related to its military prowess and infrastructure. From these examples it is evident how crucial the analysis of warfare is to understanding Anglo-Saxon England.

The Significance of the Irish High Cross: Its Iconography and Function
Amanda Mayo, Anthropology and Environmental Studies
Sponsor: Professor Pamela Crabtree, Anthropology

High crosses are often found on monastic settlement sites in Ireland. These freestanding stone sculptures consist of a traditional cross with a circle encompassing the junction of the arms, creating the form of the “Celtic cross.” Such monuments were erected during the early Christian period in Ireland, but many remain visible in the landscape today. While most are decorated with some carvings, examples from the ninth and tenth centuries are particularly intricate. These are carved with panels depicting Biblical scenes. This study examines in detail a sample of 23 high crosses from various locations in Ireland to determine which scenes are most commonly represented, where on the body of the cross these scenes are found, and what themes these panels evoke. The results are combined with archaeological and historical data to decipher possible functions of the high cross in early Christian society. Results indicate that the
carved iconographic panels evoke several broad themes, including the importance of the Baptism and Eucharist sacraments. The iconography of the crosses and their placement within the landscape indicate that they functioned as symbols of unity. As monastic sites gained a larger and more diverse population, the Scripture crosses could have become emblems of the monastery as a more cohesive community.

Walk this Way: Differences in Spontaneous Walking between Novice and Experienced Infant Walkers  
*Meghan McGwier, Neural Science and Psychology*  
*Sponsor: Professor Karen E. Adolph, Psychology and Neural Science*

What changes occur in natural walking as infants develop this skill? This study examines how infant walking changes with experience. Thirty 13-month-old novice walkers and thirty 19-month-old experienced walkers were videotaped during 30 minutes of free play in our playroom. Based on the video, I coded spontaneous measures of infant walking—the number and duration of walking bouts, the number of steps taken, and the frequency of falls. I also coded when infants are physically supported by their parents, and the number of steps infants take while supported. Novice walkers take fewer total steps, have more bouts with one and two steps, and take fewer steps per second than experienced walkers. Novice walkers fall almost twice as much as experienced walkers, and take twice as long to return to walking after a fall. Supported walking data from half the sample indicate that parents support experienced walkers less often than novice walkers when walking. Both experienced and novice walkers are supported by parents twice as much on equipment as on the floor. These data suggest that the quality of natural, spontaneous walking differs between new and experienced walkers and that parents may facilitate the development of walking by providing infants with support.

Dead or Deposed: The Effects of Assassinations and Coups on Political Institutions  
*Eric Min, International Relations*  
*Sponsor: Professor David Stasavage, Politics*

Assassinations and coups d’état represent the two most visible and dramatic political expressions in which constitutional laws are circumvented to displace a leader and/or an entire regime. While academics have sought to determine their effects on democratization and future leadership transitions, very little of this work has been quantitative or studied the two phenomena simultane-ously. Furthermore, while literature has proven the existence of a “coup trap,” in which the occurrence of a coup instigates further attempts, no investigation has been done to ascertain the existence of an “assassination trap.” This study attempts to fill these gaps. Statistical analysis performed using assassinations from 1875 to 2004 and coups from 1960 to 2004 shows that successful assassinations tend to motivate democratic shifts in autocratic states and autocratic shifts in democratic states. The data also do suggest the existence of an “assassination trap.” Meanwhile, successful coups tend to autocratize nearly all polities, regardless of initial form of government. Future leadership transitions do not seem to be dictated or affected by either event. By merging this quantitative output with contemporary qualitative theory, this study ultimately concludes that while successful assassinations and coups both have generally destabilizing effects on democratization, coups prove to be more drastic, significant, and motivated by political self-interest rather than discontent.

Pleasing the Man: Birth Control in the Media, 1961–2009  
*Ariel Moritz, Sociology*  
*Sponsor: Professor Ruth Horowitz, Sociology*

Sex has moved from the bedroom to the doctor’s office to the drugstore and billboards, demonstrating a trend towards the “commercial spirit of intimate life.” With an increased emphasis on the commercialization of sexual activity, contraceptive sales are booming. In 2002, over 38 million women globally used contraceptives and the consumer base is expected to expand to 2.5 billion women by 2025. In negotiating the overwhelming sexual market and adapting to the dangers associated with sexuality, women of all ages have turned to lifestyle magazines for advice. This study sought to explore the representation and sexual scripts used to discuss contraceptives in women’s lifestyle magazines which inform women’s self identity and reflect the readership’s views. In light of this, I conducted a comparative study of the social construction of birth control methods over 49 years in two of the highest circulating print mass media magazines directed towards two groups of American women differing in age and status. Findings suggest that magazines that differ in readership similarly inform women that they are responsible for their own sexual health and have an additional obligation to the sexual health, pleasure, and enjoyment of the man. I highlight and explore the conflicting portrayal of contraceptive use as an empowering experience for women as well as part of a submissive relation with men which lies beneath the glossy feminist dialogue of women’s magazines.
Sexual Trafficking: Modern Day Slavery with Modern Day Consequences
Kathryn Musumeci, Silver School of Social Work
Sponsor: Dr. Andrea McKenzie, Expository Writing

The American government defines sexual trafficking as “the recruitment, harboring, transportation, provision, or obtaining of a person.” The United Nations estimates that 27 million people are trafficked internationally each year. Around 40% of those people are forced into sexual trafficking, with the United States being a top destination. Despite the urgency of the issue, the federal government has addressed the problem by passing only one act: “Trafficking Victims Protection Reauthorization Act of 2008.” Due to the magnitude of human trafficking, social workers have deemed it “modern day slavery.” During the 1860s, the government passed laws protecting slaves from sexual abuse. I compare American Atlantic Slave Trade laws with the “Trafficking Victims Protection Reauthorization Act” to recommend revisions to today’s laws and more effective treatment for victims. Gaps in current American laws include a lack of resources for those who escape trafficking, and little understanding of what they have experienced and therefore need. The northern Atlantic Slave Trade laws created resource centers for sexually abused slaves, and the government increased public understanding by supporting the publishing of slaves’ narratives, two actions that would be effective for helping today’s sexual trafficking victims.

The Brigade Model: Optimizing the Provision of International Health Services by Students
Carter Neugarten, Self-Designed Honors Major—Mental Health Policy
Sponsor: Professor John Billings, Robert F. Wagner Graduate School of Public Service

Undergraduate student involvement in the provision of international health services brings with it the potential for great support to developing nations. It also, however, raises ethical questions as to what role students should play in providing international health services, and how benefits to students must be balanced with benefits to communities being served. Many organizations working with students utilize short-term medical relief models such as the brigade model. While often brigades are the only source of medical services that a community has, such models have been criticized for encouraging dependence on the organizations, for lacking accountability, and for not addressing community-relevant health care needs. Many of these criticisms have validity, but that does not mean that brigades are an ineffective means of providing health services. Rather, these criticisms help to chart a course for important steps that organizations should take, and often have taken, to provide even more effective services to both communities and students. This research considers both advantages and disadvantages of the brigade model and student involvement in the provision of international health services, and provides recommendations and principles for how student energy can be channeled into providing sustainable and high quality services. First, organizations must make long-term commitments to communities, work within existing medical infrastructure, and partner with other organizations, government agencies, and the communities they serve. Then, if students are effectively prepared and are combined with full-time in-country staff and other initiatives, they can have a positive effect on and increase the breadth of the health services that an organization is able to offer to the developing world.

A Bilingual Education Study in a Kindergarten Classroom: Language Learning through Literacy Development
Sarah Parrish, Spanish and Linguistics
Sponsor: Professor Maria Lourdes Dâvila, Spanish and Portuguese

In P.S. 163’s Dual Language Spanish-English immersion program, the primary language of instruction in the kindergarten classroom is Spanish, with the exception of one hour of English. During the spring semester I have both observed and facilitated in this classroom. I recognize that certain Spanish-dominant students struggle in developing literacy skills in both English and Spanish. In observing the progress of literacy development with all the students, it seems that capabilities such as blending, decoding words, and basic comprehension transfer from the dominant language to the second language being acquired. The Spanish speakers who have difficulties in literacy, communicate and understand English sufficiently; thus, the issue appears to be in literacy learning itself. To provide the most effective aid, I create interactive letter identification, phonics, blending, and decoding activities that enhance literacy for these students. I offer assistance in English before school hours and in Spanish during the regular day while observing students’ progress and constantly evaluating the materials and lessons that I implement. Through this investigation, I seek both conclusions about literacy development in bilingual learners and innovative techniques to serve the needs of struggling students.
A Sociolinguistic Study on Nuyorican Poetry: The Code-Switching Styles of an “AmeRícan” and a “Boringkén”
Sarah Parrish, Spanish and Linguistics
Sponsor: Professor Maria Lourdes Dávila, Spanish and Portuguese

Code-switching, a bilingual phenomenon that involves the use of more than one language in an utterance or discourse, is traditionally studied in the context of conversation. In the past thirty years, however, linguists have recognized that communication in mediums such as performance or literature is equally linguistically significant. Hence, my research performs a comparative code-switching study in the language of two Nuyorican poets: Tato Laviera, one of the founding poets of the Nuyorican Poets Café, and Urayoán Noel, one of the most recent poets of the Nuyorican tradition. As I consider the degree and the manner in which each poet utilizes Spanish and English, I contemplate this poetry in the context of the Nuyorican and Puerto Rican anthologies published since the 1970s. As poetry is the space for this discourse, the anthologists’ decisions in terms of how they imagine the language in poetry as part of the Puerto Rican, Nuyorican, and Latino literary traditions formulate the most appropriate context. With this sociolinguistic background along with the two poets’ linguistic portraits, I seek an understanding of the social messages in their dual language usages and the possible relationships between their sociolinguistic backgrounds and their language in poetry.

The Nature and Sustainability of Sino-Saudi and Sino-Iranian Relations
Aparna Patankar, Politics and Anthropology
Sponsor: Professor David Denoon, Politics and Economics

This research examines Chinese foreign policy in the Middle East, specifically focusing on China’s relations with Iran and Saudi Arabia. It examines the differences and similarities in practice and intention that underlie these two relationships. There are several potential challenges facing the continuation of these Chinese policies and relations: Saudi-Iranian conflict, Sino-American struggle for global dominance, and the Sino-Indian energy competition. I argue that although China will face difficult strategic and economic decisions in the years to come, particularly as the controversy over the Iranian nuclear program continues to unfold, the most significant threat to Chinese relations and policies in the Middle East comes from Sino-Indian energy competition. The simultaneous struggles of both India and China to transform their economies, societies, and global roles will most immediately come into conflict over each nation’s goal of establishing energy security. While the other obstacles that confront Chinese policies and relations with Saudi Arabia and Iran threaten to shift or tilt their partnerships, the Sino-Indian competition for energy security threatens the intentions and interests that guide these Chinese policies—its quest for the economic and energy resources necessary to assert its international dominance.

Children’s Essentialist Views of Animals, Artifacts, Gender, and Race
Karolina Pekala, Psychology
Sponsor: Professor Marjorie Rhodes, Psychology

Moving from infancy to early childhood, children attempt to make sense of the world they live in. Faced with many novel concepts, ranging from animals to tools to different kinds of people, children begin to form categories to form a coherent view of the world. How children form beliefs about categories is a subject of debate; the theory of essentialism states that many of children’s perceptions of the living world are based on the idea of an underlying and binding essence present in group members of a category, which is integral to their identity. While essentialism has been explored in terms of animal and artifact domains, with evidence of strict essentialist boundaries in the former, children’s views of social categories are still being investigated. In the present study, we used a picture task that found that children have strict and essentialist views of animals and gender in contrast to their flexible categorization of artifacts and race.

Balancing the Bridge: Infants’ Perception of Affordances for Walking
Jennifer L. Quon, Neural Science
Sponsor: Professor Karen E. Adolph, Psychology and Neural Science

Affordances for walking depend on the fit between the environment and infants’ bodies and skills. If a drop-off is too high or a bridge is too narrow relative to infants’ ability to keep balance, walking is impossible. Perceiving affordances is especially challenging because the environment is variable and infants’ physical abilities are in constant flux. I observed twenty-five 14-month-old infants to assess their decisions to walk over bridges varying in width (2 to 60 cm. in 2-cm. increments) at two drop-off conditions (17 and 71 cm.) I determined the infants’ “walking threshold”—narrowest bridge they walked successfully—and presented them with bridges wider and narrower than their thresholds. Walking thresholds did not differ between conditions, indicating that drop-
Causal Representations as Basic Elements of Impression Formation

Jacquelin Rankine, Psychology
Sponsor: Professor Jim Uleman, Psychology

While a charged social interaction with a stranger—a blind date or job interview—may encourage conscious impression formation, more often than not we infer person-

Identifying Hypertension in Electronic Health Records: A Comparison of Various Approaches

Jennifer L. Quon, Neural Science
Sponsor: Professor Nirav R. Shah, NYU School of Medicine

Researchers have long relied on collections of medical data to conduct research. Traditionally, large collections only existed in digital form from medical billing and insurance claims data, which aggregated millions of such records into a format conducive to research. Claims-based research, however, is limited, because the underlying data were collected for billing, included delayed signals of clinical disease relative to symptom onset, were biased toward older/sicker patients, and had many other errors. Only recently have large collections of data from electronic health records become available to researchers. I used EHR data to identify patients with hypertension based on 1) elevated clinical blood pressure values, 2) the Problem List, 3) the diagnosis associated with a clinical encounter, or 4) antihypertensive medications prescribed. Using over 100,000 electronic records from the Geisinger Clinic from 2004 to 2009, I found that nearly one-third of patients could be called hypertensive based on “objective” blood pressure readings but were not labeled hypertensive by “subjective” or doctor-dependent criteria (criteria 2-4 above). While some of these patients might be false positives, a sizeable proportion may represent clinical inertia (i.e., bad care). EHR data show promise for identifying patients in the early disease stages and can thereby assist quality improvement efforts and clinical care.

Overeating in Hypertensive Patients Actively Trying to Diet: Psychological, Social, and Health-Related Factors Associated with Nonadherence to Dietary Recommendations

Jacquelin Rankine, Psychology
Sponsor: Professor Jennifer Friedberg, Psychology

Although obesity is known to lead to serious and costly biological, psychological, and social problems, most patients face seemingly insurmountable barriers in their struggle to lose weight. In this study, we plan to: a) assess the relationship between hypertensive patients’ self report of dieting and actual caloric intake; b) evaluate the proportion achieving recommendations for healthy weight loss; and c) identify predictors of overeating. Participants’ daily caloric intake and daily caloric expenditure will be assessed to determine the proportion achieving dietary recommendations. Next, participants will be categorized into adherent and nonadherent groups utilizing National Institute of Health (NIH) guidelines for healthy weight loss. Finally, psychological, social, and health-related factors associated with nonadherence to NIH guidelines will be identified by performing regression analyses. Factors of interest include measures such as self-efficacy, health-related quality of life, and social support. We expect to see that even motivated self-reported dieters are not consuming the correct amount of calories for healthy weight loss, signifying a need for more thorough health education and counseling for overweight or obese hypertensive patients. In addition, the identification of factors predictive of disproportionately

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IMPRESSION FORMATION, more often than not we infer person-
high caloric intake can be used to tailor dietary therapy for hypertensive patients and guide interventions for obesity control.

"Helpful for Some": Interpersonal Provision and Recipient Task-Specific Competence as Moderators of the Efficacy of Advice on Recipient Mood and Liking of the Support Provider
Lance M. Rappaport, Psychology
Sponsor: Professor Patrick E. Shroot, Psychology

The current study examined the costs and benefits of the support that loved ones provide each other, specifically on the impact of advice. We hypothesized that the previously documented harmful effect of support would be observed as increased recipient negative mood (i.e. anxiety) despite increased partner liking following provision of support from another person compared with support from an anonymous source. We also hypothesized a moderating effect of self-competence such that participants low in competence would be more sensitive to these costs of interpersonally-provided support. 144 undergraduate female students received support from a confederate before delivering an impromptu videotaped speech. Participants who received support reported feeling more supported, contrast $F(1, 71.657) = 3.87, p = .055$; receiving support from an anonymous note, however, increased anxiety compared to participants who received no support and participants who received the same note from another person, $F(1, 119) = 5.56, p = .02$. There is evidence of competence moderating this detrimental effect of receiving support privately, $B = .49, p = .001$. Complicating the efficacy of advice, participants who received support from another person were not less anxious than those who received no support, $F < 1$, but they did report a higher willingness to interact further with the other person, $F(1, 114) = 8.60, p = .004$, and more positive evaluation of the other person, $F(1, 115) = 5.94, p = .016$. The current data inform interventions targeted at mobilizing loved ones as coping resources in times of distress and suggest that support behaviors have an impact on the long term relationship beyond immediate anxiety.

The Interaction of Relationship Satisfaction, Interpersonal Provision, and Recipient Task-Specific Competence on the Efficacy of Partner-Provided Advice
Lance M. Rappaport, Psychology
Sponsor: Professor Patrick E. Shroot, Psychology

The current study was funded by a DURF grant to investigate the effect of advice on recipient mood among intimate, cohabitating couples as a function of the recipient’s self-competence on a stressful task and characteristics of the recipient-provider relationship. Members of the community participated as couples where one was given the task of delivering an impromptu speech to a judge and video camera while the other provided, or did not provide, scripted advice to his partner. The presence or absence of this advice constituted the primary manipulation. There is evidence that the measure developed here to assess participant-perceived self-competence on a given task correlates highly with the increase in anxiety following task assignment, $r = .72$, and significantly predicts the increase in anxiety from post-assignment to just before delivering the speech, $B = .439, p = .055$. There is no evidence that receiving support improved anxiety; a small sample size prevented a definitive test of this hypothesis, however. Further research is needed to examine social support in the context of recipient self-concept and recipient perceptions of the partner and of the relationship.

Interpersonal Provision and Recipient Task-Specific Competence as Moderators of the Impact of Advice on Recipient Performance
Lance M. Rappaport, and Lianne J. Salcido, Psychology
Sponsor: Professor Patrick E. Shroot, Psychology

This study examined the effect of advice on the recipient’s performance in a public speaking task. We hypothesized that while support is theorized to have a harmful effect on the recipient’s anxiety, the provision of important information would overall increase the quality of participants’ performance. Data was collected as a component of the Undergraduate Support Visibility Study. Participants were undergraduate female students and received support from a confederate or from an anonymous note before delivering an impromptu videotaped speech. Performance was coded by two raters from videotapes. Performance improved after receiving support from another person, $B = 1.605, p < .001$, and from an anonymous note, $B = 1.223, p = .001$, which remained significant when adjusting for recipient GPA, recipient self-perceived competence, anxiety rated just before giving the speech, and the degree to which participants rated feeling supported. Beyond support receipt anxiety significantly predicted performance, $B = -.296, p = .007$. In conclusion, support was efficacious in improving recipient performance on a novel task. This extends previous literature by demonstrating benefits of social support on performance on a novel task.
The Influence of Behavioral Control on Human Fear Expression
Marianne Reddan, Psychology
Sponsor: Professor Elizabeth Phelps, Psychology

Controllability, the degree of behavioral control a person can exert over a stressor, may determine the impact of an aversive event. This study investigates the influence of controllability on the physiological responses evoked by subsequent aversive events. Participants were randomly assigned to an escapable task, so that correct responses terminated shocks; an inescapable task, in which shocks were administered regardless of performance; or to a control condition involving no shock exposure nor experience of control. One week later, participants underwent fear conditioning, in which a neutral stimulus was sometimes followed by a shock, generating a conditioned fear response. This was followed by extinction, during which the neutral stimulus is never followed by shock, and the fear response typically diminishes. Extinction retention was tested 24 hours later to examine whether the fear response returns after a delay. Participants in the escapable condition had low levels of arousal to the threat stimulus during fear acquisition and showed less recovery of fear to this stimulus following extinction learning. Participants who could not escape developed a nonspecific elevated fear response to both the threat and safety stimuli that reemerged after extinction. These results demonstrate that experiences of behavioral control may foster better coping abilities, reduce stress, and promote resilience in anxiety-provoking situations.

The Role of Procedures in the Intergroup Studies of Outcome Discrepancy
Eunho Rhee, Psychology
Sponsor: Professor Tom Tyler, Psychology

Some of the most robust findings in the area of intergroup relations support the notion that people do not want their group to be worse off than other groups. The classic findings of social identity theory show that the immediate result of group affiliation is favorable allocations of outcomes to ingroup members at the expense of outgroup members. Recent studies in this area further demonstrated that people are motivated to protect their group from receiving disadvantageous outcomes even when it entails less profit (in absolute terms) for their ingroup. So what if people were asked to choose between procedural justice and desirable outcomes? This study aims to examine the interplay between procedural justice and outcomes in people’s decision-making process. We asked people to choose between two countries that either give salaries that are equal to both genders or unfavorable for women. We manipulated the procedural justice information (fair or unfair) for both countries. The results suggest that people preferred to live in a country that ensures procedural justice for women regardless of outcomes. Moreover, men were willing to forgo more favorable outcomes for their group to ensure procedural justice for women. These results demonstrate the strong effect of procedural justice on people’s decision-making process that can be more influential than their group’s material status. Possible implications such as outgroup favoritism and maintenance of the status quo by disadvantaged groups are discussed.

Infants’ Ability to Understand Pointing Gestures
Jaimie Rojas, Psychology and Economics
Sponsor: Professor Athena Vouloumanos, Psychology

Gestures are an effective form of communication for humans. They allow people to communicate when speech is impaired or undeveloped. Does infants’ ability to gesture allow them to understand others’ gestures? I examine the relationship between infants’ gesture capacity and their ability to correctly interpret others’ pointing gestures. First, parents of 11-month olds completed a gesture questionnaire about their infants’ gesture production. Then, infants watched a play featuring two actors playing with two different toys. One actor reached repeatedly for one of the two toys until a scene-change made it impossible for her to reach her target toy. She then gestured towards the target, and the second actor either handed her the target or the non-target. If infants understand that pointing allows one actor to indicate her target to a second actor, infants would look longer when the second actor hands over the non-target. Infants’ looking time was compared with the number of gestures they produce. Infants with more gesture production did not look significantly longer when the non-target toy was offered. This may suggest that infants have not yet developed the ability to cognitively connect their own gestures with their understanding of others’ gestures.

From Farm to Factory: An Interdisciplinary Analysis of American Meat Production
Michelle Sarro, Environmental Studies
Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies

The United States is one of the top meat-consuming countries in the world, with an annual consumption rate of approximately 275 pounds per capita. Underlying the high rate of American consumption is a robust and elaborate system of beef, pork, and poultry production practices. From the birth, rearing, and slaughter of the animal to
the processing and final packaging of the meat as an item for retail sale, these production practices function out of public view and ultimately put meat on the American table. Complex and interconnected structural forces have transformed meat production from the agricultural farming of livestock into the commoditization and industrial output of meat products. This study examines that transformation through an interdisciplinary analysis of the economic, political, and social forces which formed and currently support present meat production, and discusses the socio-natural implications of the modern system on American society.

Analyzing Saw Mark Morphology in Bones of Different Sizes
Vincent Scaringi, Anthropology
Sponsor: Professor Pam Crabtree, Anthropology

Proper analysis of saw marks in bone has been of great importance in archaeology and forensic anthropology because these marks can be used to obtain information about the size and type of saw that has made the cut. It is essential to find, through experimentation, what marks different types of saws make in order to be able to properly identify saw marks already made in bones. This study investigates how to identify the differences in saw marks made by four different saws in bones, focusing on how saw marks in bone differ between bones from animals of different sizes. Four different saws were used to cut false saw marks in bone; each was performed on both microscopic and macroscopic levels. The marks were analyzed on both microscopic and macroscopic levels, identifying and measuring tooth marks in bone walls, striation patterns, blade drift, chipping, cut width, and kerf morphology. The analysis of these criteria demonstrates that because of the thinner bone walls in smaller bones, some types of saws produce saw marks different from the marks found in larger bones. This demonstrates how different methods of identification based on saw marks must be used when examining bones of different sizes.

Regression and Delay Strategies
Melinda Scott, Psychology
Sponsor: Professor Yaacov Trope, Psychology

When studying behavior in children at play given frustrating situations, Kurt Lewin observed a phenomenon that he coined “regression.” Regression is defined as the opposite of development, where development implies increased differentiation of behavior, activities, interests, time perspective, and hierarchical organization. Lewin discovered that frustration and developmental behaviors shared an inverse relationship. Studying self-regulation, Walter Mischel found that children promised future incentives who were successful in the waiting task leading to the outcome engaged in goal-directed behaviors. Mischel called this ability “delay of gratification.” These children, who were successful at delay of gratification, were better at coping with frustration and stress later in life. Can distraction strategies used in the delay of gratification be used to alleviate symptoms of regression? This study looks at a distraction strategy successfully used in Mischel’s delay of gratification paradigm to apply it to a frustration-inducing situation to measure whether or not this strategy helps to alleviate symptoms of regression. Regression is measured before and after the frustrating situation, looking at symptoms in regards to dedifferentiation with performance level tasks, agreeability, and self-report mood measures.

Morality, Ambiguity Aversion, and Team Decisions
Sameer Shah, Economics
Sponsor: Professor Andrew Schotter, Economics

In experimental economics, the Ellsberg Paradox suggests that people tend to choose decisions when the level of risk is known over decisions when the risk level is not known, or that people are averse to ambiguity. Currently, it is unclear how individuals’ morality levels affect their aversion to ambiguity. Using a survey of morality, I will measure participants’ morality and then have them answer two sets of questions on a computer. One set will have stated risks and the other will not. Comparing these values against morality levels, I hope to map out trends in morality versus ambiguity aversion. I also plan on repeating this experiment amongst teams of two people (paired with varying levels of morality) to determine whether “low” or “high” morality individuals can influence the other into making risk-ambiguous decisions.

The Effect of Mental Construal on Cooperation in an Environmental Commons Dilemma
Gila Singer, Psychology
Sponsor: Professor Yaacov Trope, Psychology

Sustainable management of environmental resources poses a commons dilemma, in which harvesting for immediate personal gain eventually depletes a shared resource, harming all. Adopting a high rather than low level of mental construal (an abstract and integrative, rather than concrete and detail-oriented, mindset) should facilitate understanding of the repercussions of over-harvesting, increasing cooperation. Social value orientation may moderate this effect: the construction (an abstract and integrative, rather than concrete and detail-oriented, mindset) should facilitate understanding of the repercussions of over-harvesting, increasing cooperation. Social value orientation may moderate this effect: the positive effect of an abstract mindset on cooperation may be greater for prosocials (who tend to cooperate less in commons dilemmas) than prosocials (who tend to cooperate more). In this study, participants exposed to a construal level manipulation read vignettes describing environmental commons dilemmas and decided whether or not to cooperate.
We assessed concerns motivating these decisions and measured social value orientation. When primed with a low level of construal, prosocials showed more cooperation and environmental concern, and less self-interest than proselfs. Priming a high level of construal eliminated this difference: prosocials showed no change, but proselfs showed significantly more cooperation and environmental concern, and less self-interest than previously. Similar findings were observed for concerns for others, future consequences, and financial gain. Findings suggest that framing environmental messages to elicit abstract thinking can increase pro-environmental behavior among proselfs.

**Choosing Faith: Young Adult Religious Converts**
*Rachel L. Slaff, Journalism and History*
*Sponsor: Professor Brooke Kroeger, Journalism*

Forty-four percent of Americans have changed their faith at least once, according to a recent report from the Pew Forum on Religious and Public Life. The same study indicates that most Americans who convert into or out of Catholicism or Protestantism do so before age 25. Yet young adult religious converts defy expectations. The conventional understanding of religion is that people are born and raised in it. In my research, I examine what it means for 18 to 25 year-olds from a variety of religious backgrounds to switch belief systems by presenting a series of journalistic case studies in narrative form. Today’s young adults live much less pre-determined lives than previous generations: they are seeking and exploring as part of what sociologist Wade Clark Roof calls a “quest culture.” My journalistic research endeavors to understand how and why religion can contribute to a young person’s search for identity.

**Complicating the “Community”: Strategies for and Limits to Applying the Model of Community Policing to Immigrant Communities**
*Shireen Soheili, Metropolitan Studies and French*
*Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies*

Since the 1980s a wave of community-policing efforts have been implemented by law enforcement agencies around the United States, yet very few of these initiatives are targeted specifically to immigrant communities. The lack of immigrant-targeted police outreach is surprising given the presence of large and growing immigrant populations in major cities. Also, this lack of immigrant-targeted community policing is problematic because immigrants are less likely to approach the police with safety concerns due to language barriers and preconceived negative impressions of law enforcement. Through examples such as the NYPD’s New Immigrant Outreach Unit, this study looks at the intersection between community policing and immigrant communities and discovers the major challenges of applying the police-outreach model to foreign-born residents. By weighing the intended benefits of community-oriented policing against serious challenges such as immigration enforcement and limited resources, I open a discussion on the feasibility and value of applying community policing to immigrants. Drawing on research from efforts around the country and interviews with representatives from the NYPD, I question not only the ways in which community policing is being applied to foreign-born residents, but also the implications of applying, or not applying, these efforts for the model of community policing.

**Above the Money: The Impact of Political Action Committee Membership Demographics on Senatorial Legislative Support**
*Vladislava Soshkina, Politics*
*Sponsor: Professor Sanford Gordon, Politics*

This study seeks to analyze empirically the relationship between the demographics of member-based Political Action Committees (PACs) and legislative support to determine if factors outside of political contributions may actually sway the legislative vote. By compiling 18,050 observations and completing several probit regressions utilizing demographic variables such as membership, per capita income, voter turnout, and percentage of state population for each of 30 PACs, this study concludes that PAC demographics have some effect on senatorial legislative support. Per capita income has a positive and strongly correlated relationship with legislative support. Per capita income has a positive and strongly correlated relationship with legislative support and, as one can imagine, in our current political atmosphere where more money means more victories, richer PACs garner more legislative support from senators on the Democratic and Republican sides of the fence. Cross-national membership and voter turnout, however, appear to effect voter turnout negatively but these results must be further explored as there is a strong issue regarding simultaneity between the votes placed and the membership numbers counted. After all, growth in cross-national membership size and voter turnout may rise in response to unfavorable legislation and thus yield a seemingly negative relationship in this probit regression. This study also explores interaction variables, and concludes that the percentage of state population in a field has a strong influence on the strength of a PAC’s voter turnout numbers. These findings prove quite compelling and although they are far from conclusive, this study shows that PAC demographics should be explored in greater depth.
Social Security: A Ponzi Perspective
Daniel Sprouse, Economics
Sponsor: Professor Tomasz Sadzik, Economics

The Social Security Act of 1935 established the foundation of a pay-as-you-go social security system in the United States that is still in operation today. On a basic level, the system is a transfer of funds from workers to retirees in which benefits to retirees are financed by a tax on the working population. Given, however, the current trajectory of certain economic variables such as changes in demography and income, the future solvency of social security is questionable. As it stands, workers may indeed be paying into a system that lacks sufficient resources to make returns on their investments. From this perspective, social security behaves essentially like a Ponzi scheme in which proceeds from new investments are used to finance returns on old investments. This, however, poses the inevitable question: when will the Ponzi scheme that is social security unravel? We seek to analyze the current system through the lens of a Ponzi scheme, deriving a new model for social security in order to predict the conditions under which social security requires a structural overhaul—a Ponzi “bail out.”

The Relationship between Clavicular Length and Body Proportions
Nicole Squyres, Anthropology
Sponsor: Professor Susan Anton, Anthropology

The reconstruction of body size and shape in the fossil record is an important goal in paleoanthropology due to the influence that these factors have on a species’ energetic requirements, life history, sexual dimorphism, and climatic adaptation. For example, certain features of Neanderthal morphology, such as the shape of the thorax, suggest they were hyper-cold-adapted. While such conclusions are traditionally derived from measurements of the long bones and pelvis, other less-studied skeletal elements such as the clavicle may also prove useful in more precisely reconstructing upper body dimensions. In this study, anthropometric data from a sample of 55 living humans and skeletal measurements from a museum collection of 41 individuals were used to assess the relationship between the dimensions of the clavicle and other measurements of the body. Height, weight, bi-iliac breadth, bi-acromial breadth, and clavicular length were measured in the living sample. In the skeletal sample, clavicular length, clavicular width at the mid-shaft and sternal end, scapular breadth, maximum manubrium breadth, bi-iliac breadth, and several measures of the femur were taken. This data is currently undergoing statistical analysis in order to determine the use of the clavicle in reconstructions of body size and shape in fossil hominins.

The United States: Promoting Stability or Instability in Egypt?
Megan Stewart, Journalism and Politics
Sponsor: Professor Brooke Kroeger, Journalism

Over the next two years, Egypt faces a series of critical elections that could either shepherd the country into an era of stability and democracy or plunge it into a period of turmoil and increased violence. The Egyptian people enjoy limited political freedoms and human rights, and one fifth of the population suffers from extreme poverty. The group most able to challenge Egypt’s status quo is the Muslim Brotherhood, the world’s first and oldest Islamist organization. Despite intense government pressure, the group has flourished for decades as both a social and political organization. During December 2009, the Muslim Brotherhood held internal elections in which conservative members who prefer focusing on charitable work over political participation won several positions in the organization’s top leadership. Experts believe that this reflects the growing perception that the Egyptian political system has failed to substantiate progress. The lack of viable peaceful options for systematic change has given rise to the fear of a surge in violence and radicalism within the country, and the possibility of significant sociopolitical upheaval, especially if the winners of both upcoming elections are unpopular. For years, the United States has supported the government of Egyptian President Hosni Mubarak with $2 billion annually, making the country the recipient of the greatest amount of U.S. foreign aid aside from Israel. The policy has helped preserve Egypt’s predictability and stability in the Middle East. In fostering the current stability, however, the U.S. government’s policy may have contributed to long-term future destabilization and Islamist violence. Slight changes in U.S. foreign policy in preparation for the upcoming 2010 parliamentary elections and 2011 presidential elections could prevent widespread social discord, lay the foundation for a more democratic system in Egypt and serve as a step in improving relations in the Middle East.

Statewide Renewable Fuels Standards and Their Impact on Gasoline Prices and Gasoline Demand
Nicole Stutz, Economics
Sponsor: Professor Dermot Gately, Economics

Beginning with Hawaii in September 2004, certain states began to adopt a renewable energy standard that required a certain percentage of gasoline sold to be ethanol. These statewide standards, called Renewable Fuels Standards (RFS), aim to diversify the energy portfolio in the United States and deter its dependence by introducing an alternative energy source to fuel production. This research assesses the impact of a RFS at a state level by observing
changes in gasoline prices and gasoline demand in two groups of states, ten of which have implemented a RFS and serve as the treatment group and 11 of which have no ethanol-related mandate or incentive and serve as the control group. Annual data from 2000 to 2008 are analyzed, using a Pooled Least Squares model that determines the best-fit line to the observed values for both the price and demand equations. The variables involved in the regressions include real price, gasoline demand, statewide gross domestic product, a RFS effect dummy variable, and a variable that eliminates autocorrelation from the model. The results were twofold; first, despite the popular view that an ethanol mandate in gasoline production will increase prices, the results reveal that a statewide RFS has no statistically significant effect on gasoline price; hence, this study rejects this price increase assertion. Second, a RFS has no significant impact on gasoline demand, though net demand for pure gasoline is reduced by the percentage of ethanol mandated by the RFS. A reduced net demand without altering price implies that the goals of the RFS, which were to deter oil dependence and diversify the U.S. energy portfolio, were properly met.

Rise of Complex Civilization: A Study of Heterarchy in Mali
Morgan Turnage, Anthropology and Journalism
Sponsor: Professor Pamela Crabtree, Anthropology

Societies without centralized power have long been considered uncivilized. Definitions required that hierarchy was the only valid system of governance and that any other form was only an evolutionary stage through which a society passed to achieve hierarchy. It is important to broaden our understanding and definition of complex societies to include cities without traditional power structures. The thriving city of Jenne-Jeno, on the outskirts of the Saharan Desert in Mali has city walls, specialized commerce, and long-distance trade. Yet, the archaeological site lacks evidence of social stratification. There is no palace or central government building. Inhabitants of Jenne-Jeno were divided by ethnic groups, each responsible for mastering one trade. They lived in clusters, essentially neighborhoods, within this larger city. The site lacks evidence of political dominance by any one ethnic group; it appears that they lived together peacefully. This study uses examples of heterarchy from around the world to refine the definition. Using archaeological data, I create a sample of conditions and evidence that can be used to identify heterarchy, and thus complexity, in many civilizations.

Consolidated Edison of New York, Inc.: Mapping the Electricity Stream in New York City
Nathalie Verhaegen, Environmental Studies and History
Sponsor: Professor Anne Rademacher, Social and Cultural Analysis and Environmental Studies

Consolidated Edison of New York, Inc., (ConEd) is the largest energy provider in New York City. ConEd provided electricity to a service area of over nine million customers to whom it delivered 58,323,047 MWh of electricity in 2008. This research reveals how ConEd operates as an energy company, specifically through its New York subsidiary, and exclusively in the realm of electricity generation, transmission and distribution. By explaining the legal and policy structure of the electric utility industry in the United States, New York State, and New York City, I present an outline for the greater system in which ConEd operates. The power generators from which ConEd obtains its electricity use a plethora of fuel sources and fall under a wide spectrum of size and ownership. The complex impacts of the recently deregulated energy market and how it has shaped ConEd are also considered. I have mapped the ConEd Corporation and its subsidiaries, provided a brief overview of the company as a whole, and explained its impact on the community and the environment. I have explored the complex web of
electricity with the intent of helping to place the public in a better position to understand the origins of the electricity used by New Yorkers. This research aims to foster a more complete understanding of the myriad decisions that need to be addressed related to energy production and use, both in the present and the future.

An Examination of Willingness-to-Pay for Environmental Attributes of Products
Nicolas Vissat, Economics
Sponsor: Professor Andrew Schotter, Economics

This research studies the impact of eco-labels on a consumer’s willingness to pay (WTP) for a product. Eco-labels have become an increasingly popular method for producers to signal to consumers that their products contain environmental attributes. I briefly examine the valuation methods that have been used in past studies to measure WTP for environmental attributes of products. I then perform an experiment in which one of these methods, the Becker-DeGroot-Marschak mechanism, is used to measure the effect of inclusion of an eco-label on consumer WTP. The data from this experiment was used to estimate several hedonic price regressions. Findings suggest an increase in WTP when a product possesses an eco-label; the increase varies based on the type of eco-label that is included on packaging. In addition, this research suggests that consumers may not be willing to pay more for multiple eco-labels on products. By more completely understanding the value that consumers place on eco-labels, producers will be better informed when deciding whether or not to pursue these costly labels for their products.

Arabic-French Code-Switching and Young Moroccans: A Culture of Accommodation
Dante Wadley, Anthropology and Linguistics, and Middle Eastern Studies
Sponsor: Professor Bambi Schieffelin, Anthropology

I analyze observed patterns of French-Arabic code-switching among urban and rural speakers and explore the influence of cultural preferences for social hospitality and accommodation on language choice.

“Aiding” the Homeless with One Way Tickets Home: Why Homelessness Policy is More than a Matter of Shelter
Caran Wakefield, Silver School of Social Work
Sponsor: Professor Jama Shelton, Silver School of Social Work

Despite increased efforts to combat homelessness, the number of homeless individuals in New York remains at an all-time high. In 2007, the Bloomberg administration implemented a new program which provides homeless families with free travel vouchers, if they find family willing to provide shelter. Bloomberg defends this policy as a “cost-effective” shelter alternative, while advocates claim that the homeless are essentially being “paid to leave.” Although the city has provided little data about this program, evidence suggests that it is a purely cosmetic solution to the plight of homeless families. Examining root causes of homelessness, and comparing this program to others that have successfully resulted in stable shelter for homeless families, suggests that so-called “greyhound therapy” may only perpetuate cycles of poverty and homelessness. Additionally, data suggests that host families that offer to “double-up” with friends or relatives who have fallen on hard times often incur personal and financial stress as a result. Overall, analysis of available data indicates the need for longitudinal, follow-up studies on the effectiveness of family reunification and “doubling-up.” Furthermore, evidence indicates the need to refocus homeless services to issues of poverty and economic barriers, rather than providing temporary and transitional shelter.

Representation and Resolution of Ambiguous Words
Caran Wakefield, Silver School of Social Work
Sponsor: Professor Athena Vouloumanos, Psychology

Commonly used words often have multiple meanings, depending on the context in which they are used. But how do we represent sentences with ambiguous words before the meaning is clarified? When we hear ambiguous words with distinct meanings (homophones), we commit to the most commonly encountered definition. For ambiguous words
with multiple related meanings (polysems), however, we may be able to begin interpreting the sentence using an underspecified representation of the word. Research with adults supports this hypothesis—when target words are presented before clarifying information, sentences containing homophones are read more slowly than those containing polysems. As resolving lexical ambiguities is more challenging for children, we expect difficulties with this task to be more pronounced than they would be in adults. To evaluate this, 16 children (ages 3.0 to 3.9) heard two-sentence stories about various homophonous and polysemous words, and pointed to the picture that best matched the story. Disambiguating information came after the target word. If the underspecification hypothesis is true, we predicted that children will have more difficulty reanalyzing homophones. We observed no difference between word types, however, indicating that both were processed similarly. The results of this study will provide information about the mechanisms by which children and adults process language, and how we arrive at a semantic interpretation of a sentence.

Madame la Ministre? Feminizing the French Language
Samantha Waller, Psychology
Sponsor: Professor Louise Vasvari, Linguistics

Grammatical gender is the site of some of the most heavily debated language reforms in the French-speaking world today. Many Francophone feminists have called for changes in the language’s grammatical gender system, which assigns a fixed gender to all of its nouns. In particular, these language reformers seek to address the problematic assignment of masculine gender to many professional titles. These words are especially salient linguistic features because they address and interact with questions of social power and authority. This research explores the current state of grammatical gender in French, discussing the linguistic problems that arise for women in positions of authority whose professional titles are masculine. It examines the techniques that language reformers employ to promote the feminization of such titles and the response that they receive from language authorities. It compares movements toward feminization in Québec with those in France in order to highlight their notable differences. It then discusses the function and efficacy of language reform as a feminist tool.

Do Good Fences Make Good Neighbors?: The Debate over Belfast’s Peacelines
Anna Williams, Metropolitan Studies
Sponsor: Dr. Robin Nagle, Draper Program

In 1969, the first barricade was constructed in Belfast in an attempt to control rising violence between Nationalists, who advocate for a united Ireland, and Unionists, who favor the continued union of Northern Ireland with Great Britain. Since then, Belfast has grown into a physically divided city, with entire neighborhoods of Nationalists and Unionists separated by these massive walls, called peacelines. The barriers have since come to represent the long history of struggle between the two socio-political groups. Today, twelve years after the 1998 Good Friday Peace Agreement officially ending the Troubles, or period of violence in Northern Ireland, there is relative peace in Belfast, but deep divisions between Nationalists and Unionists remain, as do the peacelines. In fact, the number of peacelines, and other physical dividers, have actually increased since 1998, leaving the city in a sort of limbo where “official peace” and decreased levels of sectarian violence show one scenario, while the urban planning and segregation of the city show another. The issue of the peacelines, and their perceived necessity, has recently been brought to serious debate in Northern Ireland. Using historical records, contemporary newspaper articles and recent public opinion polls, my research explores the different viewpoints of the debate, answering two main questions: why have the peacelines remained and why should they be removed? Through these inquiries, the work addresses the negative, and sometimes surprisingly positive, aspects of urban segregation.

On-Sides or Off-Sides: The Effects of Elections on the Salience of Ethnic Identities in Ghana
Harry B. Wolberg, Politics
Sponsor: Professor Rebecca B. Morton, Politics

This study investigates whether ethnic identity salience and attitudes towards other ethnic groups change in response to one of the most significant nation-wide events in the lives of African citizens: a national election. In past studies competitive elections have been purported to increase the salience of ethnic identification, pitting different ethnic blocs or coalitions against each other. Yet, despite such a theory there exists little empirical evidence to support this claim. Using survey data collected at three points in time over two years in Ghana’s capital city of Accra, I examine whether citizens’ responses fluctuate in a multitude of questions on the salience of their ethnic identities and their attitudes towards other ethnic groups. Further, I investigate whether fluctuations occur differently for certain subsets of the population, such as men versus women, old versus young, citizens with higher versus lower levels of education, and citizens who are employed versus unemployed. Results suggest that contrary to existing theory, ethnic identity salience does not undergo a significant increase during the national elections on the aggregate, but does fluctuate dramatically for certain subgroups of the population.
Financial Access, Economic Growth, and Income Inequality  
Montaz Yaqubie, International Relations and Economics  
Sponsor: Professor Alastair Smith, Politics

It has long been argued that microfinance is pro-poor and a cause of economic development. Until Honohan’s 2007 study, however, there was never a standardized cross-country measure that quantified access to financial services by the poor. Using these new developments, this research examines the effect of financial access in conjunction with financial development on economic growth, income inequality, and poverty. This study shows that the interaction between financial access and development has a significant, negative effect on income inequality, but no significant effect on economic growth. Additionally, financial access shows a significant negative effect on poverty at $2.00 per day. This implies that financial access helps those in lower income brackets, but does not necessarily promote growth in the traditional sense.

Undocumented Immigrants Speak Out: Rethinking Spaces of Empowerment for Illegal Immigrants  
Karen Yi, Social and Cultural Analysis  
Sponsor: Professor Thuy Linh Tu, Social and Cultural Analysis

Approximately 12 million undocumented immigrants reside in the United States. Through in-depth interviews with 13 undocumented Asian and Latino immigrants, this research unsettles commonsense ideas about illegal immigrants and rearticulates the ways in which undocumented immigrants find empowerment. Through these narratives, 13 undocumented immigrants claim a real existence from the invisible fringe and invert displacement into presence, achieve agency, and demand recognition in local spaces. The expression of these narratives at specific locations within local communities is breeding a new discourse that goes beyond the boundary delineated by legal apparatuses. This resistance through narrative stands as evidence that undocumented immigrants exist as a real and vital part of the nation; they are more than just workers and an objectified labor force and cannot be rendered invisible. Undocumented immigrants are not passive victims of marginalization but are transformative agents in their own empowerment.

Within Borders, Without Refuge: The Effect of Property Restitution Rights on the Resettlement of Internally Displaced Persons  
Yang-Yang Zhou, International Relations and Anthropology and Classical Civilization  
Sponsor: Professor David Stasavage, Politics

Currently numbering over 26 million, internally displaced persons (IDPs) are often the most at-risk yet overlooked population in the world. The issue of displacement affects the economic welfare and future stability of post-conflict nations. Both national governments and the international community continue to have difficulty defining who they are and ending protracted displacement. In this study, I posit that the major obstacle to IDP resettlement is the lack of access to livelihoods. Property, which functions not only as a home but a source of capital, is often the most valuable asset of the displaced. Thus, if the displaced are guaranteed property rights, they will be incentivized to choose resettlement. Based upon an original dataset covering
110 conflicts in sixty countries worldwide, my quantitative analysis substantiates that by providing IDPs with property rights and the agencies to enforce them, governments greatly increase their rates of resettlement. More notably, even the simple rhetorical endorsement of property rights provisions correlates with slight increases in resettlement. Giving IDPs property restitution offers them the opportunity to rebuild their political, social, and cultural identity, which ultimately leads to a more stable post-conflict environment.

**Considering Multiple Categories: Influence of Emotionally Charged Information on Category-Based Predictions**

Jennifer Zhu, Psychology  
**Sponsor:** Professor Gregory L. Murphy, Psychology

Categories are useful because they help us make inferences, or inductions, about new objects. We cannot always be certain, however, that a novel object actually belongs to the category we are using to make predictions. If a dark figure in the road could be a dog, a moose, or a wolf, one should consider all the possibilities in deciding whether or not the likelihood of attack is high. Past research has found that people generally choose one category, say a dog, and decide whether the animal will attack as if it were certainly a dog, neglecting the other categories. In this study, participants also read stories about items that could belong to several categories and made predictions about the items. Results showed that participants used multiple categories in their inductions when one of the categories was dangerous or emotionally charged (e.g., a bat), but not when it was neutral (e.g., a bird). Dangerous properties (e.g., predicting whether an illness would lead to death) encouraged to a greater extent use of multiple categories. These results demonstrate that emotionally charged information leads to the use of multiple categories in category-based induction, presumably because of its attention-grabbing power. It also illustrates the different roles of categories and properties in induction.

**Lend Me a Hand: Supported Walking in 11-Month-Old Infants**

Alyssa Zuckerman, Psychology  
**Sponsor:** Professor Karen E. Adolph, Psychology and Neural Science

Before infants walk independently, they practice upright balance walking with support—holding caregivers’ hands, pushing a wheeled walker, and “cruising” sideways along furniture. Does experience and quality of supported walking predict later walking status? Previous research indicates that cruising experience does not teach infants how to keep balance when walking, despite the similarities between cruising and walking. Previous work, however, does not describe infants’ experiences with supported walking; thus, little is known about what these experiences entail. To address this question, 11-month-old crawling infants were video-recorded for one hour at home during daily routines. I scored the frequency, duration, and type of supported walking (holding mothers’ hands, using walkers, cruising). Within each bout of supported walking, I recorded the number of steps infants took and their body orientation (whether facing forward or sideways). Finally, I inferred the purpose of supported walking bouts (e.g., whether infants cruised to get to an object out of reach). Families were contacted a second time when infants were 13 months old. Half of the mothers reported that their infants had begun to walk. I predict that the amount and quality of supported walking will portend walking status at 13 months.

**Sit Tight: Cross-Cultural Differences in Posture, Play, and Parenting**

Alyssa Zuckerman, Psychology  
**Sponsor:** Professor Karen E. Adolph, Psychology and Neural Science

I examined cross-cultural differences in maternal handling and infants’ motor skills. Using extended, naturalistic observations I described the physical and social context of infants’ motor skill acquisition. Infant-mother pairs from six countries (Argentina, Italy, Cameroon, Kenya, South Korea, and the US) were video-recorded for one hour at home during daily activities. Support context differed by culture—infants from Korea and the US spent more time on the floor, whereas infants from Argentina, Italy, Kenya, and Cameroon spent more time in mothers’ arms or on furniture. Sitting onset and ability also varied by country. All Cameroonian infants could sit independently, whereas infants from other countries could not. Cameroonian infants displayed greater sitting skill than the few infants from other countries that could sit. Across countries, when sitting, infants played with objects half the time but differed on the types of objects found around their homes. Kenyan infants had no manufactured toys; US infants had only manufactured toys. Cameroonian mothers allowed their infants to practice sitting and were less intrusive, allowing their infants to demonstrate the limits of their abilities, perhaps explaining why their infants were better at sitting. However, despite differences in maternal handling, infants everywhere had opportunities for postural practice and object exploration.
Given finite resources, should we fund more research into the cause—and possibly, cure—of cancer, or build a space station? Can weather be predicted much more accurately than it is now? Is your water supply safe to drink? Is the human population changing the world climate? We all tend to take it for granted that science and technology increasingly play a role in our livelihood, our recreation, and our economic and even our physical survival. As in the humanities, many problems in applied science are so complex that they require collaborative research by scientists with diverse backgrounds and training. The purpose of education in our “postmodern” world is to allow one to navigate with insight and comfort in an increasingly math- and science-driven environment, to distinguish what is sense from what is nonsense, and to form a basis for sound decision-making.

—Neville Kallenbach, Professor of Chemistry

**NATURAL SCIENCES**

**Gene CG33275 in Drosophila’s Clock**  
Sarah Abbassi, Biochemistry  
Sponsor: Professor Justin Blau, Biology

The 24 hour circadian rhythm is a daily cycle of biological activity that relies on a biological clock which regulates periodic gene expression. Circadian rhythm, a behavior exhibited in many animals, is regulated by neuronal cells, and is important in processes such as sleep, hunger, and other activities. This essential phenotypic character is studied in *Drosophila melanogaster*, a model organism that is an excellent tool for genetic analysis, the production of mutant species, and is easy to grow in the laboratory. The genes that control circadian rhythm in Drosophila are called clock genes and are expressed in cells of the brain, called clock neurons. Previous work done on circadian rhythm in Drosophila has revealed 37 clock genes that oscillate between specific time points. Of these genes is the one worked on for this project, gene CG33275. The aim of the project is to research the effect of gene CG33275 on circadian activity and to study the function of gene CG33275 in the molecular clock. Expression of the gene in adult small ventral lateral neurons (s-LNVs) and the possibility of the categorization of the gene as a Rho-Gef, a class of proteins involved in axon stability and the cell cycle, is also investigated. Locomotor assays on transgenic flies with gene CG33275 silenced in all clock cells were found to have shorter rhythms than wild type, while transgenic flies with the gene silenced only in s-LNVs were found to have longer rhythms. Immunocytochemistry experiments done on transgenic flies did not reveal CG33275’s function in the molecular clock, nor its expression in adult s-LNVs. Locomotor experiments done on Rho transgenic flies did not provide sufficient information to deduce in which pathway CG33275 proteins function.

**The Developmental Timing of Genetic Events and Morphogenesis in Caenorhabditis elegans**  
Samuel Ahn, Biology  
Sponsor: Professor David Fitch, Biology

*Caenorhabditis elegans* males undergo a sex-specific morphogenetic event, in which the pointed, juvenile tail tip retracts anteriorly to form a rounded, dome-shaped tail in adults. During the worm’s last larval stage, L4, the four most posterior hypodermal cells, hyp8–hyp11, fuse together and retract away from the cuticle. A number of
different pathways have been found to influence tail tip morphogenesis in C. elegans. One of these pathways in particular, the heterochronic pathway, is concerned with the timing of this developmental program. Many heterochronic genes have been characterized; the interactions between all of these, however, have not yet been discovered. Mutations of heterochronic genes disrupt the normal timing of developmental events such as tail tip morphogenesis, and normal tail tip retraction does not occur. Our aim was to determine the relation between two heterochronic factors, lep-2 and lep-5, during tail tip morphogenesis in males. To do so, we performed an expression epistasis experiment by constructing a lep-2 transcriptional reporter and comparing its expression in the tail tip in wild-type to its expression in the lep-5(ny10) background. Differential expression in the mutant background compared to in the wild-type background would suggest that the two factors somehow interact. In wild-type males, we observed a high expression of lep-2 during the L3 larval stage. The signal begins to diminish at the beginning of L4 until it is subsequently lost by middle to late L4, and lep-2 expression remains off in the tail tips of adults. In lep-5(ny10) mutants, lep-2 expression follows a similar, down-regulated trend as in the wild-type background. We also observed, however, a high variability of GFP expression throughout the different stages of development. For example, transgene expression was seen during late L4 and adulthood and not seen during L3—instances we never observed in wild-type males. Given that we observed different expression patterns of the lep-2 transgene in wild-type versus lep-5(ny10) worms, we can conclude that lep-2 and lep-5 interact in the tail tips of males. We speculate that lep-5 may be required in tightening the down-regulation of lep-2 during tail tip morphogenesis. Because both lep-2 and lep-5 are necessary for normal tail tip morphogenesis, lep-5 is a positive regulator of lep-2. Although our expression epistasis experiment has shown that lep-5 is upstream of lep-2, questions remain as to their specific interaction. The mechanism through which lep-5 acts on lep-2 first requires an understanding of what kind of gene product is transcribed. Members of the Fitch lab are currently working towards better understanding what lep-2 and lep-5 are.

Optical Forces Arising from Phase Gradients
Jesse Amato-Grill, Physics
Sponsor: Professor David G. Grier, Physics

Light’s ability to exert forces has been recognized since Kepler’s De Cometis of 1619 described the deflection of comet tails by the sun’s rays. Maxwell later showed that the momentum flux in a beam of light is proportional to the intensity and can be transferred to illuminated objects, resulting in radiation pressure that pushes objects along the direction of propagation. This study shows that in addition to the well-recognized optical force field that depends on the gradient of the intensity of the light, there also exists a force field that depends on the gradient of the phase. Remarkably, such phase gradient forces can be exerted in a direction transverse to the optical axis and are generally non-conservative. These phenomena are conveniently demonstrated within the context of Optical Trapping, a technology pioneered by A. Ashkin in the early 1980s that allows manipulation of nano- to micro-scale dielectric particles and has proven to be an invaluable research tool in fields ranging from atomic physics to microbiology. In addition, phase gradient forces allow for a new class of holographically projected optical traps with tailored force profiles that promise novel avenues for research in condensed matter physics, nanotechnology and biomedical engineering.

The Modulatory Role of Norepinephrine on Synaptic Transmission in the Lateral Amygdala
Paula Askalsky, Neural Science
Sponsor: Professor Joseph LeDoux, Neural Science

Numerous studies have demonstrated the importance of norepinephrine (NE) in fear memory formation. It has been hypothesized that NE acts on several different adrenergic receptors (AR) in concert to allow emotional learning to occur properly. The process, however, by which NE acts on each AR and how these receptor-specific roles influence synaptic transmission in the lateral amgdala (LA), a critical brain region for fear memory formation, remain unclear. Here, we show that the activation of each AR in the LA is dependent on the concentration of NE that is present. Whole cell recordings were made in pyramidal neurons in the LA to observe the effects of a range of concentrations of NE on individual cells. Then, we used α2-AR and β-AR antagonists in conjunction with tested NE concentrations to pair each concentration with an appropriate receptor. The present results indicate that high NE concentrations act preferentially on α2-ARs and low NE concentrations act preferentially on β-ARs. Thus, NE activation of presynaptic α2-ARs may autoinhibit neurotransmitter release, while NE activation of postsynaptic β-ARs enhances synaptic transmission, facilitating the acquisition of fear learning. These results may influence new treatments for fear related illnesses, such as anxiety disorders and post-traumatic stress disorder.

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Cysteamine-Bitartrate in Treatment-Resistant Major Depression
Christopher R. Bailey, Psychology
Sponsor: Professor James Murrough, Mount Sinai Hospital

Major depressive disorder (MDD) is a common, disabling and often life-threatening medical condition. Though treatments exist for MDD, many patients fail to respond, making novel treatments necessary. Clinical research indicates that low levels of brain-derived neurotrophic factor (BDNF) may play a role in the pathophysiology of MDD; therefore, drugs that increase BDNF levels might prove to be efficacious. Cysteamine-bitartrate, an FDA-approved drug used to treat a rare childhood kidney disease, has been shown to increase BDNF levels in humans. To investigate the efficacy of cysteamine-bitartrate, three patients with treatment-resistant major depression (TRD) received open-label cysteamine-bitartrate over eight weeks. We measured the participants’ level of depression throughout the eight-week study period. None of the patients’ depressive symptomatology was significantly reduced. These preliminary findings suggest that cysteamine-bitartrate may not affect TRD; larger studies, however, will be required to assess its effectiveness in MDD. Our findings can also be used further to study other BDNF modulating agents. Drugs that can increase BDNF levels could one day be the key to unlocking novel pharmacological treatments for MDD.

Detection of the Genetic Interactions between Two Spore Coat Morphogenetic Proteins of Bacillus subtilis and their Coat Protein Targets
Samantha Barry, Biology
Sponsor: Professor Patrick Eichenberger, Biology

Bacillus subtilis is a Gram-positive model soil bacterium with a dynamic life cycle. When placed in nutrient exhausted conditions, B. subtilis undergoes sporulation, developing from a vegetative cell into a dormant spore. When placed back into a nutrient rich environment, B. subtilis spores can germinate and resume vegetative growth. A spore can survive under very harsh conditions such as heat, lysozyme exposure, and radiation. The durability of the spore is enhanced due to its several protective layers. The spore is composed of three parts: the core, which contains the genome of the bacterium; the cortex, which is made of peptidoglycan for strength, support, and heat resistance; and the coat, a shell of proteins that encapsulates the spore and provides protection against predators. The spore coat is assembled in a kinetic and spatial manner, from at least 70 different proteins. Proteins are added to the coat in a distinct temporal pattern, resulting in an organized multi-layered structure. The assembly of dozens of spore coat proteins is regulated by a handful of morphogenetic coat proteins. When these morphogenetic coat proteins are absent, assembly of the spore coat is impaired to different extents because some spore coat proteins do not localize properly. The principal aim of this work is to determine whether morphogenetic proteins have partially redundant functions in coat assembly. To investigate genetic redundancy in B. subtilis spore coat formation, I determined the localization of GFP-fused coat proteins in the absence of two morphogenetic coat proteins: CotO and CotH. I compared the resulting subcellular localization pattern to that of these same GFP-fused coat proteins in a wild-type background as well as in the absence of either CotO or CotH individually. Additionally, in order to quantify the slight deformation in the absence of one morphogenetic protein, I analyzed the fluorescent images at sub-pixel resolution. This determines the precise localization of a specific GFP-fused protein in the absence of either CotO or CotH as compared to the wild-type background.

Detecting Phase Shifts in Chromonic Liquid Crystals Using the Zimm-Crothers Viscometer
Bernard Beckerman, Physics
Sponsor: Professor David Pine, Physics and Mathematics

Liquid crystals are substances that can be liquid or solid like any other, but at certain temperatures can occupy intermediate phases: phases that can flow like a liquid, but often contain strong orientational or positional order like a solid. These substances are at the forefront of many areas of soft matter research, including supramolecular assembly and self-organizing systems, and have many interesting biological applications. The amount of order can be varied by changing the temperature and concentration of the substance in water, and can be detected by measuring the viscosity of the liquid. We built, wired, and programmed a highly precise viscometer to measure the delicate effects of warming and cooling on chromonic liquid crystals (chromonics). The purpose of these measurements is to observe and report on a dramatic shift in viscosity that appears in some chromonics but not in others. Observations of this inconsistency will help solve an interesting problem by suggesting a mechanism for the formation of these liquid crystals, and, more importantly, it will inform an area of physical chemistry with strong applications in the biological sciences. Measurements on two specific chromonics, disodium chromoglycate (DSCG) and Sunset Yellow FCF, and the implications of these measurements on the question of liquid crystal formation are currently being examined for publication.
Identifying Specific Hairy-like Genes in Ciona intestinalis Heart Cell Progenitors
Renee Marie Bogdanovic, Biology
Sponsor: Professor Lionel Christiaen, Biology

In the realm of cardiovascular medicine, one approach to restoring heart tissue is using embryonic stem cells to repair damaged heart muscle cells. Multipotent stem cells differentiate to their eventual fates, and genetic mechanisms involved in this specification into heart cells must be elucidated in order to harness their power. Using the sea squirt Ciona intestinalis in this project, I focus on the differentiation of its Trunk Ventral Cells into cardiovascular tissue and atrial siphon muscles (ASMs). One prominent difference between the two cell types is the upregulation of the gene Ci-islet in the ASMs and its absence in heart cell progenitors. The Notch signaling pathway is thought to indirectly inhibit Ci-islet expression, and four candidate repressors of the Hairy-like family are likely to function downstream of Notch. Thus, I hypothesized that one or more of these four genes act to repress Ci-islet in the heart cells. I have designed primers and performed polymerase chain reaction (PCR) analysis of the four genes to create antisense probes for in situ hybridization on developing embryos. Continuing my research, I will identify which Hairy-like gene is expressed in heart precursors, which will provide a solid base for further experimentation on heart cell differentiation.

Adaptive Introgression of the MHC Genes in the Kinda/Grayfoot Baboon (Papio) Hybrid Zone
Stephanie Chen, Neural Science
Sponsor: Professor Todd Disotell, Anthropology

Natural hybridization of genetically divergent individuals typically leads to less fit hybrids; in certain circumstances, however, natural selection may also promote introgression of genetic material. In the process known as adaptive introgression, beneficial genetic variants can be introduced to populations via hybridization with distantly related populations. Theoretically, this process should be favored in genes where rare variants are evolutionarily advantageous. The major histocompatibility complex (MHC) in vertebrates is thought to be the most gene dense, polymorphic region of the human genome because it is maintained by this type of negative frequency-dependent selection. Accordingly, here I test for adaptive introgression of MHC genes in the kinda/grayfoot baboon hybrid zone. Due to the balancing selection at the MHC locus, the transfer of microsatellites, highly variable genetic markers, linked to the MHC should occur at a faster rate than that of neutral unlinked markers. The neutral markers are unlinked to any known genes and can thus serve as a control indicating the extent of neutral gene flow. Because increased MHC diversity may confer a fitness advantage, MHC-linked variants should have crossed the hybrid zone and homogenized the MHC diversity of the parent populations to a greater extent than the neutral controls. Although this hybrid zone serves as an ideal model for adaptive introgression, my data lacks the statistical power to show significantly less population differentiation at the MHC locus in comparison to the neutral loci, yielding inconclusive results.

Circadian Control of Translation
Fuad Ahmed Chowdhury, Biology
Sponsor: Professor Justin Blau, Biology

Circadian rhythms are 24-hour cycles in the biochemistry, physiology or behavior of organisms. Drosophila show similar sleep-wake rhythms to humans. These rhythms are generated by fluctuating expression of clock genes that have analogs in humans. Microarray studies of purified Drosophila pacemaker neurons (LN_s) have found more genes that show rhythms in their mRNA expression, two of which (eIF4B and eIF4G) are translation initiation factors. Microarray data showed a three- to five-fold higher level of mRNA expression in the early morning as opposed to the early evening. This suggests differential rates of translation at different times of the 24-hour cycle of Drosophila. In order to measure translation rates in the early morning and early evening, I have developed a system that allows me to precisely control transcription of green fluorescent protein (GFP) mRNA in LN_s to measure translation rates in LN_s by assaying GFP accumulation. The data I gathered from live imaging and immunostainings suggest that there is a higher rate of translation during the early morning than the early evening, which corresponds to the difference in eIF4B and eIF4G mRNA expression. Therefore, I propose that translation rates are rhythmic.

Neural Responses to Racial Ingroup Norm Violations
Emily Chumas, Psychology
Sponsor: Professor David Amodio, Psychology

Ingroup favoritism effects have typically emerged within intergroup research in social psychology; however, recent work has suggested that ingroup members are punished more severely than outgroup members when group fairness norms are violated (Mendoza, Lane, & Amodio, 2010). The present study uses event-related potentials (ERPs) to investigate whether unfair treatment from racial ingroup versus outgroup members elicits stronger neural responses associated with expectancy violations, as indi-
cated by the Feedback Related-Negativity (FRN). White participants played the ultimatum game and considered hypothetical monetary offers from both white (ingroup) and black (outgroup) computer partners. We manipulated the range of offer sizes to resemble clearly fair, ambiguously unfair, and clearly unfair monetary offers. Past ultimatum game research has shown that participants use social norms rather than economic rationale to guide their responses, and participants are willing to punish partners at a personal expense rather than accept an unfair offer. We expect that participants will punish their fellow ingroup members for proposing ambiguously unfair offers more so than outgroup members. We also expect to see stronger FRN responses to ingroup ambiguous offers than outgroup ambiguous offers, and we believe that ingroup expectations should drive the neural response.

**CO Promoter Polymorphism Results in Flowering Time Variation**

*Kelly Clemenza, Biology*

*Sponsor: Professor Michael Purugganan, Biology*

The CONSTANS (CO) gene is a key player in the regulation of flowering in plants. This gene is best represented in the model plant species, *Arabidopsis thaliana*, an organism that is heavily studied for the genetics of flowering. In our previous study, 24 wild-collected accessions were sequenced for the CO gene and its upstream promoter region, the portion of DNA that helps control when CO is expressed. That study revealed duplications within the promoter region, with most strains containing either 4 or 5 copies of the promoter. A follow-up study revealed that accessions with the 5x promoter repetition flowered earlier than accessions with the 4x promoter. Thus it seems that the number of copies of the CO promoter is affecting flowering time in nature. *A. thaliana* has a wide range of natural flowering times. This appears to be due to strong local selection for different times at different latitudes; CO promoter number, however, does not track this latitudinal cline in flowering time, as one might expect given its influence on flowering time. The previous study found that the 5x type is found in plants from Spain and Germany, but sampling did not reveal any of the 5x type in plants from France. For this project, the CO gene and promoter region of more than 200 additional accessions of *A. thaliana* will be sequenced, representing a wide range of habitats throughout Europe. By constructing a phylogeny to map patterns of relatedness and layering this map with climate information, I seek to confirm the geographic distribution of 5x and 4x types from our preliminary study and to determine whether there is any evidence for convergent evolution of the CO promoter type.

**The Mind’s Eye: Performance Fields in Visual Imagery**

*Francesca Cohen, Psychology*

*Sponsor: Professor Marisa Carrasco, Psychology*

Do visual perception and visual imagery share the same neural basis? Here, we use objective characteristics of the visual system, performance fields, to elucidate the relation between the two systems. Performance fields are measures of how visual abilities differ across isoeccentric locations. For example, adults exhibit better visual performance on the horizontal meridian than the vertical, and on the lower half of the vertical meridian than the upper. To measure performance fields in vision, observers moved their eyes toward or away from a stimulus composed of two sinusoidal gratings and reported the distance at which the two gratings could no longer be distinguished. In the imagery condition, subjects performed the same task while imaging the absent stimulus. Results showed that both vision and imagery contain similar asymmetries of performance fields, and that there was a similar reduction in overall performance as the spatial frequency of the stimulus increased. These findings support the hypothesis that vision and imagery share an underlying neural basis.

**An Efficient MTA: The Role of Cellular Microparticles in Protein Transportation**

*Ashley Comfort, Chemistry*

*Sponsor: Professor Anna Nolan, NYU School of Medicine*

My research focuses on the role of microparticles (MP) in the inflammatory cascade of the immune system. MP, small fragments of less than 2.5 microns, are comprised from segments of the cell membrane. MP are selectively released by the parent cells, and can be isolated through centrifugation methods and quantified by flow cytometry. MP have been implicated in several immune system cascades, acting as a mediator in both pro-coagulant and pro-inflammatory mechanisms. I postulate that systemic dissemination of these inflammatory proteins uses MP as a main method of transportation.

By stimulating the release of MP using a septic model, I observed the effects in two cell lines and in an *in vitro* model. I have shown an elevated number of microparticles in pure cell lines after exposure to endotoxins, isolating them using several high speed centrifugation steps. The same results were replicated using an *in vitro* approach, focusing on a septic murine model. Using Western blot analysis, CD28 and CD40 were identified on the isolated microparticle pellet. Higher levels of CD28 were seen in the septic mice versus the non-septic mice, concentrated in the lowest densities of the gradient. Levels of CD40 were found to be consistent. Further work will be done to determine if the MP pellet is still active.
The Effects of the World Trade Center Collapse on Lung Function of FDNY Personnel
Ashley Comfort, Chemistry
Sponsor: Professor Anna Nolan, NYU School of Medicine

The collapse of the World Trade Center (WTC) on 9/11/01 produced a massive toxic exposure in a clearly defined cohort of 12,000 FDNY personnel who received intensive post-exposure medical evaluations and had pulmonary function testing prior to the event. A small subset of patients, 1,720 of the original cohort, sought medical evaluation for symptoms. They presented with a statistically significant greater decline in lung capacity after 9/11. This was captured in the smaller cohort’s overall lowered FEV₁, resulting in a lowered ability to expire the same volume of air in a minute. The other parameters of lung function were stable, compared to the entire cohort. The most common physiologic abnormality was air trapping in the lungs, which was responsive to bronchodilators and a methacholine challenge test. These correlated well with thickening in the peribronchial area of the lungs. This subset of symptomatic patients had an overall reduced lung function, compared to the 12,000 exposed to the WTC collapse. In a comparison of all symptomatic patients, a greater decline in lung function was associated with a lower level of cytokine levels pertaining to mucus production and allergies, including IgG and IgA. Further work will be done on disability rates of the symptomatic cohort.

The Rewarding Effects of Drugs of Abuse in Food Restricted Animals: Examining the Role of PKA
Seth Concoris, Psychology
Sponsor: Professor Kenneth D. Carr, NYU School of Medicine

Chronic food restriction increases the rewarding effect of all known abused drugs. While this behavioral change in response to food restriction has been documented, the underlying biochemical mechanisms are still not understood. Dopamine mediates the rewarding effects of most abused drugs; further, changes in D-1 dopamine receptor signaling pathways have been observed with food restriction and its enhanced effect on drug reward. This study examined the role of D-1 dopamine signaling molecule protein kinase A (PKA). I tested free-feeding and food-restricted animals for sensitivity to rewarding electrical brain stimulation, the enhancing effect of injecting D-1 receptor agonist into a brain reward region (nucleus accumbens), and preceding that agonist with injection of a PKA-inhibitor. In food-restricted subjects, the presence or absence of PKA-inhibitor did not alter the sensitivity to brain stimulation or the effect of the D-1 agonist; free-feeding subjects, however, showed a significant increase of the effect of the D-1 agonist when preceded by a PKA-inhibitor. This suggests a possible mechanism for the observed difference in drug sensitivity between feeding groups, and it may provide a novel explanation for co-morbidities between ingestive disorders (i.e., those involving food and drugs) and also help identify a larger susceptibility to increased drug reward shown in the population.

Investigating Zelda’s Interaction with MicroRNA Enhancers in Early Drosophila Development
Josephine DeLuca, Biology and Psychology
Sponsor: Professor Christine Rushlow, Biology

Previous studies have demonstrated that Zelda (Zinc finger early Drosophila activator) plays an integral role in the maternal to zygotic transition (MZT) during early Drosophila development, and that Zelda binds to DNA at TAGteam consensus sequences. During the MZT, a subset of maternally derived gene products are degraded and zygotic transcription is activated. Zelda mutant embryos exhibit maternal transcript up-regulation and zygotic gene down-regulation. One potential mechanism for the degradation of maternal gene transcripts is that Zelda activates microRNA transcription, and then microRNAs regulate the degradation of maternal RNAs. In Zelda-deficient mutants, the primary transcripts of miR-1 and miR-309 are down-regulated, indicating that Zelda influences their transcription. The goal of our current research is to determine whether Zelda binds directly to the miR-1 and miR-309 enhancers, specifically at TAGteam sites, to regulate their transcription. We inserted wild-type or TAGteam-site mutated enhancer regions of miR-1 and miR-309 upstream of a lacZ reporter gene and injected these plasmids into Drosophila embryos. The wild-type enhancer constructs mediated lacZ expression in regions of the endogenous miR expression domains, confirming that the constructs contain the necessary sequences to drive proper expression. By comparing the lacZ patterns driven by enhancers with mutated TAGteam sites to those driven by wild-type enhancers, we demonstrated that the TAGteam sites in miR-1’s enhancer are necessary for transcriptional activation by Zelda. We are currently examining miR-309 regulation by Zelda.

Complexity of the Sum of Roots Problem
Zachary DeStefano, Mathematics
Sponsor: Professor Chee Yap, Computer Science

I researched the question of whether a sum of roots of rational numbers is equal to zero. It is a very important problem in a wide variety of areas. It is also important that we obtain an efficient and accurate algorithm for this task. The brute force method of calculating out each
root and seeing if it is equal to zero is both inefficient and potentially inaccurate. When you calculate the sum using a computer, it finds an approximation for it; if the approximation returns a value of zero, you don’t actually know if it is equal to zero. For certain problems, whether the value is very small or is actually equal to zero makes a big difference. Using abstract algebra and number theory from pure mathematics, it is possible to solve this problem more efficiently and more accurately. Most importantly, we can conclude with certainty whether the sum is equal to zero. This is all accomplished by using the algebraic properties of certain algebraic extensions of Q.

The World Within: Comparing the Genetic Diversity of Amazonian River Turtles and their Parasites
Rachel Engstrand, Biology
Sponsor: Dr. Sergios-Orestis Kolokotronis, Sackler Institute for Comparative Genomics

The major histocompatibility complex (MHC) is a vertebrate gene family that plays an important role in the immune system of an organism. While many studies have been done examining the genetic variability of the MHC and comparing it to the severity of parasite infection, there have not been any studies examining the correlation between the genetic variability of the MHC of a host and that of the parasites that infect it. This study will compare the genetic variability of different blood parasite species to the genetic variability of the MHC of their Amazonian River Turtle hosts. The turtle species examined, Podocnemosis expansa, P. sextuberculata, and P. unifilis, are all threatened and culturally important species that are indigenous to Peru’s rainforest. Understanding the genetic factors that affect host susceptibility to different parasites will give us new information about the relationship between hosts and their parasites as well as provide us with information that could help aid in the conservation of these turtles. The hypothesis we are testing is that the host will be infected with the most genetically variable parasites when the genetic variation of the MHC is high. I have finished sequencing and analyzing several genes in the MHC of the turtles and am currently working to gather sequences of several mitochondrial and nuclear genes in the parasites found within the turtles.

Neuronal Reward Contingencies of Eye-Hand Decisionmaking
Margaret Fabiszak, Neural Science
Sponsor: Professor Bijan Pesaran, Center for Neural Science

The posterior parietal cortex (PPC) forms a crucial link between sensory input and motor output. Within the PPC, properties of the lateral interparietal (LIP) region and the parietal reach region (PRR) are well known to mediate certain motor processes, particularly saccades and reaches, respectively; the manner in which they interact with each other is largely speculative, however. Additionally, the cells in LIP show a reward effect in that the firing rates of single cells are proportional to the predicted reward value of the task. This reward effect has not been shown in PRR, despite its many parallel functions to LIP. To better understand how sensory information is transformed into motor output, it is crucial to understand the mechanisms by which LIP and PRR interact. By recording from single cells during a decisionmaking task in which reaches and saccades are dissociated or paired, we show that LIP initiates movement decisions faster than PRR, indicating a potential interaction between the areas in which LIP may drive action within PRR. Additionally, we find that PRR also displays a reward effect, although not as strongly as LIP. This also may be indicative of the interaction between LIP and PRR. To further show the interaction between LIP and PRR, local field potentials (LFPs) measured while planning a coordinated movement within LIP and PRR exhibit higher coherency across the two areas than within the areas. This interaction of LFPs may contain more globally oriented information across areas. These findings suggest that LIP and PRR interact to integrate timing information, reward effects, and LFPs across areas in order to effect a unique decision toward motor output.

AMPA Receptor Inhibition Downstream of D1 Dopamine Receptor Stimulation in Nucleus Accumbens Mediates Increased Rewarding Effect in Food Restricted Rats
Casey Farin, Neural Science
Sponsor: Professor Kenneth D. Carr, NYU School of Medicine

Food restriction has been found to enhance behavioral responses to commonly abused drugs, hinting that the amount of reward experienced as a result of the drug is increased in food restricted subjects. It has been determined that glutamate, as well as dopamine, plays a role in the reward pathway, and it has been speculated that adding a glutamate receptor antagonist to a drug of abuse would decrease the rewarding effects of the drug as well as decrease the behavioral differences between food restricted and control groups. The purpose of this study was to determine whether the addition of 1-NA Spermine (a glutamate receptor antagonist) to SKF-82958 (a D1 dopamine receptor agonist) would show a decrease in reward compared to SKF-82958 alone, as well as eliminating the difference of the rewarding
effect between the food restricted and ad libitum feeding groups. In this study we employed a lateral hypothalamic self-stimulation protocol, with pre- and post-injection tests. The rewarding effect was measured by the amount of change in the reward threshold between the two rate-frequency tests. There is a significant difference between the food restricted group and the control group for injections of SKF-82958 alone, and this difference is eliminated with the addition of 1-NA Spermine. The rewarding effect of SKF-82958 is decreased with the addition of 1-NA Spermine in both groups.

Quantum Mechanical Study of a Phenanthrene•He van der Waals Complex
Jason Flamendorf, Chemistry
Sponsor: Professor Zlatko Bačić, Chemistry

The spectroscopic study of atomic and molecular clusters has recently experienced major advances. Many of the clusters investigated thus far have been atom-large molecule complexes, usually consisting of a planar aromatic molecule M and one or more (n) rare-gas atoms R interacting through van der Waals (vdW) forces. Of particular importance are the intermolecular vdW vibrational modes, which are central to the internal dynamics of these M•Rn clusters. A complete quantitative understanding of the vdW vibrational levels requires accurate 3D bound state calculations and subsequent analysis of the wave functions. One system that has yet to be studied quantum mechanically is phenanthrene•He, which is different from previously investigated complexes because of its curved aromatic substrate. The purpose of my research is to determine the intermolecular vibrational energy levels and wave functions of phenanthrene•He. I represented the intermolecular potential energy surface (IPES) of the system as a sum over pairwise atom-atom 12-6 Lennard Jones potentials between the He atom and each C atom in phenanthrene. I then explored the quantum vibrational dynamics using the Discrete Variable Representation (DVR) method. DVR represents the solutions of the Schrödinger equation by their amplitudes at a set of basis points. One of the major benefits of DVR is that the potential energy matrix is diagonal, and its elements are equal to the value of the potential energy evaluated at each basis point. This significantly reduces computational time by eliminating the need for numerical integration. By examining the energy level patterns, root mean square deviations, and wave function probability plots, I was able to make Cartesian quantum number assignments. I also observed anharmonicities in the energy level spacing of the x and y modes, which are explained by the shape of the IPES in both directions. Finally, there was weak coupling between the x, y, and z modes in the low-lying states as evidenced by the regular nodal patterns of the wave functions.

Electron Tomography of the Erythrocyte Cytoskeleton
Natalya Gertsik, Biochemistry
Sponsor: Professor David Stokes, NYU School of Medicine

The erythrocyte (red blood cell) membrane contains an underlying cytoskeleton that furnishes the red blood cell with flexibility, durability, and deformability. The cytoskeleton is a roughly hexagonal two-dimensional network comprised mainly of spectrin, actin, and 4.1R. While numerous biochemical, biophysical, and ultrastructural studies have been conducted on the erythrocyte cytoskeleton, a three-dimensional structure has never been determined. In this study, we visualized erythrocyte cytoskeletons from mouse red blood cells using negative stain and cryo-electron microscopy and then subjected them to electron tomography. Negatively-stained tomography of skeleton preparations reveals monomeric alpha and beta spectrin molecules assembling into dimers and forming a junctional complex with actin and 4.1R. Cryo-electron tomography of isolated skeletons suggests that the cytoskeleton is organized into flexible groups of filaments. Future studies are planned to assess the role of individual cytoskeletal proteins using either genetic knockout mice or peptides that dissociate the heads or tails of spectrin from the cytoskeleton while preserving the other associations. Detailed structural comparisons between wild-type and disease-model cytoskeletons will provide insight into the structural basis for skeletal abnormalities in red cell membrane disorders such as hereditary spherocytosis and elliptocytosis.

Pressure Gestures: Interacting with a Pressure-Sensitive Multi-Touch Device
Alex Grau, Computer Science and Psychology
Sponsor: Professor Ken Perlin, Computer Science

For most commercial multi-touch technologies, touch input is confined to two dimensions: a vertical and horizontal position. Recently, there have been several devices, like Touchco’s multi-touch pad, Perceptive Pixel’s Multi-Touch Wall, and Stantum’s touch screen, that have made pressure available as an additional half-degree of freedom for each touch. With pressure, novel interactions are possible that expand and improve on the currently established multi-touch paradigm. Using an UnMousePad, an interpolating force-sensitive resistor, I investigated possible gestures and widgets for a pressure-sensitive multi-touch device. Novel interactions
Amblyopia: Lazy Eye or Lazy Brain?

Regina Gurevich, Undecided
Sponsors: Professor Andrea McKenzie, Expository Writing, and Professor Lynne Kiorpes, Neural Science

Amblyopia, or lazy eye, results in poor vision in a seemingly healthy eye. This disorder affects nearly 3 percent of American citizens and carries the risk of permanent vision loss for 1.2 percent of the population. Amblyopia develops due to unequal visual input during the critical period of development, which typically ends around age 9. Physical patching of the healthy eye corrects amblyopia in children; few treatments are available for adults, however. Adults must live with the disorder and are often classified as disabled. Perceptual learning (PL) is a technique in which repeating stimuli train the amblyopic eye to gain visual function. Little is known about PL, and laboratories around the world are testing various PL programs. Though other meta-analyses have focused on amblyopic treatment, few have focused solely on PL and its efficacy. My meta-analysis summarized data from multiple PL studies, concluding that perceptual learning is most effective with mild amblyopes. The lasting improvements that result from PL highlight the feasibility of perceptual learning as a novel treatment for adult amblyopes.

Mechanism of Interaction of RW₄₀ with Membranes
Eric Greenwald, Biochemistry
Sponsor: Professor Neville Kallenbach, Chemistry

A novel dendrimeric antimicrobial peptide, RW₄₀, shows promise as a potential therapeutic against bacterial infection and resistance, due to its small size and potent activity. Its mechanism has not yet been elucidated, however. RW₄₀ may target the cell membrane, intracellular macromolecules, or both. I used a cell wall-less bacterium, Acholeplasma laidlawii, and Escherichia coli as models for testing RW₄₀’s action against the membrane. RW₄₀’s ability to inhibit cell growth was tested against A. laidlawii and E. coli. The IC₅₀ in A. laidlawii, after a 48-hour incubation with the dendrimer, was found to be 416.5 μg/ml, and the IC₅₀ in E. coli after an 18-hour incubation was 6.5 μg/ml. A carbocyanine dye fluorescence experiment, which monitors changes in cell membrane potential, and a Live/Dead fluorescent staining assay were performed to analyze the effects of RW₄₀ on the bacterial membrane. The peptide’s ability to destroy membrane potential was well correlated to its bacteriostatic activity in A. laidlawii, while these two events did not correlate in E. coli. These and fluorescent staining results suggest that the mechanism of action of the dendrimeric antimicrobial peptide involves membrane interference but may also involve disruption of internal targets.

Long Distance Photoinduced Electron Transfer in Triazole-Based Conjugated Polymers with Porphyrin and C₆₀ End Groups

Christopher Haley, Chemistry
Sponsor: Professor David Schuster, Chemistry

The photoinduced electron transfer processes of porphyrin-fullerene dyads have been an area of considerable interest. With the recent novel synthesis of triazole-linked dyads, new and different 1,2,3-triazole-based donor-acceptor linkages are conceivable. The triazole linkage has been shown to demonstrate efficient electronic communication in the excited state between the porphyrin and fullerene moieties. A monomer, whose synthesis will be described, can be used to create a triazole-based molecular wire of controlled length using “click” chemistry. This monomer has two distinct ends on which to work. The azide can react with the deprotected alkynyl end of a functionalized porphyrin via “click” chemistry to produce a triazole-linked monomer-porphyrin with the same end group as the original monomer. The deprotection of the alkynyl followed by the subsequent “click” chemistry reaction to form the 1,2,3-triazole ring can be repeated, creating a longer conjugated polymer of controlled length. We can systematically increase the length of the linkage and thus increase the number of triazole linkers between the subsequently attached porphyrin and fullerene moieties. We will report the effects of such changes with respect to the photoinduced charge separation and charge recombination, the synthesis of these new materials, and the results of the absorption studies and electrochemical characterization.

Structure Based Design of Small-Molecule Ligands for BCL6 BTB Domain

Daniel Heindel, Chemistry
Sponsor: Professor Paramjit Arora, Chemistry

BCL6 (B Cell Lymphoma 6) is a transcription factor protein that represses genes necessary for the terminal differentiation of lymphocytes. The N-terminal BTB domain of the BCL6 protein contains a homodimeric region included using a light touch to indicate position, clicking with pressure, and leaning with isometric gestures. Each interaction could be achieved by using one finger, multiple fingers, or an entire hand. My research also explored separating isotonic and isometric gestures on the pad, making both modes of interaction available for use. In order to demonstrate some possible uses of these gestures and widgets, I created applications to show how pressure gestures can enrich interaction for appropriate tasks.

Amblyopia: Lazy Eye or Lazy Brain?

Regina Gurevich, Undecided
Sponsors: Professor Andrea McKenzie, Expository Writing, and Professor Lynne Kiorpes, Neural Science

Amblyopia, or lazy eye, results in poor vision in a seemingly healthy eye. This disorder affects nearly 3 percent of American citizens and carries the risk of permanent vision loss for 1.2 percent of the population. Amblyopia develops due to unequal visual input during the critical period of development, which typically ends around age 9. Physical patching of the healthy eye corrects amblyopia in children; few treatments are available for adults, however. Adults must live with the disorder and are often classified as disabled. Perceptual learning (PL) is a technique in which repeating stimuli train the amblyopic eye to gain visual function. Little is known about PL, and laboratories around the world are testing various PL programs. Though other meta-analyses have focused on amblyopic treatment, few have focused solely on PL and its efficacy. My meta-analysis summarized data from multiple PL studies, concluding that perceptual learning is most effective with mild amblyopes. The lasting improvements that result from PL highlight the feasibility of perceptual learning as a novel treatment for adult amblyopes.
Nanoparticles Functionalized with High Gadolinium Chelate Payload as Effective In Vivo T1-Brightening Contrast Agent
Lindsay K. Hill, Biochemistry
Sponsors: Professor Youssef Zaim Wadghiri, NYU School of Medicine, and Professor Marc A. Walters, Chemistry

MRI contrast agents are often essential tools for the clinical detection of diseased tissue. Nanotechnology provides important new techniques for the design of new contrast agents. Today, nanoparticulate agents can be synthesized to carry a multiplicity of molecules on their surface or interior. This platform was utilized to explore the use of gold and silver nanoparticles that carry a high payload of MRI agent Gadolinium (Gd) to greatly amplify MR image contrast. The aqueous solubility promoter polyethylene glycol (PEG) was additionally attached to further increase enhancement and extend the particles’ plasma half-life. The relaxivity and solubility of the pegylated and non-pegylated nanoparticles, as well as the widely clinically-used agent Magnevist, were tested in vitro and their biodistribution was assessed by in vivo full-body MRI that allowed for 3D visualization of their effects and clearance during a two-hour time course in wild type mice. These studies confirmed great signal enhancement within the vasculature compared to Magnevist, as we expected from their size and Gd payload. Additionally, PEG significantly contributed to particle solubility and longevity in vitro. These Gd-linked nanoparticles thus prove to be stable MR brightening agents to visualize vasculature in vivo.

Kinetic Characterization of T Cell Receptors Specific for gp100 Melanoma Antigen
Kevin Huang, Biology
Sponsor: Professor Michelle Krogsgaard, NYU School of Medicine

Recent T cell based cancer therapies rely on the T cell receptors (TCRs) to specifically and efficiently recognize tumor-associated self antigens and to avoid self-reactivity. We hypothesized that the different functional outcomes observed among tumor reactive T cells is correlated with the kinetic parameters of the TCRs. To this end, several TCRs specific for the gp100 melanoma antigen were measured for their binding kinetics. We optimized a method to express and purify soluble TCRs. The binding on-rate (Ka), off-rate (Kd), and affinity (KD) of the TCRs were then measured using surface plasmon resonance (SPR). The kinetic data for a given TCR will be compared with its anti-tumor functional properties. This information can help identify and design promising TCR clones for improved cancer therapies.

Tertiary Motifs in Analyses of Higher-Order RNA Junctions
Abdul Qadeer Iqbal, Biochemistry
Sponsor: Professor Tamar Schlick, Chemistry, Mathematics, and Computer Science

An RNA molecule is composed of basic secondary structural elements such as helices, hairpins, internal loops, and junctions which bind together via tertiary interactions into compact and functional three-dimensional structures. The key to understanding the functions of these RNA molecules and the chemistry they perform can only be determined by analyzing their tertiary geometry. At NYU, the Schlick group performed an analysis on the junction regions of RNA molecules. An RNA junction is the point of connection between different helical segments, and its degree is determined by the number of helical segments connected together. By using visual aid programs such as Pymol and Swiss PDB viewer, we performed a junction analysis from different perspectives: sequence signatures, length of single-stranded loop regions, 3D motifs, and the 3D organization of helices. Upon accumulating recurrent structural motifs in RNA structure that appeared in the same or different molecules and had either the exact same or very similar conformations, we found helical configurations occurring across all junctions regardless of their degree of branching. We conclude that nature has a finite collection of RNA helical conformation preferences, where higher order junctions can be decomposed into smaller “subjunctions,” and knowledge from these more common junctions can be used to ultimately interpret RNA function.

Exploring the Galactic Gravitational Potential Using Tidal Streams
Aukosh Jagannath, Mathematics
Sponsor: Professor David W. Hogg, Physics

When choosing between models of the galactic gravitational potential, one must be able to answer some
very basic questions about the nature of the model itself: is it spherically symmetric or axisymmetric, which has been until recently the most common assumption, or is the potential much more complex? Tidal streams, streams of stars that are formed by the tidal disruption of globular clusters, appear to be ideal for answering this question, as they essentially map out the trajectory of a single, idealized particle. We seek to assess the extent to which one can use the phase space information of tidal streams to answer this question given that true data sets will have nonzero uncertainties. We are developing analytical techniques of comparing tidal streams and intend to use this to analyze various families of galactic potentials so as to determine what phase space information and what maximum uncertainties are necessary in order to distinguish between physically realistic models. In order both to explore and to demonstrate the efficacy of these techniques, we have developed a simulation system that models tidal streams in various galactic potentials, and using this simulator we have implemented the Metropolis-Hastings algorithm to find families of streams that are similar to any given stream under any given regime of comparison.

Alternations in Cognition and Brain Morphology in Obese Adolescents
David Javier and Esther Kang, Neural Science
Sponsor: Professor Antonio Convit, NYU School of Medicine

Obesity is increasing at alarming rates among adolescents, resulting in a global public health concern. Previous studies in adults have associated obesity with brain structural and functional impairments, but such findings are often confounded by age and co-morbid health conditions, such as type 2 diabetes and hypertension. Studying obesity during adolescence while there is overt vascular disease minimizes these confounding effects. We contrasted 27 obese adolescents and 27 well-matched lean controls. Diffusion tensor imaging showed that, relative to controls, obese adolescents exhibited reductions in white matter microstructural integrity in regions such as the temporal stem and dorsolateral prefrontal cortex. They also performed more poorly across all cognitive domains assessed, with significant reductions in working memory and trends in arithmetic achievement and frontal disinhibition. To our knowledge, this is the first report of brain and cognitive abnormalities in obese adolescents. Future studies should elucidate the underlying mechanisms and ways to protect the brain.

The Gal4 Repressor: A Novel Approach to Gene Knockdown
Harris Kaplan, Biology
Sponsor: Professor Justin Blau, Biology

The Gal4 protein is a transcription factor that binds to a target gene’s promoter at a site called UAS, thus promoting gene transcription. I manipulate this mechanism instead to decrease gene expression by creating a tissue-specific Gal4 repressor. I will attempt to combine the DNA binding domain of Gal4 with the transcription repressor protein HP1. HP1 recruits other endogenous HP1 molecules, culminating in a change in the DNA around the UAS that binds this Gal4-HP1 molecule so that the DNA condenses into heterochromatin, a state in which it is not transcribed. For tissue-specificity, the promoter for the Gal4-HP1 gene will be the timeless (tim) promoter. I will insert this DNA into a P element, which upon injection into a fly embryo will be transposed into the genome. Finally, these flies that have the tim-Gal4-HP1 gene will be crossed with flies that have UAS sites near specific circadian rhythm genes to test if Gal4-HP1 reduces their expression. I will employ the P-element insertion form of the Gal4/UAS mechanism to decrease gene expression in specific clock neurons, where the tim promoter is active. At this time, I have built my gene construct and I am preparing the P-element for injection.

Attention and Perceptual Learning in the Absence of Awareness
Anna Khesin, Psychology
Sponsor: Professor Marisa Carrasco, Psychology

An important question for understanding the relationship between attention and awareness in visual perception is whether attentional selection can occur in the absence of awareness. The effects of attention on perception can be demonstrated via the phenomenon of perceptual learning, which is the improvement of performance on a sensory task with practice. In our research, we investigated the effects of attention and awareness on perceptual learning with an orientation discrimination task by manipulating spatial attention with an irrelevant task, while using a special technique known as continuous flash suppression to ensure that observers were not aware of stimuli presented at spatially-attended locations, and then assessed whether perceptual learning had occurred for the suppressed stimuli. Our results indicated that attention facilitates perceptual learning in the absence of awareness for trained stimuli at attended locations, but also generalizes to untrained stimuli and unattended locations, to a lesser extent. These findings attest to early cortical plasticity in the brain and show that attentional
selection enhances perceptual learning outside of our present awareness.

**Regulation of plg-1 in Caenorhabditis elegans**
*Kyung Seok Ko, Biology*
*Sponsor: Professor Matthew Rockman, Biology*

Male-male competition in mating success in the wild strain of the free-living nematode *Caenorhabditis elegans* depends on the male production and deposition of a gelatinous copulatory plug on the hermaphrodite vulva after mating. An autosomal gene, *plg-1*, with dominant phenotype, is required for this phenomenon and is present in many strains of *C. elegans* in chromosome III. The molecular basis of *plg-1* has been studied, yet it is still unclear how this gene is regulated. The protein product, PLG-1, is only expressed from the fourth larval through adult stage males and is completely absent in hermaphrodites. I hypothesize that the regulatory elements of *plg-1* are related to many known genes governing sexual dimorphism, because *PLG-1* is expressed when the animal begins to show phenotypes of male-ness. By mutagenizing and suppressing the gene’s regulatory elements via chemical mutagenesis and RNA interference, respectively, I expect to find that those candidate regulatory genes that affect sexual dimorphism have effects on *plg-1* as well.

**Photoreceptor Distribution and Color Vision Across the Retina**
*Victoria Ko, Neural Science*
*Sponsor: Professor Robert Shapley, Neural Science*

The mechanisms which we rely on to see and perceive color are not clearly understood; our experimental goals, therefore, were to design a project capable of taking a more in-depth look at these mechanisms. First, we wanted to find the ratio of L to M cone photoreceptors across the human retina from the fovea to the periphery. Our data showed that individuals with high L:M cone ratios in the fovea had lower ratios in the periphery. Conversely, individuals with more average L:M cone ratios had an increased L:M ratio in the periphery. This implies that there may be an underlying normalizing color mechanism which allows us to perceive color the same despite ratio differences. Our second goal was to use each individual’s cone ratios to determine the temporal resolution of cone photoreceptor input to parvocellular neurons as one goes eccentric in the retina. Knowing the temporal resolution of the foveal input to parvocellular neurons versus the peripheral input to parvocellular neurons will help us to determine whether or not the interconnectedness of cone photoreceptors changes across the retina.

Our pilot data shows that the temporal resolution of parvocellular neurons appears to decrease as one goes eccentric. This is strikingly different from magnocellular neurons, which detect luminance differences, which have long been known to increase in temporal resolution further in the periphery. With the participation of more subjects, we hope to solidify these data and begin to draw more conclusive findings.

**Bacillus subtilis Spore Coat Composition**
*Rati Priya Krishna, Biology*
*Sponsor: Professor Patrick Eichenberger, Biology*

*Bacillus subtilis* is a Gram-positive bacterium that serves as a good model system for prokaryotic organisms. Its importance stems from its medically relevant cousin *B. anthracis*, the agent of Anthrax. When starved, *B. subtilis* cells have the ability to form heat-resistant endospores, also known as spores. These spores are surrounded by a tough coat composed of over 70 proteins. The spore is metabolically dormant and incredibly resistant to heat, lysozyme exposure, chemicals, radiation, and mechanical disruption. The incredible resistance of this complex protein coat is made possible by the various protein-protein interactions that exist within the coat. The assembly of the spore coat is directed by a relatively small number of coat proteins known as morphogenetic proteins. My project aims to understand the interactions between morphogenetic proteins and the other coat proteins using a yeast-2-hybrid system, with the ultimate goal of assembling a complete interaction map of the coat proteins in *B. subtilis*. I am studying the interactions of the different coat proteins in relation to each other as well as to the morphogenetic proteins SpoIVA, SpoVID, and SafA by yeast two-hybrid assay. The assay determines the physical interaction between two proteins by fusing each protein to a different moiety (domain) of a yeast transcriptional activator, GAL4. When the two proteins interact, a functional activator is reconstituted, resulting in the successful expression of a selected reporter gene.

**A Radio Survey of the Andromeda Galaxy**
*Joyce Lainé, Physics*
*Sponsors: Professor Glennys Farrar, Physics, and Dr. Joseph Gelfand, Physics*

Since the invention of telescopes in the early seventeenth century, the sky has been surveyed by many types of telescopes with increasing depth and accuracy, allowing us to see objects that are far away both in space and in time. The word telescope defines a broad range of instruments, but in the end they all collect some sort of electromagnetic radiation which is then used for data
analysis. I use data from an observation of M31, also known as the Andromeda Galaxy, that was taken by the VLA telescope in New Mexico in October of 2004. This telescope is an interferometer; the data is collected in pairs to form interference patterns, and then, by a Fourier transform, we can make maps to show the radio structure of the sky. Using an imaging program written for this sort of analysis, I calibrated the data, went through it to get rid of interference from nearby sources like planes, and Fourier transformed the data into an image. The next step is the analysis; the objects can be classified depending on their spectrum, its curvature, any counterparts found in other surveys, size, luminosity, etc. I am looking at a handful or particular objects: one object that we think is a galaxy merger, a handful of high-redshift objects, and a few other particularly anomalous sources. I take information from the radio data, compare my data to other surveys, and consider the implications for what possible objects they actually are (black holes, galaxies, supernovae, etc.).

Expression and Activity of the Microbial Lectin PapGI: A Novel Addition to the Recombinant Lectin Microarray
Lauren Lashua, Biochemistry
Sponsor: Professor Lara K. Mahal, Chemistry

Carbohydrates present on a cell surface are complex polysaccharides and are difficult to analyze due to inherent structural and physical properties. Standard biochemical and chemical techniques used to annotate glycan structure, such as NMR and mass spectrometry, are often time-consuming and tedious. Lectin microarray technology has emerged as a powerful carbohydrate profiling tool in the field of glycobiology. Expanding the current lectin set is a current interest in this emerging method. As a source of carbohydrate-binding proteins, microbial lectins provide a voluminous source of proteins to utilize on the microarray platform. The goal of this project is to successfully clone, express, and characterize the bacterial lectin PapGI from Escherichia coli J96. This lectin will be cloned from the papG segment of the genomic DNA using the polymerase chain reaction (PCR) and will be ligated into a commercially available vector that contains two specific affinity tags. This vector will then be transformed into E. coli, expressed, and purified. Once purified, the lectin-binding affinity will be analyzed using both enzyme-linked immunosorbent assay (ELISA) and microarray methods previously developed in the Mahal lab. The addition of this microbial lectin would surely enhance the glycan-detection spectrum of the current set of lectins.

Tripodal Ligand for Mercury Detection
Jennifer Lee, Psychology
Sponsor: Professor James Canary, Chemistry

Mercury is a toxic pollutant that contaminates our environment and poses severe health risks. The model mercury detector design contains properties such as selectivity, sensitivity (delayed detection), stability, and water-solubility as a consequence of specific structural and chemical features. Firstly, we can achieve mercury selectivity through the presence of sulfur in our backbone structure, methionine. The use of methionine has an additive advantage, allowing the tripodal ligand to display a novel property for a mercury sensor: chirality. Chiral ligands can improve the detection sensitivity of achiral metal ions derived from the conformation changes upon complexation with metals permitting a strong optical response as a result of exciton-coupled circular dichroism. Additionally, the structure will be tagged with fluorescein fluorophores, resulting in visible fluorescent activity and water solubility. We expect the target ligand to be quenched due to the interaction of the excited state with high-energy lone pair electrons of the ligand, but Hg²⁺ binding will break the quenching mechanism, allowing the fluorescence to be observed. Thus, our “smart sensor” will provide dual detection via strong increases in both the fluorescence and CD spectra.

Operation of the PX-JX2 Device Attached to DNA Origami Tiles
Peter Liang, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

DNA can be an effective building material for creating nanomechanical devices due to the specific base-pairing between the nucleotides. The PX-JX2 device utilizes a complex in which one end of the DNA strand can undergo a 180° rotation relative to the other end, making two states possible. The transition is done by using biotinylated fuel strands to remove the set strands for the PX configuration and then adding different set strands to form the JX2 state. This process can be reversed for a JX2-PX transition. This device can be designed to have sticky ends on both ends to bind to other complexes, such as DNA origami. The origami is a complex formed from a long circular DNA strand and folded with shorter DNA strands called staple strands. I will attach DNA origami tiles to each end of the PX-JX2 device based on sticky-end complementation. When the PX state transitions to the JX2 state, one of the origami will be rotated so that it will be positioned on top of the other origami. I have already formed the DNA origami and will continue working on a design for a functional PX-JX2 device that will attach to these origami tiles.
A Homogeneous Ricci Flow
Chaney Lin, Physics
Sponsor: Professor Engelbert Schücking, Physics

A particularly simple model of the cosmos is given by the space-form of an anisotropically but homogeneously stretched 3-sphere. The isometric embedding of these compact manifolds into higher dimensional Euclidean spaces has been studied by Professor Shücking of NYU and Professor Ozsváth of the University of Texas at Dallas. In their 1998 paper titled “The World Viewed from Outside”, they provide a geometric classification of these stretched 3-spheres and calculate their curvatures. This past year, the three of us extended this study by evolving the 3-spheres under the Ricci flow, a technique that has garnered much attention and study in its own right following Perelman’s use of it in his proof of the Poincaré conjecture. We derive explicit and numerical solutions for the Ricci flow PDE and discuss properties of these solutions.

Lock and Key Colloids
Chaney Lin, Physics
Sponsors: Dr. Stefano Sacanna, Physics, and Professor David Pine, Physics

In recent years, colloids have been used to model certain features of biological systems, with much research dedicated to their ability to self-assemble. As a means of directing self-assembly, Stefano Sacanna of the NYU Center for Soft Matter Research has developed colloidal particles that are able to selectively bind, with a recognition mechanism based on a lock-and-key principle relying on the complementary shapes of the particles involved, namely colloidal particles with spherical cavities as “locks” and smaller colloidal spheres as “keys”. With depletion interactions driving the self-assembly, the resulting structures retain some flexibility. This is a unique feature of the lock-and-key system and opens a rich source of dynamics that we are currently exploring further and may eventually have practical application in large-scale colloidal structures. I’ve worked with Sacanna and David Pine on constructing assemblies consisting of multiple Pacmen and multiple spheres, and the results suggest that the lock-and-key system can be scaled much further to form larger and more complex structures, but the realm of possible structures is currently limited by our incomplete understanding of the system’s basic dynamics. This has led me to study the depletion interaction in greater depth.

Event Segmentation Theory in Long-Term Episodic Memory
Liu Liu, Chemistry
Sponsor: Professor Lila Davachi, Psychology

People are constantly presented with new stimuli on a continuous basis. Event Segmentation Theory proposes that information is organized into discrete events. Events are representations structured in a series of actions that can be used to predict actions in the future, thereby reducing cognitive load. These representations, called event models, are a set of perceptual predictions in working memory, characterized by consistency and predictability. When incoming information is no longer consistent with the current event model, an event boundary is perceived, and the information receives more extensive processing. Because of this, it is thought that information processed at event boundaries has stronger associations in long-term memory (LTM). In this experiment, objects are presented (1) within events and (2) at event boundaries. I predicted that an object will yield better recall when primed with another object in the same event. When primed with an object across event boundary transitions, the ability to recall will correlate with the strength of the transition. This study shows that the ability to recall objects in memory depends on the event boundary strength as well as the load on working memory. Thus, the strength of associations in LTM is affected by how information is organized during perceptual processing.

Mercury Detection through Fluorescence and Circular Dichroism
Steven Lopez, Chemistry
Sponsor: Professor James Canary, Chemistry

Mercury is a toxic metal that is increasingly becoming a hazard to marine life and humans across the globe. It is critical to develop methods to detect levels of mercury in organisms as well as bodies of water to help prevent inadvertent mercury consumption. High sensitivity and low background is possible using the detection method called circular polarization of excitation (CPE). This spectroscopic method involves a response consisting of the product of fluorescence and circular dichroism (CD); thus, if a ligand responds with an increase in both fluorescence and CD, we can observe an amplification of the detection signal. In this study, a chiral ligand capable of binding Hg(II) was designed, synthesized, and characterized spectroscopically. Titrations of the ligand with mercury(II), copper(II), and zinc(II) were observed using CD and fluorescence. The emission frequencies were observed in the visible range and increased in intensity with the concentration of metal. The synthesis of a second generation sensor was undertaken recently. The new sen-
The Molecular Impact of RCAN1 Removal
Neil Majmundar, Neural Science
Sponsor: Professor Eric Klann, Neural Science

Prolonged or inappropriate expression of excessive anxiety can lead to the pathological impairment of normal function. Human anxiety disorders include a wide range of clinically described conditions such as panic disorder (PD), obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), specific phobia, and social phobia. These disorders affect approximately 18 percent of American adults each year. The RCANs, regulator of calcineurin proteins, are a family of small, highly conserved proteins that can bind and inhibit calcineurin, a calcium-regulated protein phosphatase (Rothermel et al. 2003, Hoeffer et al. 2007). RCAN1, by controlling calcineurin, can influence the activity of several other proteins. In order to examine the role of RCAN1 in the expression of anxiety and depression in RCAN1 knock-out and wild-type mice, we have undertaken both behavioral and biochemical analyses, studying the changes in several different downstream targets of calcineurin, which include the total/phosphorylated levels of CREB/BDNF proteins and Glutamate/GABA receptors. These studies provide evidence that RCAN1 is a critical regulator of calcineurin’s effects on cognitive disorders such as generalized anxiety disorder and clinical depression.

Behavioral Characterization of a D/N TSC2 Transgenic Mouse Strain for Autism-like Phenotypes
Jordan Maki, Neural Science
Sponsor: Dr. Eric Klann, Neural Science

Tuberous sclerosis (TS) is a genetically based disorder that results from the mutation either of the tuberin (TSC2) or hamartin (TSC1) proteins. TS patients have a high coincidence of developmental delay and autism, making the TSC1 and 2 genes interesting candidates for researching the biological mechanisms underlying autism. This study investigates the behavioral phenotype of a D/N TSC2 mutant mouse with a selective mutation in the GAP domain, the site on the protein that acts to regulate cellular processes by deactivating g-proteins (a major initiator or hub for cell signaling chains), for the possibility of autistic-like behaviors. We conducted a battery of tests assessing mouse behaviors that model both core symptoms of autism (restrictive behaviors and social deficits) and peripheral symptoms often observed in autism (anxiety, clumsiness, mental retardation, and sensory sensitivity). We observed normal behavior on all measures except for social novelty recognition and motor coordination (Rota-rod task). Compared with results from TSC1 and 2 +/- strains, these impairments suggest a novel and specific role of the D/N TSC2 mutation that makes this strain an important candidate for future studies of tuberous sclerosis and autism spectrum disorders.

Making a DNA Clock
Pavan Malhotra, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

The purpose of this project is to design and create a microscopic clock made of DNA. A molecular clock is made by annealing one large strand of DNA with several hundred smaller strands of DNA. Currently, a clock has been designed and made that can record when intervals of a half hour and an hour have passed. When completed, it will also be able to record when 90 minutes and two hours have passed. The clock is made of one 7000 base DNA strand annealed to smaller strands which are approximately 30 bases long each. The DNA strands form a rectangular prism that appears to be a square when viewed with an Atomic Force Microscope (AFM). On the largest side of the prism there are extrusions of DNA that are visible on the AFM. These extrusions can be removed over a set period of time based on how many bases are in the extrusions. Currently, there are extrusions of two different lengths on the clock corresponding to the time intervals that this clock can record. Two more groups of extrusions must be added in order to complete the clock.

Perspectives on Neonatal Transport: A Retrospective Assessment of Transports into Bellevue and NYU/ Langone Hospitals
Sayeed Manick, Biology
Sponsor: Professor Karen Hendricks-Muñoz, NYU School of Medicine

Due to the regionalization of healthcare, it is becoming increasingly important to transport sick neonates into hospitals with the facilities that can provide care. The goal of a successful neonatal transport team is to “provide care commensurate with the degree of illness severity in a safe and effective manner, minimizing risk of deterioration before and after transport.” Prior studies have shown that longer durations of transport were associated with higher mortality rates, but there is still no consensus on how to analyze inter-hospital transport services, so very little published data exists. This study aimed to assess the efficiency and quality of care for Bellevue and Tisch Hospital neonatal transports from January 2008 to June 2009.
Using medical records as well as computer records, we determined variables that can affect infant morbidity and mortality post-transport. For organizational purposes, we divided our pool of transports into urgent cases (requiring care in <72 hours) and non-urgent cases (intervention is possible >72 hours). Our results showed that, on average, the longest amount of time spent during transport was in stabilizing the baby. Factors such as hypotension and hypoglycemia in transported infants were kept to a minimum; there was, however, a significant percentage of infants arriving to Bellevue in a mildly hypothermic state. Overall, transports were found to be very efficient and safe for the infants, though we recommended keeping a closer eye on the babies’ temperature and establishing a new standardized transport form.

**Astrocytes and their Relationship with Amygdala Synapses**  
Mustfa Manzur, Neural Science  
**Sponsor: Professor Joseph LeDoux, Neural Science**

Neurons—cells that conduct electrical signals—compose only 10 percent of the brain. The other 90 percent of the human brain consists of a class of cells that do not conduct electrical signals; they are called glial cells. Of this category, a remarkable sub-type of glial cell is the astrocyte. It has been well established that astrocytes function in homeostasis of the brain by giving neurons necessary compounds for survival and allowing synapses to be as precise as possible by recycling neurotransmitters in the synaptic cleft. Recently, astrocytes have been found to modulate glutamatergic transmission, both positively and negatively. Using an existing dataset of fear conditioned neuropil in the lateral amygdala (a nucleus rich in glutamatergic transmission), gathered from serial electron microscope techniques, we looked for astrocyte presence at synapses. Based upon similar work done in the hippocampus, we hypothesized that there will be a strong correlation between astrocyte presence and synapse surface area. The results of this study indicated that astrocytes are indeed associated at the highest frequency with the largest spines in lateral amygdala (generally possessing a spine apparatus) but that this association declines one hour after fear conditioning. This indicates that spines are in flux after learning and that astrocyte presence can be associated with a stable/mature state of a synapse.

**Mathematical Modeling and Biological Systems: The Effects of Smoking on Fetal and Maternal Circulation**  
Rachel Marano, Mathematics  
**Sponsor: Professor Charles S. Peskin, Mathematics**

In this study, we investigated the acute, immediate effects of smoking on the circulation between fetus and mother. Results of this study revealed that the blood flow and oxygen delivery to the fetus were compromised during smoking; this can be illustrated through the use of a mathematical model. By applying a mathematical model to this scientific inquiry, we aim to offer a broader perspective on the subject matter. We have created a functional model of the healthy symbiosis of exchanges between mother and baby, and then altered the model to account for the effects of nicotine and carbon monoxide. Throughout this project, gas exchange across the placenta has been mathematically simulated using MATLAB, a numerical computing environment and programming language. We modeled the acute hemodynamic alterations caused by smoking and used graphs to compare the results to the healthy model. In doing so, we have been able to graphically display the immediate consequences of smoking on both fetal and maternal circulation. The reduction in blood flow may result in retarded fetal growth and low birth weight. It can also lead to poor development, among other complications. The present investigation has significant implications for increased awareness of the adverse effects of smoking during pregnancy.

**Laser Ablation of the PHC Neurons in Caenorhabditis elegans**  
Daniel Martin, Biology  
**Sponsor: Professor David Fitch, Biology**

*C. elegans* has two sexes—male and hermaphrodite. Both sexes begin post-embryonic life with a conically shaped, whip-like tail. Hermaphrodites retain this tail shape as adults, whereas males do not. During the last larval stage (L4) before becoming adults, the male tail goes through extensive remodeling where the four most posterior tail cells (hyp 8-11) fuse together and retract from the animal’s surrounding cuticle. This results in adult males having a rounded tail tip. The PHCs are a pair (PHCL and PHCR) of posterior neurons whose cell bodies are anterior to hyp 8-11 and send dendritic projections all the way to the tail tip. During morphogenesis, the PHC neurons also go through a retraction and remodeling process. This raises a question as to whether or not the PHCs are involved in some signaling with hyp 8-11 that may help drive male tail tip morphogenesis. To test if the PHCs are necessary for tail tip morphogenesis, I will ablate these neurons with a laser beam at earlier larval stages (L2-L3). In order to distinctly recognize the PHCs from the surrounding cells, I have prepared a reporter gene construct of the promoter of ida-1 fused to GFP so that the PHC neurons fluoresce under ultraviolet light. This allows the PHCs to be easily identified during ablation. I will then determine how this affects male tail tip morphogenesis. This will be done by examining adult tail tips, post-ablation.
Regulation of the Female Post-Mating Response in Drosophila melanogaster
Wilfredo R. Matias, Biology & Romance Languages
Sponsor: Professor Mark L. Siegal, Biology

After mating, the fruit fly Drosophila melanogaster undergoes a series of profound behavioral and physiological changes referred to as the female post-mating response. Despite their significance, little is known about the genetic and molecular mechanisms underlying these changes. In an effort to elucidate these mechanisms, I set out to understand the regulatory architecture governing the expression of a set of serine protease encoding genes that have been shown to be upregulated upon mating. Here, I show that the cis-regulatory regions driving the expression of seven serine protease genes are located on DNA fragments directly upstream of these genes. Furthermore, these genes are only expressed in the spermathecae—the sperm storage organs of the fly—making them the first known gene products that are unique to this organ. Subsequently, I set out to identify the transcription factors that bind to these DNA regions. My study has identified two transcription factors, Smad on X and Serpent, that affect the expression levels of the serine protease encoding gene CG17012, and are thus promising candidates to be investigated further. My findings lay the groundwork for understanding the regulation of a biological process that is common to flies as well as many pests and human disease vectors.

Elucidating the Time Course of Cognitive Benefit Following Acute Aerobic Exercise Intervention
Omar Meziab, Neural Science
Sponsor: Professor Wendy Suzuki, Neural Science

Much inquiry in the field of neuroscience has been devoted to uncovering the cognitive benefits imparted by exercise intervention. While a majority of the research has been dedicated to investigating the effects on the elderly population, there is also evidence in younger adults that has shown that certain cognitive abilities can be immediately boosted after completion of acute aerobic exercise. This study was the first to investigate the time course of the cognitive benefits provided by acute aerobic exercise intervention. Twenty-four NYU undergraduates were split into Control and Exercise groups and administered a cognitive testing battery at one of three different time points following movie-watching or aerobic exercise. We found that all frontal lobe function tasks showed significant effects due to exercise during at least one of the investigated time points, while no medial temporal lobe function tasks showed any significance. We also found that attentional ability was a commonly tested theme to all significantly affected tasks. The finding that attention can be significantly affected for up to an hour, at least, by an aerobic exercise intervention in college-age adults indicates that exercise may be able to be utilized as a tool to boost studying and test-taking abilities.

Hydrological Responses to Land Cover Changes in the Hudson River Watershed
Angelica Murdukhayeva, Environmental Studies
Sponsor: Professor Mary Killilea, Biology

The Hudson River Watershed covers nearly 35,000 square kilometers and spans New York, New Jersey, Vermont, Massachusetts, and Connecticut. The lower Hudson has experienced greater commercial and industrial construction, which has led to an increased amount of impervious surfaces in the watershed. This study uses SWAT, Soil and Water Assessment Tool, a physically based hydrological model, to predict the possible impacts of these changes in land cover on river flow and other hydrological processes. Elevation, soil and land cover data from 1992 and 2001 were used to create multiple hydrological response units. Then, I added weather data in order to predict river hydrology. My simulations found statistically significant differences in groundwater contribution to stream flow, lateral flow contribution to stream flow and soil water when impervious surface coverage increased 2.39 percent in 2001. Coupled with changes in precipitation events due to climate change, increased impervious surfaces may significantly alter the future flow of the Hudson. Further research should closely study the hydrological response units of the lower Hudson River.

Studying the Link between the Molecular Clock and Neural Rhythms in Drosophila
Gabrielle Myers, Biology
Sponsor: Professor Justin Blau, Biology

Circadian rhythms in Drosophila behavior are driven by cellular clocks that maintain an internal sense of time-of-day, even in the absence of environmental cues. At the molecular level, the clock is comprised of a negative feedback loop that generates a 24-hour (circadian) rhythm in the expression of key clock genes. Although the molecular clock mechanism is relatively well understood, an important question that remains is: what constitutes the link between the molecular clock and less well-characterized rhythms in physiology and cellular output? To identify molecular factors that interact with the molecular oscillator and neural rhythms, a genome wide microarray of purified clock neurons was performed at two time points twelve hours apart. Genes
**Identifying the Enhancers that Control Expression of the Drosophila Retinal Homebox Gene during Visual System Development**

*June Ng, Biology*

*Sponsor: Professor Claude Desplan, Biology*

The retinal homeobox (Rx) gene is a master control gene for mouse eye development (Mathers et al. 1997). Similarities in the sequence of the Rx gene are seen among the fruit fly (*Drosophila melanogaster*), mouse (*Mus musculus*), frog (*Xenopus laevis*), and zebrafish (*Danio rerio*), suggesting a conservation of function between them. Preliminary experiments in the Desplan lab have shown that expression of DRx, the *Drosophila* Rx homologue, is observed in several regions of the developing optic lobe. These regions include the neuroprogenitor cells as well as a subset of optic lobe neurons. The objective of my research is to characterize the *Drx* gene by identifying enhancer regions that drive its expression during optic lobe development. I generated reporter gene constructs containing possible Rx enhancer fragments in flies. Identification of Drx enhancer regions will help to place it within the “molecular hierarchy” of transcription factors that control optic lobe growth and differentiation.

**Biofilms and Contaminated Drinking Water**

*Ashley Nickelsen, Biology, and Sameer Shah, Economics*

*Sponsor: Professor Ignatius Tan, Biology*

Many impoverished nations have trouble attaining the resources to provide clean water for their people. Thus, a cheap and efficient water purification system is needed to ensure that all have reliable access to safe drinking water. We propose that biofilms can be used as a net to trap and kill contaminants from the water. We plan to genetically modify *E. Coli* K12 bacteria to form a strong biofilm that will trap organic parasites upon contact. Then we plan to devise a receptor-mediated response to kill the parasite once it has been successfully chelated by the biofilm. We also plan to research the economic and epidemiological conditions of each developing nation, to see how effective it would be to implement our device.

**Constant Region Function of Nurse Shark Immunoglobulins**

*Reza Parungao, Biology*

*Sponsor: Professor Ellen Hsu, SUNY Downstate Medical Center*

Sharks are part of the oldest group of vertebrates to possess an adaptive immune system, including antibodies or immunoglobulins (Ig) and T cells which humans rely on. In humans, the presence of the five Ig isotypes (IgM, IgA, IgE, IgD, IgG) is necessary for different immune responses in different parts of the body. Those who suffer from genetic disorders like Hyper IgM syndrome, where humans only have IgM, are characterized by extreme immunodeficiency. Sharks, however, only have one antibody isotype (IgM) in their serum that responds to antigens. In the nurse shark, there are nine to twelve functional IgM genes. We are hypothesizing differences in the constant regions of the different IgM genes, the region responsible for encoding the antibody’s function. We aim to see if these IgM genes might carry out the different functions that have since been taken over by the different Ig isotypes in humans. Nurse sharks have been evolving for 240 million years. We are looking to study the evolution of their constant region. In order to study the constant regions, we generated chimeric antibodies consisting of a variable region from the nurse shark antigen receptor (NAR), the antigen binding portion of the antibody, and the different IgM constant regions. We want to determine if the different constant regions can perform different functions in the presence of the same antigen. Red blood cells, with antigen conjugated to the surface membrane, are used as target cells to detect the chimeric antibodies in the serum. We show the process of how the antibodies were engineered. Currently, we are attempting to design optimal assays that will test the antibodies’ functions.

**Color and Orientation Cues in the Visual Perception of Texture**

*Angel Patel, Psychology*

*Sponsor: Professor Michael S. Landy, Psychology*

The visual system uses multiple cues to perceive an edge and segment an image into separate regions. Research in the area of visual texture is focused on understanding the underlying mechanisms that characterize the perception of texture. Our research examines how the visual system combines two cues, color and...
orientation, to detect edges. Observers viewed a twelve-inch by twelve-inch array of Gabor patches (i.e., small texture elements defined by a windowed sine-wave grating) and indicated whether the patches were organized into vertical or horizontal stripes. In baseline conditions, adjacent stripes were first defined by color or orientation differences. In noise conditions, we perturbed the (other) irrelevant stimulus dimension of the entire array with a Gaussian distribution of noise. This enabled us to determine if color-tuned and orientation-tuned mechanisms interact. Results indicated that noise in the irrelevant dimension does not affect performance. Next, we combined both color and orientation cues and also perturbed both stimulus dimensions with an orthogonal Gaussian noise distribution, to test for the existence of a third mechanism tuned to detect combinations of both color and orientation. Finally, we projected the color and orientation components of the combined noise distribution to the individual stimulus dimensions. We then compared performance based on a single cue in the presence of noise to the combined cues in the presence of noise. Results suggest that color provides greater weight during the combined-cues task. Therefore, we concluded that separate color and orientation mechanisms exist, and that color is a more reliable cue in the combined-cues task.

**Patchy Particles and Polymers in the Directed Self–Assembly of the Diamond Structure**

**Sonal Patel, Chemistry**

**Sponsor: Professor Marcus Weck, Chemistry**

It is highly desirable to achieve well-defined, self-assembled, three-dimensional architectures in order to make progress in the fields of optics, osteology, and porous materials. In this study, carboxylic acid-functionalized latex particles were synthesized, clustered, and encapsulated with unfunctionalized polystyrene to form “patchy particles”. These particles consisted of patches of the original latex particles protruding from the encapsulation; only the patches of the particles had acid functionalities on the surface. Meanwhile, two heterotelechelic polymers were synthesized containing primary alcohol functionalities on one end of each polymer and complementary metal-coordination functionalities on the other ends. Theoretically, the polymers can be covalently attached to the acid groups on the patchy particles and then directed by the noncovalent interactions to self-assemble. Preliminary results confirm patchiness of particles, but the covalent attachment to the polymers and the subsequent self-assembly have proven difficult.

**Diverse Roles of Gld-2, Ccf-1, and Spn-4 in C. elegans Early Embryogenesis**

**John Phair, Biology**

**Sponsor: Professor Fabio Piano, Biology**

Pleiotropic actions occur through a complex network of interactions in early development. Polyadenylation and deadenylation are ubiquitous processes that develop through the combined actions of several pleiotropic genes. This action of adenylation and deadenylation at the end of a final transcript of mRNA is necessary for vitality and regulation. GLD-2, CCF-1, and SPN-4 are key regulators that participate in adenylation, deadenylation, and mitotic spindle orientation, respectively, in the *Caenorhabditis elegans*’ germline. Genetically, these three cell products have multiple processes that govern the fate of an organism. Concentration-dependent RNA interference recapitulates the embryonic lethality of the knockdown of these genes, and also reveals the relative importance of these genes based on quantity of RNAi. Finally, the concentration of RNAi was lowered to help reveal the more minute roles of GLD-2, CCF-1, and SPN-4. Diverse phenotypes of these three genes are revealed, which present functional associations for these proteins in the early development of the cell.

**Optimal Experimental Design for Regulatory Network Inference**

**Yeison Rodriguez, Computer Science and Neural Science**

**Sponsor: Professor Richard Bonneau, Biology**

This research project aims at elucidating genome regulatory networks by developing novel computational methods for analyzing genome-wide datasets. Currently, the most available genome-wide technology is the expression microarray, which simultaneously measures the abundance of thousands of transcripts. To improve measurement reliability, microarray experiments are repeated, allowing one to use average transcript levels; the need for repeats, however, can make microarray experiments prohibitively expensive, especially when a series of assays are required to answer a question. In this project an alternative experimental design is investigated where more time points are measured, but without repeats. To test this hypothesis a multi-step pipeline was implemented. First GeneNetWeaver, a widely used tool in the field of network inference, was utilized to generate realistic synthetic networks. The output of GeneNetWeaver is a dataset containing the simulated levels of each gene over a given time-period, for chosen conditions. Second, the output of GeneNetWeaver was used as input for our network inference method, Inferelator, which predicts the structure of the underlying network. Because we
use simulated data, we can immediately evaluate our performance. Based on the assessment of datasets that mimic the effects of replicate measurements and those that use the same number of measurements but without replication, we determined an optimal data set design of our inference method.

**Optical Probes for Manganese (II)**
*Christina Rotsides, Chemistry*
*Sponsor: Professor James Canary, Chemistry*

Manganese is an essential nutrient for human nutrition, but in excess it can exhibit significant toxicity. Of particular interest is the relationship that exists between manganese and calcium ions. Calcium ions are well known as neurotransmitters; the ability to study calcium in the brain, however, is hampered by its ubiquity. By using a metal with similar physical properties that is able to pass through the brain's calcium channels but is less prevalent, calcium can be studied indirectly. We aim to design and synthesize turn-on fluorescent probes for manganese. Such sensors must, by definition, be selective for manganese ions over other competing ions, such as calcium. Another substantial challenge is obtaining fluorescence enhancement, rather than quenching, as is typical with paramagnetic metals, upon metal binding. Such tools are needed by neurobiologists to complement the widely used technique manganese enhanced magnetic resonance imaging (MEMRI). In addition to the design and synthesis of probes, we developed novel systems for the detection of biologically relevant ions using a fluorescence displacement assay method. Central to the development of novel sensors and sensing systems is the study of binding units of similar ligands that are well known to selectively bind calcium. Such analyses shed light on how to approach the design of novel probes selective for manganese over calcium.

**Towards “The Radiant Embryo”: In Vivo Localization Patterns of Polarity-related Proteins in C. elegans**
*Julietta Dina Rubin, Biology*
*Sponsor: Professor Fabio Piano, Biology*

Polarity is the process by which cells asymmetrically organize their sub-cellular components and structures; this is often lost in diseases such as cancer. The molecular mechanism underlying polarity is still not completely understood, but certain key molecules, such as PKC-3 and the PAR polarity proteins, are recognized to have important roles in its organization. My study aimed to determine the localization patterns of twenty-four proteins predicted to exhibit physical interaction with PKC-3 or one of the PAR proteins during *C. elegans* embryogenesis in the 1-4 cell stage. Localization patterns were obtained by generating GFP fusion clones of each protein-encoding gene, transforming the genes into *C. elegans* worms via microparticle bombardment, and recording each protein's movement in given spatial and temporal parameters using a spinning-disc confocal microscope. Out of the original twenty-four proteins I aimed to study, fifteen were successful in yielding final expression clones and distinct localization patterns. Analysis of these localization patterns allows us to postulate about functional molecular relationships and the cellular networks involved in the formation of embryonic polarity.

**Phenol Deprotection Assisted by Microwave Irradiation**
*Marcel Said, Chemistry*
*Sponsor: Professor Marcus Weck, Chemistry*

Protecting groups are chemical compounds that block a functional group on a molecule from reacting with other molecules, with varying degrees of success. As such, they are a powerful, and sometimes unavoidable, tool found in many complicated organic syntheses. The use of protecting groups is well established in the literature, but the additional steps and resources required for protection and deprotection prove to be a deterrent to their application in most areas besides micro-scale laboratory work. While it is well known that alcohol protecting groups tert-butylidimethylsilyl ether (TBDMS) and tetrahydropyranyl ether (THP) are typically deprotected by conventional heating, implementing microwave irradiation as an alternative could lead to a cheaper, more effective, and more environmentally friendly method of deprotection. By using microwave irradiation on protected phenols, I hope to increase the ease and decrease the cost of these specific deprotections, making their usage more acceptable in the quickly greening chemical world.

**The Role of CAMKII in the PScDKO Model of Alzheimer’s Disease**
*Lokesh Shah, Neural Science*
*Sponsor: Professor Chiye Aoki, Neural Science*

Using the electron microscope, I am comparing an Alzheimer’s Disease (AD) model, conditional preselinin knockout (PS-cDKO), against wild-type mice for the distribution and levels of Calcium/calmodulin-dependent kinase II (CaMKII)—which the literature has shown to be involved in synaptic changes underlying learning and memory. Specifically, I am concerned with the CA1-stra- tum oriens region of the hippocampus, a region shown to be involved in spatial memory. While previous studies have shown declines in hippocampal long term potential (LTP) recordings in the PScDKO, a study in the Aoki lab revealed
to help retrain the sphincter muscle, which connects the lower part of the esophagus, pushes the stomach up, and the transhiatal esophagectomy, the surgeon removes the pyloric sphincter muscle is then cut. Botox is administered to attach it to the remaining section of the esophagus. The pyloric sphincter muscle contracts and the effects that different dosages have on the contractions. I compared Botox treatments to other post-operative treatments. I collected data from surgical reports for the amount of Botox administered. It appears that a direct relationship exists between the amount of Botox injected and the degree of pyloric sphincter contraction. Finding an efficacious dosage of Botox for patients through mathematical modeling would increase the potential for single-dose administration.

**Cadherins Expression in C. elegans**  
*Sameer Shah, Economics*  
*Sponsor: Professor Jeremy Nance, NYU School of Medicine*

Embryonic development encompasses a wide array of proteins which interact in a poorly understood series of mechanisms. After fertilization, the embryo undergoes radial polarity, upon which many genes are activated to facilitate development and differentiation. In mammals, the products of radial polarity include the formation of a placenta, which continues to nourish the developing embryo after it implants itself in the wall of the mother’s uterus, and the embryo itself, which further differentiates into the new organism. Using *C. elegans* as a model organism, I would like to study the role that cadherins, transmembrane proteins which form adherens junctions amongst cells, play in development. The first goal is to understand where cadherins are expressed during embryogenesis. I have used a biolistic particle delivery system, where cadherins genes tagged with GFP are bombarded into worms, to determine the localization of the protein during embryogenesis. Unfortunately, this technique failed to provide integrated lines with maternal expression of the genes of interest. Thus, I am currently attempting to inject this DNA directly into worm gonads to achieve a similar effect. Once I am successful, I hope to examine interactions with other polarity proteins.

**Modeling Pyloric Sphincter Contractions in Esophageal Cancer Patients**  
*Steven Shanab, Mathematics*  
*Sponsor: Dr. Andrea McKenzie, Expository Writing*

Esophageal cancer affects roughly 16,000 people in the United States annually and has one of the lowest survival rates among all cancers. Several treatments exist, with the transhiatal esophagectomy being the most effective. In the transhiatal esophagectomy, the surgeon removes the lower part of the esophagus, pushes the stomach up, and attaches it to the remaining section of the esophagus. The pyloric sphincter muscle is then cut. Botox is administered to help retrain the sphincter muscle, which connects the stomach to the small intestine; the dosage and frequency, however, are currently determined for each patient through trial and error, leading to potential repetitive administrations. My goal is to discover how much the sphincter muscle contracts and the effects that different dosages have on the contractions. I collected data from surgical reports for the amount of Botox administered. It appears that a direct relationship exists between the amount of Botox injected and the degree of pyloric sphincter contraction. Finding an efficacious dosage of Botox for patients through mathematical modeling would increase the potential for single-dose administration.

**Mathematical Analysis of a p53 Protein Kinetics Model**  
*Michael Sharpnack, Mathematics*  
*Sponsor: Dr. Geoffrey McFadden, National Institute of Standards and Technology*

P53 acts to repair DNA damage caused by mutagens; consequently, the loss of p53 function can cause tumor growth. Concentrations of p53 have been shown to oscillate in response to DNA damage. Mathematically, p53 concentrations can be described by a system of nonlinear ordinary differential equations. A nine-variable system
has been shown to oscillate. We found a seven-variable, simplified model that has a steady state solution of the same form as the nine-variable model, namely a sixth-order polynomial. This implies that the seven-variable model also has an oscillating solution. Parameters of this system that induce oscillation are not immediate, however, so we formed a Jacobian linear approximation matrix and solved for its eigenvalues. We looked for dominant complex eigenvalues of the form $a+bi$, where $a>0$ and $b$ does not equal 0. After extensive random parameter searches, we have not yet found the desired eigenvalues. Solving the nine- and seven-variable systems analytically shows that some protein interactions are more important in adding complexity (higher order) to the steady state solution than others. These important interactions may prove to be possible drug targets, for their role in creating oscillations that may be necessary for the normal repair of DNA damage.

**Prolonged Intrathecal Infusion of beta-methylamino-L-alanine: An Evaluation of a Novel Animal Model of Amyotrophic Lateral Sclerosis**

*Maximiliano Sobrero, Neural Science and Psychology
Sponsor: Professor John H. Weiss, University of California, Irvine, School of Medicine*

The amino acid beta-methylamino L-alanine (BMAA) has been proposed as a candidate cause for the high incidence of Amyotrophic Lateral Sclerosis-Parkinsonism Dementia Complex (ALS-PDC) in Guam. BMAA, an active compound in cycad seeds consumed by the Chamorro people of Guam, was found to induce selective injury to motor neurons (MNs), with minimal effects on other spinal neurons at low concentrations. Although concerns about the estimated levels of human consumption forced a re-evaluation of the BMAA hypothesis, recent reports suggest novel routes of BMAA exposure, including biomagnification and protein incorporation. In light of evidence that BMAA damages MNs at lower concentrations than previously thought, this study aims to determine whether BMAA selectively targets MNs in an in vivo animal model. Specifically, we infuse BMAA intrathecally in order to bypass the rat’s digestive system and allow direct access of the drug to the spinal cord. We expect BMAA to directly trigger selective MN damage after prolonged spinal cord exposure to micromolar concentrations of this toxin. We also observed that BMAA damages MNs in culture, and its deleterious effects can be diminished by the presence of antioxidants in the culture medium, suggesting a mechanism involving oxidative stress.

**Tetherin and the Inhibition of Viral Replication in Neurons**

*Thana Theofanis, Neural Science
Sponsor: Professor Carol Shoshkes Reiss, Biology*

Tetherin is an interferon (IFN)-induced, gpi-linked, type 2 transmembrane protein that plays a significant role in inhibiting the spread of viral infections, such as HIV and Ebola. Shown to tether viral particles to the membrane, tetherin then rapidly redirects them to be degraded in autophagosomes. The Central Nervous System (CNS), due to its “immunologically privileged” state, handles pathogens via the innate immune system, which starts fighting off pathogens in the initial days of infection. IFNs are cytokines produced during the innate immune response; they usually cause infected cells to be destroyed to prevent the spread of a virus. Neurons, the major component of the CNS, are too precious to be killed. Vesicular Stomatitis Virus (VSV) is a rhabdovirus which causes acute encephalitis after intranasal infection in mice. VSV’s symptoms and mode of infection in mice are similar to West Nile Virus, rabies, and other viruses causing encephalitis or meningitis. For this reason, studies of IFN’s effects on VSV can be used to study viral immunity in the CNS and gain insight into therapeutics for such pathologies. Presently it is unknown whether tetherin plays a role in infections of neurons where other antiviral pathways are ineffective. The data presented are encouraging and suggest IFN’s strong inhibition of VSV replication in neurons in the absence of the normal suppression of viral protein synthesis.

**A Placental-Specific Conditional Knockout of Dlk1 in Mus musculus**

*Lindy Triebes, Biology
Sponsor: Professor Jennifer Schmidt, University of Illinois, Chicago*

Dlk1 is a paternally-expressed imprinted gene that plays a role in growth and development in the mouse. Dlk1 (delta-like homolog 1) acts in the Notch signaling pathway, but the specifics of its function are still under study. Mice with a constitutive knockout of the gene show postnatal lethality, growth retardation of survivors, and physical abnormalities. Dlk1 is highly expressed in several tissues, but it is not yet clear which specific tissues are responsible for the observed knockout phenotypes. Because Dlk1 is highly expressed in endothelial cells of the placenta in developing embryos, I spent the summer of 2009 breeding and characterizing placental-specific knockouts. I created this specific knockout by crossing the Tie2Cre strain with cDlk1 floxed mice. Any postnatal
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deads were recorded and each animal was genotyped. DNA was obtained by phenol/chloroform extractions from tail preps, then PCR was performed with primer sets specific to both the Tie2Cre and floxed alleles. Conditional knockout mice were compared with wild type, controls for Dlk1 imprinting, and controls for the Tie2Cre allele. Weights were taken weekly and compared across each genotype. I hoped to use histology of various organs, including placenta from sacrificed pregnant females, to compare conditional knockouts with the controls, but was not able to due to time constraints and difficulty with breeding. From the animals analyzed during the summer months, no significant differences in growth or development were observed between conditional knockouts and controls. My lab in Chicago has since been continuing this cross for more statistically significant results.

Drosophila Color Vision: R8 Subtype Determination
David Tsai, Biology
Sponsor: Professor Claude Desplan, Biology

To acquire visual information, Drosophila has about 800 ommatidia (a single eye unit). Each unit contains eight photoreceptor cells (R1–8), six of which (R1–6) are involved in motion detection and image formation. R7 and R8 are located in the center of the ommatidium. These “inner” photoreceptors exist as three different subtypes. Two of them, “yellow” and “pale,” respond to different wavelengths of light and form the basis for color vision. R7 and R8 each express one of four rhodopsins (rh3–6), which are proteins that detect light. In the “pale” subtype, R7 and R8 express rh3 and rh5, respectively, and in the “yellow” subtype, rh4 and rh6. The two subtypes occur randomly throughout the retina, with 30 percent pale and 70 percent yellow. The Desplan Lab has recently shown that the choice between the “pale” and “yellow” fates of the photoreceptors is first made by R7. R7 then signals R8 to express the corresponding rhodopsin. Such a mechanism ensures the correct coupling between R7 and R8. Two genes, warts and melted, play a crucial role, by forming a bistable feedback loop. My project focuses on delineating and characterizing these genes, as well as other genes that are involved in the R8 subtype determination.

Effect of T-regulatory Cells on Progression of M.tuberculosis Infection to Active Disease in Pediatric Patients under Two Years of Age
Vladislav Tsaltskan, Biology
Sponsor: Dr. Jennifer L. Lighter, NYU School of Medicine

T-regulatory cells (Tregs) are components of the cell-mediated immune response and normally act to downregulate the immune system to prevent autoimmune diseases. Specifically, Tregs decrease the T-helper type 1 response, which is believed to be important in combating M. tuberculosis (M.tb) infection. We hypothesized that in young children, a larger amount of Tregs could result in a reduced ability to suppress growth of M.tb bacteria, leading to an increased rate of progression from latent to active disease. Although we have not found a significant correlation between absolute Treg count and age, we have found that younger children possess a greater ratio of naïve Tregs (not previously exposed to antigens) to memory Tregs. Because memory Tregs have been shown to be more potent than their naïve versions, the correlation suggests that the relative fraction of naïve Tregs may play a role in decreasing the immune response to M.tb. We plan to further test this hypothesis in-vitro on cultured lymphocytes depleted of Tregs by stimulating them with M.tb antigens and comparing their cytokine production to undepleted cultures. The relative levels of cytokines produced by the cells will allow us to determine the level of immune response to the antigens.

Paternal Care and its Adaptive Significance in Red Titi Monkeys (Callicebus discolor)
Ashley van Batavia, Anthropology
Sponsor: Professor Anthony Di Fiore, Anthropology

Titi monkeys are arboreal New World Monkeys restricted to northern and central South America. Titi monkeys are of particular interest to primatologists because they display two behaviors that are rare among mammals: social monogamy and paternal care. Social monogamy is defined as a group composed of a breeding pair in which the male and female are closely associated. In addition, male titi monkeys display a high degree of infant care, acting as the primary caregiver to infants shortly after birth. The need for a high degree of paternal care has been proposed as the selective pressure that drove the evolution of social monogamy in titi monkeys. Using data on free-ranging red titi monkeys (Callicebus discolor) at Tiputini Biodiversity Station in Ecuador from Anthony Di Fiore and Eduardo Fernandez Duque, I was able to quantify the degree of male investment in infant care and the sexual division in parental care. In addition, changes in the foraging and feeding rate along with changes in diet composition between males and females from gestation to lactation were studied to explore the adaptive significance of paternal care and to evaluate the credibility of the paternal care model for the evolution of social monogamy.
In Like a Lion: The Invasion of the Pacific Lionfish
Piper Wallingford, Environmental Studies
Sponsor: Dr. Anne Rademacher, Social and Cultural Analysis and Environmental Studies

Introductions of invasive species are one of the most environmentally devastating effects that humans can have on the natural environment. Successful introductions lead to a shift in the native environment’s biological diversity and the ecosystem’s food web. Until recently, the effects of invasive species on marine environments have been largely unknown and unstudied due to the few cases of successful invasions. An introduction in the last fifteen years, however, has shown that invasions of marine environments have as much potential to cause lasting and irreversible harm as terrestrial invasions do. This invasion is that of the Pacific lionfish (Pterois volitans and Pterois miles), which were introduced to the Atlantic Ocean in the early 1990s. By analyzing academic papers that have researched this issue since the introduction, I explore the likely environmental effects associated with the introduction of the lionfish, and whether these effects are predictive for other marine invasions. I also look at the current policies relating to international trafficking that affect the aquarium industry—the most likely source of the lionfish’s introduction to the Atlantic. This paper aims to highlight the importance of tracking species that are being traded internationally and to promote further research into marine invasions.

Hovering of an Asymmetric Body in an Oscillatory Airflow
Annie Weathers, Physics
Sponsor: Professor Jun Zhang, Physics and Mathematics

I investigate the dynamics of free, asymmetric bodies subjected to an oscillating background airflow. The asymmetry of the object introduces a net upward lift upon the body over each period. At a given frequency, when the air amplitude is above a threshold, the lift exceeds the weight and the object start to hover with surprisingly high stability. In particular, the required air amplitudes for hovering are significantly less than predicted by a quasi-steady analysis. In an effort to understand this stability and efficient lift production, I carry out a series of flow visualizations. The visualization shows how paired vortices are shed by the body, which leads to stable and efficient hovering.

Investigating the Role of Trypanosome Lytic Factor in Fighting Bacillus anthracis in Transgenic Mice
Cary Weiss, Biology and Environmental Studies
Sponsor: Professor Jayne Raper, NYU School of Medicine

Innate Immunity is the first line of defense against microorganisms and acts by providing an initial barrier against disease. A sub-fraction of human high-density lipoprotein (HDL), known as trypanosome lytic factor (TLF), is defined by its ability to kill African trypanosomes. The roles of the two unique TLF components apolipoprotein L-I (ApoL-I) and haptoglobin related protein (Hpr), which only humans and a few primate species express, have recently been defined. Hpr, when bound to hemoglobin (Hb), enhances the endocytosis of TLF via an Hpr-Hb receptor on trypanosomes. Therefore, TLF is delivered to the lysosome within the parasite wherein ApoL-I is activated in the acidic environment to form pores in the cellular membranes, leading to parasitic death. We have recently shown that TLF is also endocytosed by mammalian macrophages and delivered to the lysosomes of the cell. The macrophages, unlike trypanosomes, do not die. Using mice that are transgenic for TLF, this study investigates protection against Bacillus anthracis Sterne, which is taken up as an inactive endospore and germinates in the acidified phagolysosome of mammalian macrophages. Results show that Bacillus anthracis Sterne is killed by the acid-activated TLF that is delivered to the same phagolysosome and that transgenic mice are protected from B. anthracis Sterne infection, indicating that TLF is a broad spectrum innate antimicrobial HDL.

Assessing Bacillus subtilis Spore Coat Functionality through the Identification of Germination Defects
Lara Winterkorn, Biology
Sponsor: Professor Patrick Eichenberger, Biology

Patrick Eichenberger’s lab studies the network of proteins that interact to form the spore coat of the sporulating bacterium Bacillus subtilis. Much of the research done in the lab involves the use of fusions of coat proteins with fluorescent proteins, such as Green Fluorescent Protein, in order to visualize the sub-cellular localization of these proteins in vivo. Modifying a given gene by adding the coding sequence for a fluorescent protein, however, can affect the function of the corresponding gene product. It is important to use a phenotypic test to ensure that the strains carrying these fusions are still capable of assembling a functional coat. One way to do this involves an assay that measures the ability of the bacteria to break out of the spore stage and return to a vegetative state, a process called germination. Because the germinants that

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induce this process must be able to permeate through the multi-layered spore coat to activate germination receptors located in the inner membrane of the spore, this assay is an indirect test of the functionality of the spore coat. A new high-throughput germination assay has been created to systematically test strains used in the lab. This new assay is more quantitative than previously published techniques and is well-suited for the analysis of dozens of strains. Of over 100 strains tested, we have identified several deletion mutants that have germination defects. Additionally, several strains that include fluorescent protein fusions that do not rescue the wild type phenotype have been identified, and the defects of these strains have been quantified.

**Somnus: A Database System for the Analysis of Complex Behavioral Traits**  
*Jared Wyatt, Computer Science*  
*Sponsor: Professor Justin Blau, Biology*

Understanding complex behavioral traits like sleep and feeding is central to neuroscience. An enormous challenge in the study of these traits is dealing with the vast amount of data generated by automated behavioral analysis devices. We are screening for genes regulating sleep in fruit flies. The existing data analysis system is limited to evaluating changes in total sleep. My research focuses on the development of a new database system, Somnus, which facilitates a more comprehensive analysis of changes in sleep and is capable of complex analysis of other data vectors as well. The system maintains computer-generated activity data, along with relevant metadata information that can be used for more precise organization and distinct classification of the data. The reporting tools for Somnus provide better access to and control of the entire data set, allowing the user to dynamically model and remodel the data to draw out interesting and useful conclusions. The capability of Somnus to evaluate more completely the relationships between genes and phenotypes allows for powerful, in-depth analysis of the biology underlying specific sleep components, and gives it the potential to become a standard tool for the analysis of complex behavioral traits.

**Molecular Capsules in Hydrogen-Bonded Host Frameworks**  
*Jin Ju Yi, Chemistry*  
*Sponsor: Professor Michael D. Ward, Chemistry*

Trisulfonate molecules, which bear three sulfonate groups in their structures, can affect the structural outcome in their co-crystals with guanidinium. When the sulfonates are intra-connected by flexible linkers, such as alkyl chains, a lamellar structure with quasi-hexagonal GS sheet structures is formed. In this structure, the three sulfonates from one molecule are attached to the same sheet, forcing the linkers to point in the same direction. In this way, the flexible trisulfonate is fixed to one special conformation with a capsule structure. When the sulfonates are intra-connected by rigid linkers, such as aromatic groups, however, tubular structures are produced when they are crystallized with guanidinium ions. The achievement to control the crystal structures indicates that the local environment of multisulfonates has a profound effect on the crystal structures of GS compounds. With the understanding of this relationship, we aim to further modify trisulfonates in search of bigger, discrete, or channel-like cavities by adjusting the length and rigidity of the linkers between sulfonate groups.

**Correlating SNPs in Transcription Factor Binding Sites with Gene Expression Divergence in Saccharomyces cerevisiae**  
*Maryam Zaringhalam, Biology*  
*Sponsor: Professor Mark Siegal, Biology*

Single nucleotide polymorphisms (SNPs) account for much of the variation we observe in nature. Here, we focus on the effect of SNPs on gene expression by examining the effect of SNPs within transcription factor binding sites (TFBS) using *Saccharomyces cerevisiae* as a model system. A bioinformatic analysis identified a confident set of genes with TFBS containing SNPs that are predicted to cause expression divergence between yeast wild-type strain RM11-1a (RM) and yeast lab strain BY4716 (BY). We selected two genes from this set—haze protective factor 1 (HPF1) and resistance to sphingoid long-chain base 1 (RSB1)—for experimental validation. Genetic cloning techniques were used to mutate the BY SNP to the RM SNP in the TFBS of HPF1 and RSB1 in the BY genetic background. Quantitative PCR analysis will next be performed to measure the change in expression between the BY strains with the BY SNP and with the RM SNP. These studies will test the hypothesis that HPF1 and RSB1 expression divergence is due to the effects of predicted causal SNPs (cSNPs) in their TFBS.

**Epidemiologic Variables and Their Effects on P. falciparum Multiplication Rate and Survival of Parasites in vitro**  
*Thomas Zervos, Biology*  
*Sponsor: Dr. Patrick Sutton, NYU School of Medicine*

In an effort to understand better the factors that influence the success of the malaria parasite *Plasmodium falciparum* in vitro, we designed a study to investigate...
the epidemiologic variables on \textit{in vitro} culture success over time. Host variables considered upon collection of a vacutainer of infected blood were: age, sex, body temperature, haematocrit level, and blood group type. Parasite variables considered upon collection included: parasite density, complexity of infection (COI), and parasite genotype. There were 306 parasite isolates collected for this study from 2003 to 2009, in Amazonian villages surrounding the city of Iquitos, Peru. The rate of growth in the first 48 hours (multiplication rate) and success in culture was studied in relation to the host and parasite variables over time. \textit{P. falciparum} infection cultures with the greatest success were those cultured from individuals with a higher parasite density (p<0.0001). Additionally, complex infections successfully adapted to culture at a higher frequency than single-clone infections (p<0.032), and COI was also correlated to increased disease severity in children (p<0.001). Certain parasite genotypes correlated to increased disease severity, which then translated into increased success in culture growth. Isolates from patients with blood groups other than O (A, B, AB) had a greater multiplication rate in the first two days of culture than isolates from an O blood group (p<0.016). Results from this study indicate that variables that influence the immunity of the host or the pathology of parasitemia \textit{in vivo} are related to the multiplication rate and growth of parasites \textit{in vivo}. O blood group individuals might be putting a strong selective pressure to limit parasite growth.

The finding of genetic diversity, COI, being related to the parasite multiplication rate might suggest some associated parasite factor impacting growth or its ability to invade host red blood cells. These findings should be explored and analyzed in regard to other genetic markers and more detailed analysis of clinical symptoms.
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