

INQUIRY:

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INTRODUCTION:

Research as Educational Paradigm

The annual journal *Inquiry* showcases abstracts of selected student research undertaken in the academic year 2011–2012 in the College of Arts and Science at New York University. It is a celebration of the achievements of our most curious, driven students, and those who have availed themselves of the opportunities for research that we afford. As part of a premier institution of research, the College of Arts and Science has the responsibility to involve undergraduates in the production and expansion of knowledge, under the aegis of world-class faculty researchers who routinely teach our undergraduate students.

Research can take many shapes, as this publication attests. Students featured here spent time working in a lab with a team of scientists in order to understand how a specific hormone affects brain development; picking through boxes in an archive, finding textual evidence to support a literary analysis; or interviewing a living eyewitness to a major historical event in a foreign country. The benefits are many. Educationally, students learn to work closely with a mentor, sharpen their problem-solving skills, and learn about “the big ideas” of their chosen field. Professionally, students explore possible future careers, learn how to work independently, and hone marketable skills, such as effective written and oral communication. Personally, there is no greater achievement than meeting the challenges of a long-term project, following a passion to a wonderful conclusion, and having a completed work to show for it, whether it be a poster, thesis, or data set. The internal standard of excellence that our students discover within themselves is perhaps the most salient personal outcome of undergraduate research, and a reward that keeps on giving no matter what one pursues after college.

This publication represents only a fraction of the research undertaken by College students, as individuals and in groups, under the close mentorship of faculty; for the most part, the projects featured here were supported by the Dean’s Undergraduate Research Fund, created through the generosity of alumni parents, and friends, which provides 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.) These abstracts were also presented at the annual Undergraduate Research Conference, which was established over thirty years ago and encompasses the sciences, humanities, and social sciences, as well as creative writing.

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. The content of this issue underscores 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.

G. Gabrielle Starr
Acting Dean, College of Arts and Science
Associate Professor of English

FACULTY PERSPECTIVE:

Feet First: Jumping into a Career as a Research Anthropologist by Professor Rayna Rapp

I entered college at the University of Michigan intending to major in French, which soon proved to be a field burdened by what we later called sexism: bright young women were not expected to do anything as exciting as engage existentialism or the late medieval ballad. We were being trained exclusively as high school teachers. Casting around for another focus, I registered for an anthropology course with little understanding of what was about to befall me. Within a month, I was having dreams of Margaret Mead among the Arapesh, and I woke up in the middle of one remarkable night with the thrilling insight that I could really do this. Embracing anthropology proved to be an utterly naïve agenda, but it nonetheless reconfigured my life, which is exactly what college is supposed to do for you.

After my sophomore year, my advisor secured an unpaid summer internship for me at the American Museum of Natural History here in New York. I took the elevator every morning to the creaky fifth floor under the eaves, and to this day I remember vividly the excitement of the men (and they were overwhelmingly men) whom I thought of as Old Geezers (they were probably the age I am now!). They lived and breathed their work; they would get on the elevator with me, enthusiastically chattering away about research, travel, and writing. I had by then spent a few summers in the typing pool (remember the typewriter?) at a large insurance company, and I felt both inspired by and envious of their intellectual focus and excitement. A passion for work was the take-home lesson that summer.

I attended graduate school at the University of Michigan, and thought about dropping out after my first year. After listening to my concerns, my wise mentor hired me as a research assistant on his grant: I was to go to rural southern France to explore social networks there. After a few weeks of awkwardly getting my academic French into shape to face the challenges of village life, I was totally hooked. Whether interviewing the baker about the provenance of the ingredients that went into his crusty bread, or harvesting lavender with peasant-workers in the fragrant August fields, I found that engaging with people quite different from me, in small places, was utterly fascinating. A few family members and some of my significant others could not understand exactly what the heck I was doing. But when my paternal grandfather expressed doubts about the suitability of earning a graduate degree in such an obscure field, querying how I intended to

support myself, my father was quick to reply: “Don’t worry Pop, she’ll open an anthropology store.” With the support of my family, I went on to earn a doctorate in cultural anthropology at Michigan, spending about two years in villages and small towns across Provence. My initial romance with fieldwork extended to several other projects, but I would never again have the luxury of international time-out-of-time. There is a freedom to research—when supported—that is hard to replicate.

Indeed, the luxury of graduate school time disappeared when, while writing up my thesis research, I got kidnapped by the women’s movement, specifically, the women’s health movement. Along with many members of my generation, I helped to found the academic field of Women’s Studies. I got a full-time teaching position, intending to write about teen pregnancy as my next research project. But instead, my own late pregnancies eventually led me to another topic: just as amniocentesis was getting routinized, I became interested in the study of genetic testing in pregnancy. I thought I was investigating women’s health; I was, however, also quickly recruited into medical anthropology. My focus honed in on studying the social side of genetics, from the forging of laboratory discipline and diagnosis, women’s ruminations on the meaning of heredity, fetal life, and which, if any, childhood disabilities might be worth an abortion. Science as a social phenomenon was clearly mapped all over and inside women’s bodies, and again, I was hooked. Women confronting the choice of a new reproductive technology often had to become what I call “moral pioneers,” thinking through some of our culture’s toughest and most politicized choices inside embodied, intimate space.

Just as I was finishing my long-awaited book manuscript on amniocentesis, I got a call from a colleague that changed my life, and my research direction, once again. Having just served as a panelist at the National Institutes of Health evaluating grant proposals—something that to we researchers regularly do as “pay back” for the funding we have received and benefitted from—she convinced me that we could successfully explain why ethnography was a scientific methodology. We secured federal funding to explore how scientists were then mapping the human genome by arguing that we needed to impersonate a parallel scientific research team, complete with post-docs, graduate

research assistants, and undergrad interns. We anthropologists worked in genetics labs, among medical clinicians, and with families whose members had the genetic diseases now under laboratory scrutiny. We asked questions about what bench scientists, clinicians, and patients living with genetic disease and their family members wanted from this first plunge into publicly-funded life science. As anthropologists, we worked slowly and thoroughly, and our three-year grant stretched into six or seven years of publication, during which time I worked with a lot of family health advocacy support groups, and learned my way around federal funding.

Currently, I'm in the middle of a collaborative research project with Faye Ginsburg, a colleague and friend in NYU's Anthropology Department, and head of the Program in Culture and Media. It's a big, sprawling project, which began from what we might want to label "mother-speak": we both have children who were classified with learning disabilities, and who garnered special education services during their early grade school years. The more we spoke about our kids and their schooling, the more our curiosity grew: where, we wondered, were kids like these when we were growing up in the 1950s and '60s, when few kids went to special ed? It has taken us more than five years to explore the changes in de-institutionalization, civil rights law, science and medicine, media, school innovation, and family activism to begin to produce an answer: although each family whose child struggles in school and gets a diagnosis imagines the problem is endogenous to their daughter or son, it is also the case that disability has become much more visible in the social landscape of contemporary America. Indeed, students with disabilities are much more visible here at NYU than they were in our youth, and all the undergraduates I've queried have a familiarity with the topic that is radically different from how we were taught. Today, siblings, friends, and neighbors with disabilities are much more likely to be integrated into local community life. We are currently exploring the impact of such changes on cultural understandings of human diversity right here at home.

Around the edges of these larger, longstanding research projects, I've been privileged to serve as a consultant on shorter projects: the genetics of tobacco addiction, family and community patterns of diet and exercise as they affect cardiovascular disease, public policy pertaining to genetic information and education, DNA-borne prenatal diagnostics. Now, I'm in the early stages of imagining a

future in diabetes research, where some medical anthropology and comparative, international thinking is badly needed.

Over the years, I've learned many lessons from a life in research. It takes a lot of hidden support to sustain the intellectual and policy passions of someone like me. Some of that support is highly competitive, and it comes via various grants and the research networks one is lucky to build across national and international conferences, symposia, and funding panels. But support is also required and found much closer to home. Both my kids, for example, could in their childhoods produce a quick abstract of any of my current research projects while rolling their eyes, as they had to live with its consequences at the dinner table. Consequently, they have both fled from anthropology, choosing other fields for study and life's work.

If you chose a career in research, you are not likely to be spectacularly well-paid: you'll be able to march with the Occupy movement with a clear conscience, never entering the 1%. But like me, you'll probably be able to support yourself and your family in a perfectly reasonable fashion, and your kids will have the benefit of lots of international travel.

You will also have the satisfaction of following your intellectual and social passions. I can promise that you will never, ever be bored. Like those scholarly Old Geezers I so long ago envied at the American Museum uptown, I wake up each morning, rarin' to go, ready for the science section of the Times, or a new interview with a mother whose child has recently been diagnosed with ADHD, or a question about the existential gap between what genetic researchers presently know about diabetes, a very complex disease which has an obvious hereditary component, and the daily risks of aging, diet, exercise, and , life style, not only here, but also, for example, in Abu Dhabi, which has the highest incidence of Diabetes 2 in the world (in proportion to its population).

Every April, as I attend the Dean's Undergraduate Research Conference, I salute all of NYU's emergent researchers: but I also must warn you that pursuing your passion can lead to unpredictable results. For those of you who move on to pursue your topics at increasingly advanced levels, I hope that your research experience at NYU will become an opening story. When asked to look back on how you jumped into research, you can reply, like me: Feet First.

Professor Rayna Rapp has been a member of the Anthropology Department since 2001. She specializes in the study of gender, reproduction, health and culture, and science and technology in the United States and Europe. Her publications include: Where Hereditary Abnormality, Biomedical Explanation, and Family Responsibility Meet (2002, Duke University Press); Testing Women, Testing the Fetus (2000, Routledge), and a myriad of articles and conference papers. Dr. Rapp pioneered a graduate seminar, "Genes09" which emphasized a pedagogical integration of theory and method across the bio-social disciplines, and this fall she will offer a version of her undergraduate course, "Kinship and the Politics of Reproduction" to graduate students. Professor Rapp and Professor Faye Ginsburg (Anthropology) recently launched a research project on cultural innovation in special education in New York City, funded by both the Spencer Foundation and NYU's Institute for the Study of Human Development and Social Change.



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*

HUMANITIES

Opera and Social Politics in New York City during the Gilded Age (1870–1910)

Kathleen Mae Aguilar, Music

Sponsor: Professor Rena Charnin Mueller, Music

The Gilded Age, following the American Civil War, was characterized by a great divide between suddenly prosperous and ostentatious robber barons and an increasingly impoverished lower class. This trend was most prominent in New York City, then the progressive, fashionable, and intellectual center of America. During this time, opera, a foreign musical import, began to take hold of the city, from elegant Fifth Avenue to crime-ridden Mulberry Street. The ever-widening divide between the city’s socio-economic levels had an impact on how opera, with its myriad performance and scenic requirements, looked and felt in different neighborhoods or venues, depending on the political, social, and economic factors of the local groups that embraced it. By investigating memoirs, newspapers, and the founding and establishment of the Metropolitan Opera House in 1883, my project examines how opera helped define and reinforce New York City’s social strata in the Gilded Age, and how opera’s presentation and reception reflected the concerns of a city caught in a tug-of-war between old European traditions and blossoming American ideals.

Re-placing “Cosmopolitanism”: Recovering Loss in the Works of Kwame Anthony Appiah, Chang-rae Lee, and Mohsin Hamid

Nadia Ahmad, English

Sponsor: Professor Cyrus R. K. Patell, English

Cosmopolitanism can be perceived as a negative concept, suggesting that the local and particular

perspective might be lost in the process of embracing the worldly. Kwame Anthony Appiah argues for “rooted cosmopolitanism” in his 2006 work *Cosmopolitanism: Ethics in a World of Strangers*, offering the possibility that cosmopolitanism could exist without loss of the local perspective. I look closely at two literary works to examine what Appiah’s definition might still be lacking: in the novels *Native Speaker* by Chang-rae Lee (1995) and *The Reluctant Fundamentalist* by Mohsin Hamid (2007), the narrators’ split affiliations seem to be caused by the loss of a reminder of home and a sense of displacement. If we think of cosmopolitanism as partly prompted by experiences that involve loss, then Lee’s and Hamid’s texts point to what costs, individual and cultural, we might incur when adopting Appiah’s version of it. Rereading the philosophy through literary criticism and trauma theory may help recover the stories of loss that Appiah notices but does not explore further.

A White-Washed History: Representations of Black Agency in American Civil War Films

Modupe Akinnawonu, History

Sponsor: Professor Martha Hodes, History

In 1915, director D.W. Griffith made cinematic history with his production of *The Birth of a Nation*, the first Civil War epic and one of the most successful, if bigoted, films ever created. This thesis examines its impact on the way both African Americans and the period are represented in the motion pictures that followed it over the course of the twentieth and twenty-first centuries. In an attempt to avoid the controversy that marred *Birth*, the roles of slaves, ex-slaves, and freedpeople are simplified or erased, creating a genre of film that claims to portray

the stories of the Civil War without the actors that played an essential role. This study evaluates both how the historical agency of African Americans is characterized, and the influence this white-washed history has had on popular memory of the conflict throughout the United States, especially in the South. It opens with a brief history of the war and Reconstruction from the black perspective in order to establish that African Americans did in fact have a sense of agency. It will also touch upon the efficacy of using film to teach history and attempt to determine under what conditions, if any, this is possible.

The Show That Must Go On: Gender Performativity in Austen's *Pride and Prejudice* and Shakespeare's *As You Like It*

Shahida Arabi, English

Sponsor: Professor Elaine Freedgood, English

Judith Butler's concept of gender performativity asserts that gender is a performance that is constantly problematizing itself. Using this idea as a basis for my research, and combining literary criticism with performance studies and gender studies to guide my analysis, I explore how gender is theatricalized and problematized in Shakespeare's *As You Like It* and Austen's *Pride and Prejudice* within their respective historical contexts. The body in both texts serves as the site where cultural meanings are inscribed and performed through various stages of gender signification, including cross-dressing, drag, and the rituals of marriage. The body exerts a performative labor that exposes and subverts the very performances being staged. Austen's *Pride and Prejudice* emphasizes the role of marriage in successfully "passing" for a woman in eighteenth-century England, while Shakespeare's *As You Like It* reveals a world of drag and cross-dressing that both destabilizes and exposes the performativity of gender through the vehicle of Rosalind's body. Rosalind's doubling performances construct several layers of gender performance, reflecting the nuanced roles of sixteenth-century English women and the dubious nature of the gendered body on the Shakespearean stage. These performances, engineered through clothing and language, are partially negated by Rosalind's references to her biological body, even as they are reinforced by her defamation of the female sex. The financial necessity of marriage in eighteenth-century England compels female characters in *Pride and Prejudice* to perform their gender through marriage rather than through the stage props of clothing or weapons. Consenting to or refusing a marriage proposal could secure social mobility or undercut social and class expectations. The narrative, however, complicates seemingly subversive performances by reducing characters to the physicality of their bodies, or granting physical agency

to "flattened" or one-dimensional characters. These two texts, despite the difference in historical era, problematize this timeless discourse of a stable gender identity .

A Nietzschean Interpretation of Ecology: A Philosophical Approach to Environmentalism

Robert Baldwin, Economics

Sponsor: Professor Friedrich Ulfers, German

Despite our best efforts, humans are far from a real solution to environmental catastrophe. In my research, I use the writings of Friedrich Nietzsche to explore a body of literature connecting his philosophy to ecology. I argue that instead of political solutions we must consider the underlying philosophical questions of how we relate to the environment. By looking to the foundations of Western philosophy, we can see that even the ecologically minded are grounded in Cartesian dualism, which views human activity as superior to the physical world and nature. Using the writings of Nietzsche and his followers, I explore different philosophical worldviews that can change the way we relate to the environment. I conclude that only through a radically different way of relating to nature, defined by interconnection and respect for the sublime, can we create a more sustainable environmental future.

A Historical and Political Analysis of La República de los Niños: An Approach to Understanding Peronism's Internal Conflict of the 1950's

Lois Bladykas, Spanish; Politics

Sponsor: Professor Jill Lane, Spanish and Portuguese

La República de los Niños ("The Children's Republic") is a children's theme park in La Plata, Argentina, that was created to instill a specific set of political ethics in its young visitors. The park's original intention was to arm children with the necessary information to function as "model citizens" in a "republican" system of government. Created in 1951 by Domingo Mercante, a Peronist governor, the space is often attributed to Eva Perón or her social welfare foundation. While much research has been done on Eva Perón's welfare programs and institutions, there has been little work done on Peronist constructions that were not directly created by Eva or her husband, President Juan Perón. By detailing the historical and political atmosphere of the 1950's in Peronist Argentina, this paper explicates the conception and construction of La República de los Niños. Using archival materials collected in La Plata, photo documentation, essays written by its creators, and archival research compiled by other scholars, this paper uncovers and examines the internal conflict of the Peronist party, a political party that, somewhat ironically, prided itself on its ability to instill "spiritual unity" in the Argentine populace.

“Paseo por el amor y la muerte”: Fernando Romero’s Search for Purity in Flamenco by Journeying through Dante’s *Inferno*

Alice Blumenfeld, Comparative Literature

Sponsor: Professor Lourdes Dávila, Spanish and Portuguese

My research looks at an adaptation and appropriation of Dante’s *Inferno* into a flamenco performance entitled *Paseo por el amor y la muerte*. The performance was choreographed by Fernando Romero and premiered at the world’s largest flamenco festival, La Bienal de Sevilla, in 2010. Beginning with a detailed analysis and close reading of elements of movement already present in Dante’s text, I then analyze how Romero interpreted the text into the genre of flamenco, how his work is based in Dante’s text, and how it complicates and breaks away from Dante and subsequently also breaks away from traditional flamenco aesthetics, even as it searches for purity in flamenco. I bring in Federico Garcia Lorca’s *In Search of Duende* to elaborate on the idea of purity in flamenco. My final conclusions show how Dante and Romero use concrete allegories to create metaphors that aim to grasp and reveal what cannot be explained in literal terms.

Notre-Dame de Paris: Iconoclasm, Spoliation, and Sign Transformation in Revolutionary France

Alicia Caticha, Art History

Sponsor: Professor Kathryn Smith, Art History

In 1793 the French revolutionary government ordered the sculptures in the Gallery of Kings on the Cathedral of Notre Dame de Paris removed and ritually decapitated. Misidentifying these statues as French kings rather than the kings of Jesus’ regal lineage, government officials considered the sculptures threatening to the new republic. This study draws on recent scholarship on iconoclasm—the methodical destruction of art that threatens a specific belief system—and spoliation—the reuse of art and architectural elements—in order to reinterpret the events at Notre-Dame as a deliberate form of “sign transformation” rather than a purely destructive act. Indeed, Jacques-Louis David planned to reuse the disembodied heads of the sculptures in a new monument dedicated to the Republic, an act of reappropriation that blurred the line between iconoclasm and spoliation. This study argues that Notre-Dame’s location on the Île de la Cité, the symbolic birthplace of the French nation, imbued the cathedral with a powerful monarchical identity. The revolutionaries perceived the cathedral as representative of an era of repression under the French monarchy. They aimed to transform Notre-Dame into a monument compatible with the new political and social structure, and thus to move it into a new era.

TIRET and the Politics of *Ghazat*

Christina Chen, History

Sponsor: Professor Zvi Ben-Dor Benite, History

My thesis looks at how efforts to aggrandize Turkic-Uyghur nationalism were made through the duplicitous promotion of Islamic religious fervor in the formation of the Turkic Islamic Republic of East Turkestan (TIRET) in Xinjiang, China, in 1933. Diplomatic accounts portrayed the state as the successor of the late nineteenth-century Kashgarian Emirate created by Yaqub Beg, a native Andijani who was known to have actively portrayed *ghazat*, a holy war, as an integral form of cultural campaigning. This association reinforced stereotypes of Uyghur Chinese Muslims as innately fierce, predatory, and difficult to control, that had become axiomatic by the mid-Qing dynasty. I argue that the employment of *ghazat* was wholly topical and superficial since the leaders of TIRET, seeking to modernize their anti-colonial nascent state, recognized the ineffectiveness of religiously-legitimized militancy in the early twentieth century for the sake of achieving politico-ideological ends. Lingering stereotypes continued to caricature and make impotent TIRET as an “Islamic Movement” which had ironically gained secular, political momentum through the Jadidist focus on Quranic orthodoxy. The externalist deployment of Islamic revivalism coincided, and assisted, with the emergence of solidifying territorial and ethnic borders of “Chinese-ness.” Finally, as modern Chinese historiography became dominated by a revisionist focus on class struggle, and as the War on Terror has redefined *ghazat* as the neologism “jihad,” traces of Uyghur nationalism are now dissected through a new lens of social militancy that reinforces long-standing habits of ethno-religious vilification.

Love.edu

Elizabeth Dana, Journalism; Politics

Sponsor: Professor Katie Roiphe, Journalism

In the last ten years, the Internet has become an inescapable part of life on American college campuses. Not only does the Internet function as a library, a classroom, and a study group, it is also an extension of the student union, the dorm room, and the frat house. The Internet is increasingly becoming an important player in collegiate love lives, as students sign up for online dating sites, find romance on Craigslist, and flirt virtually. In this piece, the voices of students, experts, and site developers explain what it is like to be a young person dating in the digital age. The stories of these students capture the awkwardness of dating, both virtually and in person. They describe the frustrations and benefits of conveying emotion through type. They easily construct and manipulate their online identities through Facebook

profiles, yet often feel deep embarrassment over creating a profile on a dating site. This is a generation for which the ways to communicate have fundamentally changed, yet the need to connect and the desire for love is ultimately the same as it has always been.

New York Dreamers: Undocumented Youth and the New York DREAM Act Campaign of 2012

Emma Diab, Journalism; Middle Eastern and Islamic Studies

Sponsor: Professor Carol Sternhell, Journalism

“Undocumented and unafraid!” rang the cry in Albany as hundreds of undocumented students gathered to lobby New York State legislators to support the DREAM Act in the hopes of passing the bill before the end of this legislative session. After the Federal DREAM Act fizzled, plans for an education bill for undocumented youth began to form on the third floor of a crowded office room in SoHo. Drafted by the New York Youth Leadership Council, a volunteer organization run by undocumented youth, the bill was introduced by Senator Bill Perkins, and would enable immigrant youth who have grown up in New York to access state funded financial aid programs for higher education. For students who have lived the majority of their lives in New York, attended its grade schools and high schools, and borrowed books from its libraries, the instability of their status becomes apparent during the college application process as they realize they are ineligible to receiving financial aid. A delicate balancing act begins as these students, usually from low-income households, attempt to juggle college payments, more than one low wage job, and academic and familial responsibilities. For those students who are vocal about their status and seeking change, involvement with the DREAM Act Campaign is a powerful act of self-advocacy.

Cycladic Figures in the Context of the Museum

Allison Foutch, Art History

Sponsor: Professor Thomai Serdari, Art History

Cycladic figures rose to popularity in the 1920’s as artists like Picasso, Moore, and Brancusi exclaimed over the abstract, minimalist aesthetic of Cycladic figural sculptures. The 1960’s saw an exceptional rise in demand for these figures; museums and collectors competed furiously to acquire items with a particular modern quality. The annexation of this ancient culture into that of the fashionably modern art connoisseurship has been detrimental to the learning of the museum visitor and Cycladic scholar both, who encounter these objects within the Western aesthetic framework of the art museum. Due to looting of the figures for their market value, scholars lack knowledge of provenance or archaeological data for

these figures. Given the damage to the archaeological record, a complete understanding of the ancient context of Cycladic figures may be beyond our reach, but by studying the display of Cycladic art collections in museums and exhibitions, my research aims to pinpoint those problems obscuring context, and to examine display methods that will help separate Cycladic figures from our modern aesthetic ideals and encourage viewers to understand these works in their ancient context.

Reasons for Action, Thick Concepts, and Ethical Knowledge: A Response to the Ethical Philosophy of Bernard Williams

Nicholas French, Philosophy

Sponsor: Professor Thomas Nagel, Philosophy

Moral philosopher Bernard Williams identifies two kinds of statements about reasons for action: internal and external. The truth of an internal reason statement depends on a person having the appropriate desire or motivation—as Williams puts it, the right element must be present in the agent’s “subjective motivational set.” The truth of an external reason statement does not depend in this way on prior desires or motives. Williams denies the existence of external reasons for action, claiming that a person’s reasons to act in some way must somehow derive from that person’s pre-existing subjective motivations. Williams also famously emphasized the notion of “thick” ethical concepts, concepts that describe some empirical feature of the world while also offering an ethical evaluation—concepts such as *brutality*, *cowardice*, and *chastity*. I contend that, once we properly understand the nature of these thick concepts, Williams’ positions on reasons for action and ethical judgment are found to be incompatible. My argument turns on disputing the “non-objectivist” interpretation of thick concepts advanced by Williams through an analysis of the way thick concepts may change their evaluative valence in ethical discourse.

Comic Economics: Aristophanes and Civic Transformation in the Athenian Empire

Jenny Fried, Classics

Sponsor: Professor Barbara Kowalzig, Classics

An examination of the plays *Acharnians*, *Knights*, *Wasps*, *Peace*, and *Wealth* suggests that fifth-century Athenians lived in a time of swift transition as trade became more vital to Athens than farming. Prior to the Athenian Empire, most Athenians were subsistence farmers. As imports increased, Athenians began to purchase their goods in the marketplace rather than to produce them on a farm. Aristophanes reacts against these changes by creating characters longing for a return to agrarian life, away from the markets of the city, especially in *Acharnians* and *Peace*.

The comedy *Acharnians*, along with *Knights* and *Wasps*, demonstrates that Athenians became “foodies,” almost expecting to buy luxurious foods in the marketplace, revealing that a return to a life of farming would not be so simple. As depicted in *Knights* and *Wasps*, the politicians, who used their expert knowledge of the marketplace to control the *demos*, profit from the empire. *Peace* yearns for a panhellenic coalition of farmers to overturn these politicians, bringing peace throughout Greece and a return to subsistence farming. Yet *Wealth*, written after the war, when the farmers returned to the countryside, reveals that subsistence farming is no longer an Athenian ideal. The poet changes his argument, advocating on behalf of specialization and purchasing goods in the marketplace. The transition away from farming and towards buying and selling seems inevitable, and maybe even advantageous, for the Athenians. The plays suggest that a change in economic habits brought about a change in ideals of citizenship, because the self-sufficient farmer was no longer the model citizen.

Using Humanity as an End: An Analysis of the Formula of Humanity in Kant

Ryan Gander, Philosophy; Politics

Sponsor: Professor Ralf M. Bader, Philosophy

Although all three variants of the categorical imperative are, in some sense, equivalent, Kant maintains that each highlights a different aspect of duty; as such, a complete understanding of the categorical imperative requires a thorough investigation of the three variants. In my research, I grapple with the particular complexities of the second variant, otherwise known as the Formula of Humanity. I frame my investigation of the second variant in terms of end-containing, a concept mentioned by Kant in the *Groundwork of the Metaphysics of Morals* and discussed by modern philosopher Thomas Hill in his article, “Humanity as an End in Itself.” Taking “humanity” to refer to rational capacity, I reject Hill’s deflationary account of end-containing by demonstrating that it is rooted in (1) an understanding of rationality fundamentally incompatible with Kant and (2) the erroneous conflation of end-containing and maxim universalization. In doing so, I not only dispel a variety of Hill’s particular interpretational errors, but also establish a foundation for a more robust and theoretically consistent account of end-containing.

High Iron Lovers: Inside the Lives of America’s Railfans

Joseph Gracely, Journalism; Art History

Sponsor: Professor Katie Roiphe, Journalism

The railroad is inextricably linked to the past and present of American achievement, yet it has become a

cultural relic, thought of as dirty, old, and obsolete. For most, railroad crossings and midnight air horn soundings are a constant nuisance, to be avoided and complained about at length. But there are some who think differently, who look at a train and see the beauty and excellence of a railroad network that ships cars and televisions and oil and wood across this vast country. Who are these self-proclaimed “railfans” and how does a childhood interest grow into an adult passion? This project explores these questions through extensive interviews with several rail enthusiasts. Family, history, and a love for the pure power and strength of a locomotive are central themes for these fans, who gather in online communities to share and discuss their rail photography and sightings. For the rail obsessed, a train is the ultimate transportation machine, full of legacy and majesty, a dynamo of force uniquely integral to the functioning of this country.

The Institution of Madness in Berlin, Germany

Caroline Hayes, Comparative Literature

Sponsor: Professor Anne Lounsbury, Russian and Slavic Studies

Coming to understand the history of mental institutions—the diverse contexts in which they were constructed and the far-reaching impact of their existence—is an ongoing academic effort. Central to this effort is the intention to understand madness as a product and construct of the mental institution; as the institution changed forms, so too did the interpretation of madness. In order to study these changing forms and interpretations, I have employed three methods of research—historical, sociological, and architectural—to examine mental institutions in Berlin. During my semester abroad, my research focused on the emergence, transformation, and present reality of mental institutions in Berlin, and the ways in which this history fits into a national and even an international context. This broader research component is accompanied by a focus on two institutions in Berlin, the Karl Bonhoeffer Nerven-klinik and the asylums built in the Berlin-Buch medical complex. By visiting and studying these two hospitals, I have applied the knowledge gained from my broader research component to site-specific research and analysis.

The Relationship of the Egyptian *Wesekh* Collar to Middle Kingdom Anthropoid Coffins

Sarah Jolly, Anthropology

Sponsor: Professor Ann Macy Roth, Art History

As perhaps the most popular form of ancient Egyptian jewelry, the *wesekh*, or broad collar, appeared consistently from the Old Kingdom to the Roman period. The *wesekh* collar is a beaded necklace of multiple strands that either wraps around the neck or has end pieces

that connect the strings and rest on the shoulders. With the development of anthropoid coffins in the Middle Kingdom, this necklace became an essential decorative element. This project aims to understand why the collar was so integral to the decoration of anthropoid coffins through an analysis of the relationship of the collar to earlier coffins and mortuary culture to better understand their amuletic significance. By ensuring protection to the neck, the collar offers its regenerative powers to protect the head via its connection to the body. On coffins, collars may act as divine embraces, which help protect and preserve the coffin and the deceased inside to ensure passage into an eternal afterlife.

Images and History

Cecile Karsenty, Latin American Studies

Sponsor: Professor Lourdes Dávila, Spanish and Portuguese

How does the use of photographs in art, politics, and media change over time and influence the way we read them? My project seeks to answer this question through the analysis of Susan Meiselas's photographs and interviews, keeping in mind historical context and photography theory. Susan Meiselas is an American photographer who documented the Nicaraguan Revolution in 1978 and 1979. Susan Meiselas's goal was to document history and preserve the cultural context for her work. Many of Meiselas's images have become iconic in Nicaragua; they have been used to defend various and often contradicting agendas. Images that once belonged to the revolution have repeatedly been used as political tools, obscuring the original context and meaning of these historical documents. Certain photographs, such as the "Molotov Man," have been used as symbols of the revolution and the counter-revolution in Nicaragua, or as propagandantistic murals and paintings.

Identity in the Melting Pot: Spanish Restaurants in New York City

Layla Khabiri, Romance Languages

Sponsor: Professor James Fernandez, Spanish and Portuguese

This thesis explores the representation of "Spanish" identity in New York City restaurants during two moments in which Spain had become particularly fashionable: the so-called Spanish craze of the 1920's and the post-Franco period. I will analyze restaurant décor, menus, and advertisements from various publications to explore the constructions of different notions of Spanishness. I will also draw on interviews with contemporary Spanish chefs and restaurateurs to provide insight into the current interplay of Spanish identity and cuisine around

the city. I will show that tensions between American consumers and Spanish chefs resulted from their competing conceptions of Spanish identity. During the earlier craze, Spanish restaurants catered to the needs of Spanish people, but also to stereotypes Americans had about Spain. And while Spanish identity changed considerably during the post-Franco period, which resulted in the rejection of nationalism and the development of "nationless" restaurants, contrasting notions of Spanish identity still exist. Currently, there is a tension between the expectations of an educated or traveled American customer who nostalgically seeks a national "Spanish" cuisine and the post-national chef who embraces his individuality and rejects the anachronism of national stereotypes.

How Do Journalists Portray High School Dropouts?

Nia Kiara England, Journalism

Sponsor: Dr. Andrea McKenzie, Expository Writing

The United States ranked number one in the world for high school graduation rates in 1970, but today ranks only number twenty-one. Today, only seven out of ten American ninth graders are expected to graduate from high school. Common reasons students cite for dropping out include academic struggles and family responsibilities. The way in which the media portray these students affects their overall public image. In this research project, I explore how *The New York Times* depicts people who do not graduate from high school. Articles concerning high school dropouts usually focus on prevention and retention, economic ramifications, or exceptional success stories. I examine the differences in how people were represented, based on a particular article's central focus. I evaluate the style, content, and graphics in or alongside articles from the period between December 1, 2011, and February 29, 2012. A clearer understanding of the public image of high school dropouts can lead to more effective methods of garnering support to reduce the dropout rate.

A Teleological and "Non-teleological" Continuum: Rethinking Causality and Narratology in Steinbeck's Short Novels

Eric Kim, English

Sponsor: Professor Josephine Hendin, English

John Steinbeck's works, particularly his best-known novel *The Grapes of Wrath*, seem at first glance to be teleological: they emphasize the final outcome or purpose for which events occur. The mobilization of the Joad family from Oklahoma to California, an endpoint in *The Grapes of Wrath*, and the cause behind their migration, hint at a *telos*-driven understanding of life: that everything happens for a reason. Earlier episodic and cyclical novels, however, like *Tortilla Flat* and *The Red Pony*, complicate

Steinbeck's fiction and illustrate that he was not completely in line with the determinism of the naturalists, or even with the fragmentation of the modernists, but rather was of its own brand, a Steinbeckian experience in which both ultimate aim and completely random events, or the "non-teleological," coincide. I argue that *The Red Pony* uses both modes of thinking to represent the modern inability to reconcile one's attitudes toward human (and animal) mortality. Is death something that can be explained, understood, and then changed, or is it something that just "is"? I also read *Tortilla Flat* narratologically, arguing that the *paisano* stories, as written transcriptions of orations, reflect the dualities that are endemic in Steinbeck's storytelling: memory and narrative, orality and literacy, and "non-teleological" and teleological.

The Evolution of Light: Plato's *Allegory of the Cave* in the Early Works of Odilon Redon

Ramsay Kolber, *Art History*

Sponsor: Professor Elizabeth Mansfield, *Art History*

Following Darwin's publication of *On the Origin of Species* in 1859, an interest in the ancestry of mankind spread across Europe during the end of the nineteenth century. Within France specifically, developments in the fields of anthropology and archeology helped to construct an image of prehistoric man's physical appearance and living conditions. Odilon Redon (1840–1916), a French artist of the time, adopted these new scientific ideas as a way to represent an image of early French ancestry. While this has been previously stated, my research seeks to unveil the usage of Plato's *Allegory of the Cave* in connection with said imagery. In this way, the accepted physical appearance of the primitive cave dweller that emerged in the sciences during the 1860s became an ideal visual representation of the freed prisoner of Plato's *Allegory of the Cave*. By drawing this parallel, the artist sought to do more than construct a visual link between French ancestry and Plato's freed prisoner. This paper seeks to investigate Redon's these sources as a way in which to comment on the French human condition in the years before and after the Franco-Prussian war: a nation "blind" to its own ignorance, yet striving towards higher truth.

The Viennese Trifolium and Alfred Stieglitz, 1897–1911

Irene Koo, *Art History; English*

Sponsor: Professor Shelley Rice, *Art History*

At the turn of the twentieth century, photographers Heinrich Kühn, Hugo Henneberg, and Hans Watzek, who were collectively dubbed the Viennese Trifolium, became early proponents of Pictorialism and founders of the Austrian school of photography. Pictorialism emerged in Europe in the late 1880s as a movement that aspired

to elevate photography from a mere scientific tool to the realm of the Fine Arts. Often omitted from this narrative is the important role of the Viennese Trifolium, who were highly acclaimed for their images' unprecedented scale and masterful rendering of tone and light. This research contextualizes Kühn, Henneberg, and Watzek at the complex intersection of Pictorialism and the contemporary Vienna Secession, and thereby integrates photography into a larger artistic environment. In addition, the significance of the Trifolium is further reaffirmed through its ties to New York photographer Alfred Stieglitz, the leading visionary of the Art Photography movement in the United States. A close examination of the trio's prints and images illuminates why Stieglitz thought so highly of them and featured them in his publications and exhibitions. I conclude that Stieglitz admired the Trifolium's photographs not only as the embodiment of Pictorialism, but also as a body of work whose ideological kinship with the *fin-de-siècle* Vienna Secession most closely aligned photography with the Fine Arts.

Isolated from Identity: The Paradox of the Relational Self in Virginia Woolf's Fiction

Lauren Kuhn, *English; Psychology*

Sponsor: Professor Perry Meisel, *English*

Juxtaposing her characters' self-obsession with their obsession with being understood by others, Virginia Woolf creates a model of our quest for the relational self, a term used by Stephen Mitchell in his *Relational Concepts in Psychoanalysis* to describe the way our interactions with others form our self-identities. This paper will employ the concept of relational self to trace Woolf's characterization of self-obsession and identity, and I will argue that Woolf's model is most fully realized in *The Waves* where it presents the ultimate paradox of human interaction. It is in *The Waves* that the relational self that motivates our interactions ironically problematizes interpersonal relationships and identity formation. Inherent narcissism makes "relational" and "self" opposing terms; they become desires which are related but reciprocally inhibit one another. In this way, empathic relationships dissolve, people become isolated, and Woolf calls into question not only whether we can obtain a cohesive sense of self, but whether without such a self we can ever truly relate at all.

Disavowing Elegy: "That Pause of Space" and Emily Dickinson's Discourse of Mourning

Cate Mahoney, *English*

Sponsor: Professor Catherine Robson, *English*

After Emily Dickinson's father died in 1874, she wrote to her editor T.W. Higginson to thank him for his

poem “Decoration”: it had, she claimed, “assisted that Pause of Space which I call ‘Father’—”. But just how did “Decoration,” a traditional elegy that reaffirmed the location of the dead in the graveyard, inspire Dickinson to coin this mesmerizing construct, a phrase that reflects upon the temporal and spatial absences of the dead? That “Pause of Space” lies at the heart of my project: I argue that it functions as a rebuke to the ideas that inform Higginson’s poem and as a catalyst for Dickinson’s idiosyncratic discourse of mourning. Putting Dickinson’s letters in conversation with Freud and Derrida’s writings on the subject, I first establish how the poet shunned consolatory concepts of the “work of mourning.” Next, I examine theories of elegy, which define it as a form that enacts a consolatory turn from the lost beloved to the creation of a poem. Finally, I argue that understanding how this “Pause of Space” generates Dickinson’s unique approach to elegy can advance our comprehension of her poems, two of which I subject to close analysis.

The Hollow Rose: Elizabeth I as Vessel and Vector in Late Elizabethan Literature and Music

Caroline Marris, English and History

Sponsor: Dean Susanne Wofford, Gallatin

This thesis examines three late sixteenth-century works that re-appropriated Elizabeth I’s symbols to create new commentaries upon her rule and her person, as they manipulated her iconography either to imply subtle criticism of her and of female authority, or to discuss more personal courtly topics far from praise and flattery. I propose to understand their strategy as a phenomenon of “emptying” her symbolic shell and re-filling the vessel of her literary figures. My main texts are John Lyly’s 1588 play *Endimion, or The Man in the Moon*, Edmund Spenser’s epic poem *The Faerie Queene*, and the 1601 madrigal collection *The Triumphs of Oriana*, all of which presented Elizabeth at once as a totemic, goddess-like container of ideas and as a mortal and flawed woman. Focusing on circular imagery in all three works, and examining the influence of Angus Fletcher’s theory of “daemonologic” allegory, will help to structure my argument as it progresses from criticism of Elizabeth and female power in Lyly to the fragmenting of her character into minor queenly figures in Spenser, and finally to the pastoral pleasures of the *Triumphs* as assembled by Thomas Morley, The paradoxes inherent in many aspects of Elizabeth’s iconography—her construction of herself as both a virgin and a mother, for example—will inform my discussion of the paradox artistic courtiers faced in their eagerness to use the Queen’s sanctioned myths while often attempting to subvert and undermine them.

Building Preservation Training Project

Olivia Meegoda, Art History

Sponsor: Professor Carol Krinsky, Art History

The objectives of this study were to understand the general procedures for conserving a historic stone building structure, including the analytical, operative and consolidation phases, with a focus on the later two phases. I learned this procedure through the case study and physical restoration of the medieval Porta Burgi Gate in San Gemini, Umbria, Italy through the San Gemini Preservation Studies Program. The goals were to remove harmful organisms and elements to slow the rate of deterioration of an outdoor stone structure. The Porta Burgi was preserved by means of cleaning the structure, removing the Portland cement mortar, applying a new hydraulic lime mortar, and adding a final protective layer of clear fluoline. During the analysis of the structure, the 19th century addition of the Portland cement was found to be too rigid and to be cracking the original stone beneath it. Therefore, we replaced the mortar with a strong yet softer material, with strength comparable to the original stone. We were able to clean, remove the harmful mortar, consolidate the loose materials with the new mortar, and reduce the water and number of organisms that can enter the structure—therefore reducing the speed of deterioration of the structure.

The Evolution of the Reader in Marcel Proust’s *In Search of Lost Time*

Kate Meltzer, French

Sponsor: Professor Eugène Nicole, French

Published between 1913 and 1927, Marcel Proust’s *In Search of Lost Time* redefined the modern novel. Implicitly formulated in the text, the themes of reading and the reader are notions that guide the entirety of this seven-volume work. Even before Proust began this great novel, he was already considering the role of the reader in his 1906 text *On Reading*, the preface to his translation of John Ruskin’s *Sesame and Lilies*. My research investigates the evolution of this reader while considering the Proustian “narratee,” from *On Reading* to *Time Regained*, the final volume of *In Search of Lost Time*. I demonstrate how this development leads the reader to reconsider his understanding of the world, suggesting that his ultimate task is to embody the role of writer himself, learning to read the world as a writer would.

The International Legal Struggle against Amnesty: Seeking Justice for the Victims of Argentina’s Dirty War

Lisandra Novo, Latin American Studies

Sponsor: Professor Diana Taylor, Spanish and Portuguese

The global quest for justice is fraught with obstacles; one of the worst being impunity. Many governments trade

justice for peace, succumbing to the threats of the perpetrators of the gravest human rights violations. Argentina serves as an excellent case study of this particular phenomenon. In an unprecedented move, President Raúl Alfonsín sought to try the members of the Military Junta immediately after their fall from power. But, as is usually the case, threats of destabilization usurped the pursuit of justice and legalized impunity was the price paid for political stability. Fortunately, the international community filled the void left by the Argentine nation by trying the perpetrators in their own national courts. Eventually, Argentina followed suit and put an end to the legalized amnesty granted to violators of human rights during the military dictatorship. I will analyze two landmark legal decisions, one involving foreign courts' attempts to try an Argentine national for crimes committed in Argentina and, secondly, the Argentine decision credited as the catalyst for the end to impunity in Argentina. My analysis will show how international and domestic actors can circumvent, and eventually strike down, impunity by using the existing domestic and international legal framework in a complementary manner.

From Simone de Beauvoir to Dominique Strauss-Kahn: A Feminist Analysis of the Dominique Strauss-Kahn Affair

Jillian Patton, French

Sponsor: Professor Judith Miller, French

The recent scandal involving the former head of the International Monetary Fund, Dominique Strauss-Kahn, which came to be known in French as "l'affaire DSK," represented a significant moment in recent French history. One of the major controversies surrounding the treatment of the incident in France was the overtly sexist manner in which the affair was discussed in the media, with well-respected public figures regularly making light of the events. This offhand treatment of what in the minds of many was a violent crime generated a strong feminist backlash in France. This strong reaction by French feminists was notable both for the amount of publicity it received and the public figures that became involved in the movement against Strauss-Kahn. My research focuses on analyzing this feminist response in relation to the works of two established French feminist theorists in France, Christine Delphy and Simone de Beauvoir. It seeks to determine whether this renewed interest in feminism is simply the natural progression of earlier feminist thought in France, or whether this contemporary wave of French feminism represents a new development in gender relations in the country.

The Degeneration of *La Vie de l'Humanité*: an Alternative Analysis of Gustave Moreau's Polyptych

Hillary Pearson, Art History

Sponsor: Professor Elizabeth Mansfield, Art History

Completed in Paris in 1886, Gustave Moreau's polyptych *La Vie de l'Humanité* is composed of nine panels, each illustrating commonly known biblical and mythological stories; however, Moreau presents them in an original way. His unique use of cycles conveys an indisputable message of progressive degeneration, both of the individual and of mankind. After connecting text and image, I recorded different methods of reading these cyclical panels, following scholar Dorothy Kosinski's presumption that they represented the artist's preoccupation with religious and cultural syncretism. Moreau incorporated Orpheus and the mystical philosophy of Theosophy as key components of this multi-faceted message, allowing the scenes to reference indirectly the past, present, and Moreau's ominous prediction of the future. Kosinski concludes that the lunette above the polyptych, illustrating Christ's ascension, represents the necessity of salvation to prevent impending degeneration. I propose, however, that Moreau's journals and a careful compositional analysis of the polyptych's form and color suggest otherwise. Through this work, Moreau made a statement about the evolution of civilization, and placed religion as the overarching and dominant cause of strife in society, the catalyst for bringing about humanity's demise.

"Treatment of the 'Thing'": The Object and the Psyche in Early-High Modernism

Phillip Polefrone, English

Sponsor: Professor Peter Nicholls, English

The goal of this paper is to consider poetic representation in terms of communication and the psyche. Ezra Pound, W.B. Yeats, and T.S. Eliot refer to the "object" or the "thing" in their early prose writings, but they refer not to physical objects that represented a thing, but to the representations themselves as *textual* objects. Two types of "object," then, are at odds: the set of "extra-textual objects," or what the poem evokes, and the set of what I am calling "textual objects." Pound's Imagism uses a process of poetic transference to evoke images in the conscious mind, while Yeats's symbolism aims its effects at the unconscious by concretizing that which has no physical referent. Eliot uses a "set of objects" to encapsulate the disparate nature of sensory experience. It is in the division of poems into separate but sympathetic objects that these poets hope to transcend the barrier of subjectivity in communication and shared experience.

Uneasy Alliance: Understanding the U.S.-Pakistan Relationship

Sruti Ramadugu, History

Sponsor: Professor Zachary Lockman, Middle Eastern and Islamic Studies

This study explores the history of the Pakistani-U.S. relationship in order to understand the ups and downs of a partnership that has existed since the founding of Pakistan in 1947. To Pakistan, the United States provides essential military and economic support. To the United States, Pakistan is a necessary ally in the struggle to stabilize Afghanistan and combat terrorism. Yet, Pakistani leadership has been unable to control the military's ties to militant groups (especially in Afghanistan) and the Taliban, and the United States does not fully understand Pakistani preoccupation with regional conflicts in India and Kashmir. The extremely divergent interests on the part of both nations has caused highs and lows in the relationship, in which contradictory long-term goals have created regional instability in the short term and fractured the possibility of productive partnership. Pakistan and the United States are, as one journalist put it, locked in a "hostile embrace."

Searching for an In-Between Model: A Comparative Study of the Urban Elements of Modi'in & Tel Aviv

Samantha T. Rothberg, Urban Design and Architectural Studies

Sponsor: Professor Jon Ritter, Art History

Can designed or engineered cities provide livable and sustainable communities? Due to impending global issues such as climate change, declining resources, and a drastically increasing population, there has been a shift of attention to cities and their design. Modi'in, a modern Israeli city, was designed in the early 1990s as a model for controlled urban growth. Architect Moshe Safdie planned this urban community to accommodate future growth, alleviate coastal crowding, and provide an attractive living option, offering the amenities of both town and city, such as ample green space and mixed uses. This paper compares the urban elements of Modi'in with its neighbor, the more traditional Tel Aviv, in order to identify the elements of compromise that make Modi'in appealing and can be applied universally. This research utilizes primary documents from local and Israeli archives and consultations with involved planners. Although Modi'in may not be as vibrant or urban as Tel Aviv, it is pedestrian friendly and dense, while attracting various demographics on a minimal footprint: it offers an alternative living option within commuting distance of Tel Aviv and Jerusalem. By identifying the livable and sustainable factors in Modi'in, this study concludes a new kind of urban model is feasible.

Beyond the Soapbox: Facebook and the Public Sphere in Egypt

Anton Root, Journalism; Middle Eastern and Islamic Studies

Sponsor: Professor Helga Tawil-Souri, Steinhardt

My research grows out of recent scholarship about the contested use of Facebook as a forum for political debate; I focus specifically on the use of Facebook as a virtual public sphere in Egypt. Based on an analysis of a note posted by Wael Ghonim during the January twenty-fifth uprising on the Facebook group "We are all Khaled Said," I discuss the structural and technological benefits of the platform, as well as user behavior and interaction. Using Jürgen Habermas' *The Structural Transformation of the Public Sphere* and Yochai Benkler's *The Wealth of Networks* as the theoretical groundwork for my study, I make observations about the internet's ability to allow for considered opinion, and not just as a tool for recording popular sentiment. I argue that while Facebook's structure has both drawbacks and advantages for promoting discussion, the new medium's biggest limitation in helping to produce a virtual public sphere is user inexperience with the platform.

On the Pavement in January, Over the Balcony in June: The Problematics of Biography in the Work of Virginia Woolf

Anna Russell, English

Sponsor: Professor Maureen McLane, English

Over the course of her career, Virginia Woolf experimented with her ideas on biography across genres: in essays, novels, "fictional biographies," and finally in her 1940 biography of Roger Fry. In diary entries and within the projects themselves, Woolf—whose father, Leslie Stephen, was the first editor of the *Dictionary of National Biography*—displays an unresolved anxiety over how to best represent the "true self." I argue that Woolf's relationship with "life-writing" was shaped primarily by the tension between her father's influence over her conception of the genre and her close ties to its experimental development. I explore Leslie Stephen's dominance over Woolf's language as a child through a reading of Cam and Mr. Ramsay's relationship in Woolf's 1927 novel *To the Lighthouse* and Woolf and Leslie Stephen's relationship in Woolf's 1939 memoir, "A Sketch of the Past." I then examine the overlap of fiction and non-fiction in Woolf's work as it relates to biography. I also turn to the most comprehensive recent biography on Virginia Woolf, Hermione Lee's 1996 *Virginia Woolf*, and argue for its structural and stylistic similarities to Woolf's own work in *To the Lighthouse*.

À la Quête du sens dans “La belle et la bête”: Une comparaison des versions orales de la France, de Haïti, et du Québec

Bethany Schiffman, French; Anthropology
Sponsor: Professor Evelyn Vitz, French

“Beauty and the Beast” is not, in fact, a tale as old as time, nor is it born of the oral folkloric tradition. Its origins date to the 1700s and lie in the work of two authors, Madame de Villeneuve and Madame de Beaumont. These were the seeds for the rich oral tradition the story enjoys in the Western world. This paper examines three oral francophone versions (from 1870s France, 1920s Haiti, and 1970s Quebec) of “La belle et la bête,” analyzing how differences in the details described by the three storytellers reflect the sociohistoric context in which the story was recounted. It specifically focuses on descriptions of Beauty’s family and of luxury, and briefly considers other social trends that shape the story. Each story does reflect its context. Principle influences include the agrarian-peasant culture for the French version, the American occupation for the Haitian story, and both the Quiet Revolution and a surging women’s movement for the Quebec recounting. My thesis suggests that stories from an oral tradition can be seen as more than allegory; they are a tool for exploring the context from which they emerged.

“Krauts with Attitude”: Hip-hop as Dialogue of German Identity

Alexander Sedler, French and German
Sponsor: Professor Arne Höcker, German

Hip-hop is a communal culture that encompasses both audio and visual arts, and transcends race, nationality, and class. Oppressed groups have engaged with hip-hop to create a defiant social discourse as a form of self-empowerment. Hip-hop’s American movement of the 1970s and 1980s is the most iconic example; however, many would be surprised to learn that the world’s second most successful hip-hop movement comes out Germany. This project will use the American movement to analyze hip-hop’s cyclical nature and performativity as a “culture of citation,” illustrating how hip-hoppers continually reference the past in order to create a public and often critical discourse of the present. In the context of this framework, I will examine the diffusion of hip-hop from America to Germany and its progressive development with relation to the overarching social and political issues of the era. I will show how hip-hop not only gave a voice to the disenfranchised minority communities in Germany, specifically to Turkish-Germans, but also how the genre aided young, white Germans to reconcile their desire for a modern identity with their disassociation from Germany’s troubling history.

Desilusión, Esperanza, y la Lucha Contra Un Sistema Ineficaz: The Stories of Latino High School Dropouts in New York City

Daniella Silva, Journalism
Sponsor: Professor Katie Roiphe, Journalism

As of the 2010 Census, Latinos compose nearly twenty-nine percent of New York City’s population—the second largest ethnic group after non-Hispanic whites. Despite the considerable size and influence of this community, it has remained the least educated and the most impoverished. A study conducted by the Center for Latin American, Caribbean & Latino Studies at the CUNY Graduate Center found that by 2010, thirty-seven percent of Latinos aged twenty-five and older had not graduated from high school. Only fifteen percent had received a Bachelor’s degree. Media coverage concerning the Latino dropout rate has yet to address the problem from the perspective of the students and the families directly involved. My research sought to identify the leading causes and consequences of this phenomenon through a series of extensive interviews with three Latino dropouts and their families, in which they recount and analyze their personal stories. Theirs is a history of immigration and cultural richness, of poverty and the struggle of families within an ineffective public school system.

“La Meilleure Façon d’Honoré Nos Aînés”: the S.F.I.O. and the Memory of 1871

Laura Skove, French ; History
Sponsor: Professor Stephanie Gerson, French

For socialists in the early years of the twentieth century, the Communard’s Wall in Père Lachaise cemetery in Paris was the site of fervent annual commemoration of the Paris Commune, the failed socialist uprising of 1871. Yet, by 1914, the anniversary was scarcely mentioned, and the invocation of 1871 became that of the lost territories of Alsace and Lorraine, annexed to the German Empire after the Franco-Prussian War. This research examines how the “année terrible” of 1871 was memorialized by the French Section of the Socialist International, and in what ways that commemoration changed under the menace of imminent world war. Through an examination of socialist pamphlets, press, and discourses in the National Assembly, this work documents the constriction of an idealized past and the evolution of social memory in response to mounting international tensions. This research argues for the creation of places of memory—in this case, the Communard’s Wall—sustained through didactic iconography and popular culture. This communal memory, however, found itself pitted against the memory of war and national trauma, and ultimately lost out, sinking into collective lapse of memory. This would have important

implications for the collapse of international socialism during the First World War.

The Empire and Impact of *Saturday Night Live*

Lindsey Victoria Thompson, Art History and English

Sponsor: Dr. Andrea McKenzie, Expository Writing

Even after thirty-seven years and over 700 episodes, audiences nationwide still tune in each week to view America's most enduring comedy show. *Saturday Night Live* cast members go on to enjoy prosperous careers, often taking on lucrative television deals of their own. In what ways, though, does this "comedy inbreeding" influence other shows on television? To answer this question, I will study relevant seasons of *SNL* and scrutinize the ways in which the style, format, and subject matter crop up in two other contemporary television shows—NBC's *30 Rock* and IFC's *Portlandia*. Both of these programs star former *SNL* cast members (Tina Fey and Fred Armisen, respectively) and are produced by Lorne Michaels, *SNL*'s creator. All three shows seem to operate under the comedic theory that humor has the power to reveal things about contemporary society. I will examine these shows as a form of social commentary by uncovering how the shows operate and why they appeal to audiences. By analyzing what American society finds funny, I also hope to reveal what we as a culture appreciate and value.

The IRT Powerhouse: Aesthetic and Professional Conflict in the United States at the Turn of the Twentieth Century

Mei Tuggle, Urban Design and Architecture Studies and History

Sponsor: Professor Mosette Broderick, Urban Design and Architecture

Industrial architecture in the United States from the mid-nineteenth century to the early twentieth century experienced great change in structural form as it incorporated new materials and building techniques. As industry exploded in the United States, industrial engineering emerged as a profession to meet the new demands of the factory. While the engineer, engaging in scientific management, transformed the simple mill factory into larger, more complex industrial spaces, the architect was slower to respond to industrialization—resulting in a disjuncture between the two professions. Around 1900, less than ten percent of factory designers consulted an architect. Part of this small percentage, the IRT Powerhouse (1902–1904), which generated power for New York City's first subway, hired the architect Stanford White of McKim, Mead & White to design a Beaux-Arts facade. Further examination of this building will help to illuminate the relationship between engineers and architects at the beginning of the

twentieth century, as well as to identify other factors that contributed to this professional conflict, including union activity and public opinion. Although there has been extensive research on the first subway, there is no direct scholarship on the IRT Powerhouse. I have consulted several archives related to Chief Engineer William Barclay Parsons, Stanford White, and the powerhouse's development.

Tracing the Spider's Web: Artifice and Conflict Resolution in the Epistolary Writings of Vittoria Colonna and Veronica Gambara

Christina Varipapa, Italian Language and Literature

Sponsor: Professor Virginia Cox, Italian

Letters in the late fifteenth to early sixteenth centuries were a standard means of communication for men; however, they offered up a new form of freedom to privileged women of the upper echelons of Italian society, such as the poets Vittoria Colonna (1490–1547) and Veronica Gambara (1485–1550). Epistolary writing allowed such women to craft their own images, maintain long-standing connections, and forge relationships with new contacts. For Gambara and Colonna, writing letters also became a means of exerting influence over their correspondents. Corresponding with key figures such as the celebrated author Pietro Bembo, they established themselves as essential members of certain communities and spheres of power. Each used her letters to gather information and to persuade the recipients of the letters to take or abandon certain courses of action by means of distinctive rhetorical strategies. Drawing on Deanna Shemek's studies of Isabella d'Este's letters, my analysis will ultimately show that Gambara and Colonna were able to establish themselves as independent luminaries and essential intermediaries or arbitrators involved in conflict resolution for their respective families by way of their correspondence.

Non-Referential Fiction of *The Unconsoled* and Multi-Referential Non-Fiction of Kazuo Ishiguro

Zhijian Yee, English

Sponsor: Professor Jini Kim Watson, Comparative Literature

Kazuo Ishiguro's novel *The Unconsoled* deliberately frustrates any attempt at clarity. This project contextualizes Ishiguro's fourth novel in relation to his earlier work, highlighting the distinctive aspects that have aroused an intriguing spectrum of dismissive criticism that contrasts with his history of accolades. Literary categories and authorial labels relegate Ishiguro to a role as cultural mediator, and his oeuvre as works that are expected to provide cultural authenticity. More broadly, I aim to and distinguish among categories, and to examine the label "postmodern" itself, in Ishiguro's *Unconsoled*.

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

Planning Grasp Actions: Developmental Changes in “End-State Comfort”

Evelyn Abraham, Psychology

Sponsor: Professor Karen Adolph, Psychology and Neural Science

The tendency to end movement sequences in a comfortable rather than uncomfortable posture—often at the cost of using an uncomfortable initial posture—is termed the “end-state comfort” effect. The phenomenon provides evidence of planning actions in anticipation of a future state. Previous work showed end-state comfort planning in adults, but not infants. To study developmental changes in the end-state comfort effect, we tested four-, eight-, and twelve-year-old children. Their task was to hammer a large peg with a mallet. Because hammering is most efficient with a radial grip (thumb and index finger pointed towards the hammerhead), we observed children's initial grasps and subsequent hammering when the mallet was oriented to the right or to the left. All children eventually flattened the peg. Twelve-year-olds showed consistent evidence of end-state comfort; they avoided swapping hands after grasping the mallet and they used a radial grip even if it required an initially uncomfortable underhand position. Four-year-olds frequently used their

non-dominant hand, swapped hands, and used awkward grips while hammering, and 8-year-olds were midway in terms of end-state comfort. Results suggest that younger children may have difficulty planning actions in terms of future states.

The Impact of Social Networks on Immigrant Wages

Aurelle Amram, Economics; Sociology

Sponsor: Professor Edward Wolff, Economics

Previous research on the role of social and ethnic networks for immigrants has found that ethnic networks tend to assist the assimilation and job search process, and even provide significant wage gains. This paper extends the previous literature by examining U.S. Public Use Microdata from 2000 and 2010 to identify the effect that ethnic networks have on immigrant wages in metropolitan areas. Contrary to expectations, network effects do not contribute significantly to the power of earnings models. Ethnic networks are also found to have a negative effect on earnings, estimated at a decrease of two to three percent in wages per additional percent network size. An oversupply of immigrants in local labor markets as well as occupational ethnic enclaves, may be responsible for these negative network effects.

The Changing Role of the Workers in the United Farm Workers' Organizing Efforts

Dylan Anderson, Political Communication and Culture (Self-designed)

Sponsor: Professor Ruth Horowitz, Sociology

While working with the United Farm Workers on a specific unionization effort, I used ethnographic methods combined with interviews of the other team members to analyze the workers' role in relation to the campaign. I combined this work with a historical review of the UFW, the workers' traditional role in organizing, and a tension within the organization between framing itself as a union or as a social movement. I argue that two factors have contributed to the changing role of the workers: the segmentation of work that the Internet creates, and the shift towards an advocacy framework. I found that, as the UFW moved from its first two decades of successful organizing into the twenty-first century, the workers experienced a shift in their role in the organizing process. The UFW went from a collective model of organizing to a segmented approach, in which actors take on work befitting their positions. The workers are still crucial to the initial organizing stages, but as the process moves into deliberation and action, the UFW advocates on behalf of the workers.

Simple Compositional Processing in Language and Music: An MEG Study

Aaron Apple, Language and Mind

Sponsor: Professor Liina Pylkkänen, Linguistics and Psychology

Our research follows prior investigations into neural activity during simple linguistic compositions. Activity associated with simple composition was observed in the left anterior temporal lobe and the ventro-medial prefrontal cortex. Our study asks if activation in these areas is language-specific or indicative of general compositional processing. Although much research and debate in cognitive science focuses on domain specificity, mounting evidence suggests that some brain regions are domain general, and used for various functions. We ask if cortical regions employed in the processing of simple linguistic compositions are utilized during simple musical compositions as well. Pilot data suggest that this may be the case, though extended contexts seem necessary to elicit musical composition.

Method to the Madness: Gendered Discrepancies in Punitive Judgments of Murderers

Nicholas Armenti, Psychology

Sponsor: Professor Madeline Heilman, Psychology

Female offenders within the criminal justice system are often treated in unpredictable ways, though

explanations as to why women receive harsher sentences in certain situations, but are subjected to more lenient punishment in others, remain unclear. Method of employed murder and how it may communicate the consequential impact on the assignment of punitive judgment in accordance with violation of gender expectations was the subject of this study. Participants were exposed to one of four scenarios: a female who murders by bludgeoning (gender incongruent method), a female who murders by poisoning (not gender incongruent method), a male who murders by bludgeoning, and a male who murders by poisoning. I anticipated that females who murdered by bludgeoning would be subjected to harsher punitive judgment when compared to males who implemented the same method, whereas females who murdered by poisoning would be subjected to lenient punitive judgment when compared to males who implemented the same method; this was thought to be due to the perceived deviation from the communal and unaggressive gender norms expected of women. Results indicated that, regardless of the gender of the perpetrator or method of employed murder, participants' punitive judgments were not substantially impacted.

Organizational Culture and Organizational Success in Small Information Technology Service Companies

Wesley Aster, Economics

Sponsor: Dr. Andrea McKenzie, Expository Writing

Since the concept of organizational culture was popularized in the 1970s and 1980s, many businesses have attempted to identify and create organizational cultures that facilitate productivity and efficiency. Many scholars suggest that organizational culture is, in fact, an important factor in organizational success. No consensus about a definition of organizational culture currently exists, however, and no definitive connection has been formed between organizational culture and organizational success. In my research, I explore the correlation between organizational culture and organizational success in small information technology service companies. Specifically, I investigated how small information technology service companies define organizational culture and organizational success, and how these definitions impact the companies' decision-making. To perform this research, I conducted a case study of Prosum Technology Services by surveying and interviewing its managers and employees. I also read and analyzed articles on organizational culture. Results of this research suggest that although definitions of organizational culture and success impact decision-making within Prosum, these definitions are not consistent throughout the organization.



Understanding the Tap: Perceptions of New York City Water

Katherine Barton, Environmental Studies
 Sponsor: Professor Tyler Volk, Biology and Environmental Studies

New York City is known for impeccable drinking water, which reaches citizens’ taps without the requirement of filtration; it is also known for its polluted waterways, which constantly endure the discharge of untreated sewage due to combined sewer overflows. This paradox points to a segmented system that controls these waters, as well as the misguided perceptions of the millions of residents in New York City. Conversations with members of a community situated near a wastewater treatment plant, proposed surveys to the wider Manhattan population, calculations regarding current and potential water consumption, and analysis of how publicly available information guides citizens’ perceptions, all point to a lack of understanding held by residents, and reveal the impression citizens have about their role in determining water quality. As action is guided by perception, this research reveals gaps in community engagement, proves that implementation of wet-weather water conservation would be highly beneficial in mitigating estuary pollution, and informs the role these perceptions play in the urban political ecology of water.

Eating and Feeding: Planning Grasps for Self- and Other-Directed Actions

Yasmin Bata, Emily Young, and Evelyn Abraham, Psychology
 Sponsor: Professor Karen Adolph, Psychology and Neural Science

Simple everyday activities, such as grasping a spoon, require planning actions in anticipation of future goals. Previous research has shown that infants’ grasps are more mature for self-directed actions (e.g., feeding themselves) than for other-directed actions (feeding a doll). Here we investigated whether older children also exhibit deficits in planning grasps for other-directed actions. Notably, we separated self-other targets from motion direction (toward/away from body), which were confounded in previous work. We observed how four- and eight-year-old children grasp spoons for (1) feeding themselves (self as target, motion toward body), (2) feeding a doll on their lap (other as target, motion toward body), and (3) feeding a doll seated across from them (other as target, motion away from body). In half the trials in each condition, the spoon pointed left and half on right. Eight-year-olds showed mature grasping strategies in all conditions. But four-year-olds showed deficits in the other-directed feeding conditions regardless of whether the doll was across the table or on their laps. Results indicate that deficits in planning grasps for other-directed actions persist into childhood and are not simply a consequence of bio-mechanical and/or perceptual constraints.

Changing Faces: Resource Scarcity Biases Intergroup Allocation through Mental Representation of Group Members

Sara Bellin, Psychology

Sponsor: Professor David Amodio, Psychology and Neural Science

People typically give fewer resources to those outside their racial group when resources are scarce (e.g., during an economic recession). It remains unclear how this bias operates. In two experiments, we tested the hypothesis that resource scarcity amplifies intergroup bias by changing the way people conceptualize (or mentally represent) those of different races. In Experiment 1, we tested whether scarcity influences the distribution of resources to racial outgroup members using a novel scarcity manipulation and allocation task. Replicating previous research, white participants who believed resources were scarce allocated less money to black recipients if they possessed low internal motivation to respond without prejudice. In Experiment 2, we tested whether scarcity influenced mental representations using a reverse correlation task in which participants generated images of those mental representations. As predicted, white participants' mental representations under conditions of scarcity of black faces differed from those expressed in the abundant condition. Together, these findings highlight an implicit, yet powerful, mechanism through which discrimination against racial minorities may increase during times of economic scarcity.

How to Create Hope: Intergenerational Storytelling and Social Change in Post-Genocide Rwanda

Zoe Berman, Anthropology

Sponsor: Professor Noelle Stout, Anthropology

The youth of post-genocide Rwanda matured during a period characterized by dramatic sociopolitical changes, censorship, and globalization. Despite the resilience they demonstrate in their everyday lives, these youth are often cast as victims of their country's past. This thesis evaluates the ways in which "vulnerable" Rwandan youth targeted by an American non-governmental organization (NGO) promoting unity and trauma recovery changed their lives after having a special, facilitated discussion with an elder. Drawing on fieldwork conducted in Rwanda in 2011, I first contextualize the research setting, exploring Rwandan history and the current socio-political climate. I then examine how participants claim the program affected their lives, engaging anthropological theories on childhood to evaluate the ways in which the youth conceptualize adolescence and agency. The research reveals how youth used the knowledge and communication skills they gained from conversing

with their elder via the NGO to change the ways they perceived themselves within the society to fortify their understanding of Rwandan culture. My work offers critical, anthropological insights on humanitarian work and highlights the potential of Rwandan youth to re-invigorate and re-conceptualize notions of unity and culture in the post-genocide climate.

The Unbearable Whiteness of Being: Political Ideology Predicts Biased Categorization of Racially Ambiguous Faces

Leslie Berntsen, Psychology

Sponsor: Professor Jay Van Bavel, Psychology

For multiracial individuals, the consequences of racial categorization are especially significant, as an immense amount of social privilege can be extended to them—or not—based on a single judgment. In two experiments, we investigated whether political ideology can predict how people categorize racially ambiguous faces. In the first experiment, participants categorized a series of artificially morphed faces that ranged in racial ambiguity from one hundred percent black to one hundred percent white. As predicted, self-reported political was associated with the tendency to categorize ambiguous faces as black. This effect was present when faces were presented in color and grayscale. In the second experiment, we replicated the effect of conservatism on racial categorization using the same task as in the first experiment, with both upright and inverted faces displayed in grayscale. Additionally, faces were less likely to be categorized as black when they were inverted. Together these findings help us understand the circumstances under which multiracial individuals are categorized and thus subject to greater discrimination.

Representations of Intersex Animals, 1940-2009

Joseph Bishop-Boros, Social and Cultural Analysis

Sponsor: Professor Leyla Mei, Social and Cultural Analysis

Although scholars and activists have long analyzed scientists' portrayals of intersex humans, less attention has been paid to portrayals of intersex animals. In this thesis, I examine the extent to which intersex animal research reflects and reproduces sex norms. I utilized SPSS Text Analytics 2.0 and direct interrogation to conduct an analysis of articles published on intersex animals between 1940 and 2009 in *Science* and *The New York Times*. I found an enormous gap between the portrayals of hermaphroditic animals that can reproduce and those of sterile intersex animals, with the former being viewed as evolutionarily fit and the latter being viewed as defective. The negative portrayal of "non-functional" intersex

animals reflects the scientific community's—and the broader culture's—refusal to acknowledge the viability of bodies that stray from normative sexual development pathways. Neither the variety of species studied nor the representation of those animals changed significantly over time, indicating that dominant paradigms have not been drastically altered by social movements such as transgender liberation and intersex liberation.

Younger and Older Adults' Perception of Safe and Unsafe Motor Actions

Angela Char, Psychology; Cinema Studies

Sponsor: Professor Karen Adolph, Psychology and Neural Science

This study investigated whether younger and older adults differ in their ability to perceive safe and unsafe motor actions. College students and adults sixty years and older decided whether to walk through openings of different sizes: a doorway and a ledge. In the doorway condition, participants could squeeze to fit through narrow openings, but attempts to pass through impossibly small doorways resulted in entrapment. In the ledge condition, participants could turn and balance to cross narrow ledges, but attempts to walk along impossibly small ledges resulted in falling. Older adults were less accurate than younger adults at scaling attempts to their action possibilities. Older men, in particular, erred considerably by overestimating their bodies' abilities. These errors likely stem from decreased perceptual sensitivity, flawed knowledge of their abilities, or a combination of the two.

Nantucket Quakers and the Rise of Commercial Whaling

Eric Christodoulatos, Environmental Studies

Sponsor: Professor Tyler Volk, Biology and Environmental Studies

One of the great ironies of the early American whaling industry is that it prospered, in large part, at the hands of the pacifist New England Quakers. The Quakers were a fervently anti-war religious sect, yet they were the trailblazers of the whaling industry that blossomed in Nantucket and would be responsible for the drastic reduction of whale populations in all the oceans of the world. Through my research, I aim to shed light on this dichotomy. In doing so, I also touch upon issues of gender and race that were such an integral part of this industry. My study focuses on the analysis of primary sources, including diaries, journal accounts of sea voyages, histories of Nantucket written in the late 1800s, and numerous other types of documents preserved by the Nantucket Historical Association and the New Bedford Whaling Museum in New Bedford, Massachusetts, which has hundreds of

primary sources on Quakers and whaling. I also explore recent literature to determine how my research can enrich the discussion of early American whaling.

Wotome, the Woman Not Yet Visited: Wordplay, Poetics, and the Semiotics of Kanji

Colin Coltrera, Linguistics

Sponsor: Professor John Costello, Linguistics

The written word can be spoken of as its own discrete medium, but within the medium of writing there exist two easily discernible subtypes: phonographic and logographic, like the systems of the Sinosphere. This paper seeks to analyze, from a linguistic and semiotic standpoint, the influences and power of a logographic system. I selected the complex orthographic system of Japanese as the medium to study, as it is one of the only systems that uses a phonographic system fully capable of portraying the spoken language, in tandem with a logographic system. I attempt to expand upon Ferdinand de Saussure and Charles Sanders Peirce's conceptions of the "Sign" to account for the forms that logographs take, and then to highlight the ways in which logographs are utilized—especially in poetics and wordplay—in ways in which phonographs alone would be insufficient.

Assessing Implicit Adult Attachment Styles Using the Implicit Association Test

Caitlin Conroy, Psychology

Sponsor: Professor Patrick Shrout, Psychology

Humans have different ways of forming an attachment to romantic partners. These attachment styles are commonly measured using self-report questionnaires. Although self-reports are convenient, they do not access the unconscious, inaccessible, and more implicit processes of attachment. Understanding these automatic responses may provide better predictions about how people behave in relationships. Here, we developed two new measures specifically designed to assess implicit adult attachment patterns using the Implicit Association Test (IAT) model. Over two experiments, we determined if these new IATs are reliable measures of adult attachment and if they relate to explicit self-reports. We further examined if these attachment IATs had concurrent validity, specifically in relation to levels of self-esteem, rejection sensitivity, relationship duration, number, and satisfaction. We administered the IATs and two self-reports to undergraduates using a cross-sectional design, in which participants were tested in one session (Experiment 1), and using a two-point design, where participants were tested twice over two sessions (Experiment 2). Psychometric analysis indicated that the attachment IATs were reliable both within one administration and across

two separate administrations. We found weak correlations between our explicit self-reports and implicit IAT measures. These IATs have the potential to resolve self-presentation bias concerns that arise from self-reports, and to provide a richer understanding of adult attachment.

The Effect of Peer Wellness Services within the Housing First Model of Addressing Homelessness on Symptom Severity

Kristen Courtney, Psychology

Sponsors: Dr. Sam Tsemberis, Pathways to Housing

For this study, we examined a Peer Wellness Program (PWP) in the context of the Housing First Model of addressing homelessness. The Housing First Model provides housing and services to the chronically homeless with psychiatric disabilities and substance abuse problems, and the PWP employs individuals who have already succeeded in the Housing First Model to aid current recipients of services in the recovery process. Hypotheses are that symptom severity, as measured by the Modified Colorado Symptom Index (MCSI) will be negatively and significantly associated with time spent in the PWP, and that this relationship will be strongest for those whose involvement in the PWP is intense. I will also examine whether symptom severity decreases differentially depending on psychiatric diagnosis. Although the PWP has not reached full enrollment for the larger study, the present study compares groups on changes in mean scores on the MCSI for the participants who have completed the baseline and six-month interviews. This study could provide support for the efficacy of peer wellness services in the Housing First Model to aid consumers in the recovery process.

Attachment Style as a Moderator of the Dual Effects of Receiving Support

Charlotte Cunningham, Psychology

Sponsor: Professor Patrick Shrout, Psychology

During times of stress people often desire social support. Social support has multiple psychological and physical benefits in the long run; enacted support can also be associated, however, with increased daily anxiety during times of stress. Most individuals experience these costs and benefits simultaneously; but individual differences have not been extensively studied. This study proposes that attachment style moderates the dual effects of receiving support. Specifically, we hypothesized that, following emotional support, anxious attachment will be associated with increased anxiety and increased closeness, while avoidant attachment will be associated with increased anxiety and decreased closeness. We conducted a multilevel analysis on an existing data set from a daily

diary study of couples, in which one partner was preparing to take the bar exam. After replicating the individual differences in costs and benefits of support, we found that the negative outcomes were not explained by attachment style. Similarly, avoidant attachment did not account for or predict closeness outcomes. Anxious attachment, however, was associated with an increased closeness on support days as opposed to days without social support. These results suggest that anxious individuals experience benefits of emotional support without the cost of increased anxiety.

Slanting Views: How Personal Experiences Relate to Perceptions of Bias in the Media

Dina Davis, Sociology; Journalism

Sponsor: Professor Ruth Horowitz, Sociology

This research examines how the amount of bias a person perceives in the news is related to factors in their personal backgrounds, political views, and news consumption habits. Thirty students were interviewed, half from New York University and half from the City University of New York. Within each school, five Democrats, five Republicans, and five Independents were selected. The interviews involved three sections: biographical information, questions about news consumption and political views, and a discussion surrounding bias in six newspaper articles. The subjects did not know which publications the articles came from. This study showed that everybody believed that there is at least some bias in the media, but their answers varied in the amount they perceived. The first group believed the media had a slight liberal bias but were accepting of that because they think people are inherently left leaning. The second group thought the media was very liberally biased. They were mostly conservatives who would like publications to announce their political leanings. The third group saw the media as extremely biased, and as using publications to push agendas.

Charter School Management in New York City: An Intra-Charter Comparison

Elizabeth DeBold, Politics

Sponsor: Professor Nathaniel Beck, Politics

Charter schools represent one of the fastest growing forms of school choice today. Recently, non-profit and for-profit educational management companies have been brought in by charter holders to run their schools on a daily basis. The introduction of these outside companies has added to the controversy over charter programs, raising questions as to whether a profit enterprise can be more effective at boosting student success. This study addresses those debates by looking at the New York City charter network, comparing pupils enrolled in schools either

independently managed or operated by a non-profit or for-profit company. Using statewide testing data as a measure of performance, I explore whether the private sector can have a positive effect on the academic growth of charter students. Using one-variable regressions examining the association of profit, I found that some test scores can be higher in charter schools with non-profit management. When other confounding influences are introduced, however, achievement gains are difficult to discern. The evidence does not indicate that charter management and profit motivations have a significant effect on charter student performance.

The Revolving Door: Growing Up Gay and Latino, A Lens into a Past and a Present

Mahalet Dejene, Journalism; Spanish

Sponsors: Professor James Fernandez, Spanish and Portuguese, and Professor Jason Samuels, Journalism

In traditionally patriarchal cultures, characterizations of masculinity and the onerous and limited description of gender roles feed into the social construction of homosexuality as an identity that is morally corrupt. In this thesis, I examine the culturally constructed and socially maintained aspects of homosexuality, the roles of religion and government in certain Latin American countries, the overly precise stereotypes of masculinity, and the processes of ethnic and sexual identity formation to contextualize why being Latino and gay was such a difficult dual identity to accept in Latino communities in the United States. I use first-hand accounts of two currently gay-identifying individuals to explore the navigation of being gay and Latino, and how these conflicts have changed over the years.

“What’s With All the Cans?” Exploring How American Preppers Manage Concealed Identities

Jonathan DeYoung, Sociology

Sponsor: Professor Ruth Horowitz, Sociology

In the past several years, many Americans are increasingly classifying themselves as “preppers.” Preppers are individuals who actively prepare to be able to survive any potential disaster or catastrophe. Most preppers keep their identities hidden from non-preppers in social situations, although there are circumstances in which they choose to reveal certain aspects. This paper explores the ways in which preppers manage these concealed identities and how they deal with their discovery. I find that: 1) preppers conceal their identities for fear of becoming a target during a disaster and for fear of stigmatization; 2) they develop strategies for discussing “prepping” with others without fully revealing their identities; 3) when preppers face stigma from non-preppers, they reject the stigma and

rationalize their actions by distinguishing themselves as having more common sense than non-preppers; and 4) the Internet facilitates an environment in which preppers can create online identities and form communities, while still maintaining concealed personal identities.

Self-Directed Information Selection for the Learning of Logical Rules

Devin Domingo, Psychology

Sponsors: Professor Todd Gureckis, Psychology

In self-directed learning tasks, participants control the sequencing and timing of information presentation. Passive learning tasks, in contrast, are those where the learner does not get to make independent decisions about what to learn. The majority of research in category learning has emphasized passive learning. In the present study, participants learned by actively querying the category membership of individual exemplars in an array or by passively viewing examples. Results showed that participants who chose which items to query learned faster than those learning from experimenter-controlled passive sequencing. The benefits of self-directed learning were mostly uniform, and did not vary as a function of the category structure. The results suggest that different ways of interacting with learning materials can alter the difficulty of learning problems.

Food Riots, Protests, and Political Survival: The Effect of Food Prices on Anti-Government Demonstration and Riots

Gheanna Emelia, International Relations

Sponsor: Professor Alastair Smith, Politics

Many have speculated that food price volatility in 2007 and 2008 caused approximately twenty anti-government demonstrations and riots across the world. In the face of overpopulation, climate change, non-arable land, and famine, will this need to protest food prices only increase? Despite the plausibility of these arguments, this study finds that there is in fact no evidence that food prices have an effect on collective action and protest. By running three fixed effects time series regression models, this study demonstrates the lack of systematic evidence for any effect food prices have on protest.

Two Paths, One Road: Educational Environments Created by Immigrant and American-born Parents

Talia Ergas, Sociology

Sponsor: Professor Ruth Horowitz, Sociology

Two important trends in our country are the rising importance of higher education and the continuing influx of immigrants to American soil. Because the American higher education system is unique, and because our

country continues to be inhabited by a growing number of people who are most likely to be unfamiliar with it, it is important to study the interplay and impacts of these two factors. In this study, I examine the educational environment created in the home by immigrant and American-born parents, and how these environments have shaped the way first- and second-generation students function and approach their academic careers with the ultimate goal of a university degree. I conducted twenty in-depth interviews with private and public university students, in which first- and second-generation students were equally represented. My research shows that immigrant parents create environments that are more structured and use repetitive rhetoric to drive their children towards the highest academic achievements, whereas American-born parents tend to foster freer environments for their children. They use a more hands-off approach to teach their children independence, encouraging them towards success on the path that brings them the most happiness. The students' levels of success do not vary based on their first- or second-generation status, but rather depend on how they define success and how independent they feel.

Tweaking Therapy: Communicating Abstractly Reduces Rumination

Michael Feder, Psychology

Sponsor: Professor Yaacov Trope, Psychology

Can the way in which a person communicates a sad memory affect how sad that person comes to feel? Past research has indicated that linguistic cues and communication format can independently affect whether people think in generalized, abstract terms, and whether or not they are aware of these forms of communication. Test subjects were asked to write and then draw a sad memory after hearing a narrative with certain verbal cues. I expected to find that, when asked to share a sad memory, participants who wrote about the event would conceptualize the event most abstractly, preventing them from ruminating about the memory and feeling sad. What we found was that participants who *drew* their sad memory reported feeling least sad. It seems that drawing can induce abstract thought. These results indicate that abstract thought may minimize the attention given to the salient details of negative events, in turn preventing negative thoughts from overwhelming the mind. These findings highlight the therapeutic value of subtle communication tools, and that the way one communicates a personal memory actually affects how that person represents and responds to the memory.

From Interest to Institution: Pathways to Interdisciplinarity in the Social Sciences

Thomas Geib, Sociology

Sponsor: Professor Ruth Horowitz, Sociology

Research institutions across the country are supporting initiatives to encourage interdisciplinary work in ever-increasing numbers. Few of these initiatives have examined the motivation to do interdisciplinary research. In other words, how does a researcher entering one or another field of study end up doing interdisciplinary work, as opposed to work within the bounds of a traditional academic discipline? This study seeks to answer that question as it pertains to the contemporary social sciences, in the hopes of not only discovering how social scientists enter into interdisciplinary work and shedding light on a relatively uncharted area in the sociology of science, but also providing an understanding of what makes an interdisciplinary project a success or not.

The Global Spread of Domestic Violence Legislation: Causes and Effects

Nisha Giridhar, International Relations

Sponsor: Professor Alastair Smith, Politics

Between fifteen and seventy-one percent of women will experience domestic violence in their lives, depending on which region of the world they live in. Although government legislation is considered important to combat this widespread problem, there has been little research on what motivates a government to act and the actual effects of legislation. This study analyzes the circumstances under which a nation passes domestic violence legislation and the effects of legislation once it is passed. The results suggest that democracies, particularly wealthy democracies, are the most likely to pass domestic violence legislation. A case study of Malawi indicates that legislation—even when unimplemented—can have a tangible, positive effect by changing people's attitudes on domestic violence.

Women in Struggle: A Study of Organized Maquila Workers in El Salvador

Hilary Goodfriend, Latin American Studies

Sponsor: Professor Mary Louise Pratt, Social and Cultural Analysis and Spanish and Portuguese

This paper is a study of the organized workers of the Hermosa Manufacturing apparel *maquila*, or assembly factory, and their struggle for labor rights and redress over the course of a decade in El Salvador. My work is based on interviews and research conducted in El Salvador and from the U.S. By the time of the factory closure in 2005, the workers, predominantly women, had experienced years of deteriorating work conditions. Their employer began withholding wages and benefits and pocketed the

healthcare, pension, and housing quotas deducted from their paychecks, excluding them from vital state healthcare and causing some to lose their homes. The workers' struggle sits at the intersection of neoliberal economic policy, globalized production and activism, a politicized postwar civil society, wartime international solidarity relationships, and centuries of a deep-seated patriarchy. They have sought justice through engagement with the state as individuals and associates, through international labor and human rights organizations, with brands and their licensers, and through collaboration with national women's, labor, and human rights NGOs. Examining the range of practices that the workers have employed, the role of gender in their strategies and discourses, and the evaluations and definitions of success according to the various actors, I seek to identify the possibilities for organized labor in this brutal context.

Judgment and Impression Formation from Stereotypical and Non-Stereotypical Information

Emily Green, Psychology

Sponsor: Professor Uleman, Psychology

We all stereotype, but the degree to which we stereotype is difficult to measure. In self-reports measuring stereotypes, people may be unwilling to respond truthfully or may be unaware of their own stereotyping behaviors. This study employed a memory task to detect stereotype activation implicitly. We tested the differences in stereotype activation between high- and- low prejudiced individuals. Participants were exposed to phrases that implied stereotypes about African Americans, and then were asked to recall the phrases they read. Over successive trials, we saw a decline in memory as a result of proactive interference, a memory phenomenon that occurs when previously learned information interferes with the ability to learn new items in the same category.

Career-Switch Resultant Mismatch and the U.S. Labor Market

Victoria Gregory, Economics; Mathematics

Sponsor: Dr. Giorgio Topa, Federal Reserve Bank of New York

The focus of this paper is on the labor market friction known as mismatch, the situation in which the characteristics of workers demanded by employers do not match those possessed by workers. In this paper, I derive a new measure of labor market mismatch that takes into account how workers transition between careers. Specifically, I define a sector-by-sector matching technology, and use transition matrices that are formed by computing net flows between careers. I then solve for an optimal allocation of workers across careers, which serves as

a benchmark against which I determine the amount of mismatch present. The aggregate matching function is then estimated, using this measure of mismatch, along with aggregated U.S. micro data on new hires, job vacancies, and job seekers. Then, I use this estimated matching function to compute what the job-finding rate and matching efficiency would be without mismatch. My approach is unique because it allows me to determine how workers are transitioning between occupations, and whether their transitions alleviate or exacerbate the problem of mismatch.

Immigration and Conservatism: A Case Study of the Presidential Rhetoric of George W. Bush

Barrie Grinberg, Social and Cultural Analysis

Sponsor: Professor Cristina Beltrán, Social and Cultural Analysis

To understand the possibility of pro-immigrant legislation being passed in the current conservative climate of the United States, I perform an analysis of George W. Bush's speeches during his presidency and his campaign to pass liberal immigration reform. Situating his futile attempt at immigration reform in the long history of the relationship between the U.S. and Mexico, its subsequent contradictory immigration policies, the factionalized condition of the Republican Party, and the way the Mexican immigrant has been conceived in American society, I argue that these histories, each abundant with contradictions, set Bush's immigration policy up to fail. To comprehend how these complex histories operate as a force against immigration reform, I analyze how they interact with his rhetoric on immigration and related issues, and inevitably force him to perpetuate anti-immigrant sentiment in American discourse. I conclude by suggesting that the best hope for pro-immigrant reform is to reconceptualize the understanding of Mexican immigration as the movement of humans with agency. I advise that in the short term, the most politically viable option is a grant of legalization to all undocumented immigrants with an emphasis on the role of U.S. immigration policy in creating the current Mexican immigration crisis.

Another Sign, Another Beauty

Vanessa Gubbins, Comparative Literature, Joyce Lainé, Physics, Massiel Sepúlveda, Politics, and Emily Peder-son, School of Individualized Study

Sponsor: Professor Jacques Lezra, Spanish and Portuguese, and Comparative Literature

"Another Sign, Another Beauty" is a project of collective translation that explores the possibilities and limitations of translation through the work of the Granadian poet Antonio Carvajal. The project is a journey into the

intricacies of poetic translation that entailed not only the translation of words, but that of cultures and worlds as well. The NYU team traveled to Granada, Spain, in May 2011 for a week-long translation session with students from the University of Granada, where we translated twelve of Carvajal's poems from Spanish to English. Together, we navigated terrains of sound, grammar, and meaning. We searched for words and sentence constructions that would convey the sentiment of Carvajal's words while preserving the poetry's rhythm. The culmination of our work was the anthology—also titled “Another Sign, Another Beauty”—which represents our venture into the relationship among words, meaning, and cultures.

Examining the Effects of Goal Projection in Dyadic Negotiations

Sharyu Hanmantgad, Psychology

Sponsor: Professor Gabriele Oettingen, Psychology

Goal projection is the unconscious assumption that another person shares one's personal goals. As common goals in a competitive context lead to higher distrust, increased competitive interaction, and enhanced conflict, we hypothesized and observed that projection of competitive goals also produces such interpersonal interactions in a negotiation paradigm. We found that participants who were told their negotiation partner also has competitive goals (same goal condition) or participants who *projected* their competitive goals (goal projection condition) onto their negotiation partner, won the negotiation more than those who were told their partners have a goal to enjoy the interaction (different goal condition). We looked at self-reports on feelings of satisfaction with the negotiation, trust for the negotiation partner, and enjoyment with the negotiation as well. Results have implications for the effects of goal projection and widen the scope of projection in general.

Afghan Cultural Identity in the Diaspora in Queens

Sophia Hameed, Anthropology

Sponsors: Professor Aisha Khan, Anthropology

This thesis examines how first-generation Afghan women negotiate questions of cultural identity in the diaspora in Queens, New York. Cultural identity is a salient issue in the Afghan diaspora, as immigrants must decide to what extent they should maintain their native customs, norms, and worldviews in the process of adapting to their new host country. Anthropologists frequently adopt a postcolonial framework to study diasporic identity, positing identity as constantly transforming and diasporas as transnational, collective entities. The thesis refines this postcolonial paradigm through ethnographic study of an ethnically and regionally heterogeneous Afghan group.

This research demonstrates that Afghan identity is rooted in Afghan cultural values, as multi-generation Afghan women become a single diasporic generation through common identification with specific Afghan cultural practices and conceptions of identity. Conversely, the data elucidates the existence of multiple identifications within the umbrella of an Afghan identity, disproving that the Afghan diaspora is homogenous. The thesis also analyzes how Afghan women perceive their identity in the diaspora, finding that although first-generation women feel more empowered, they reify their culturally prescribed female identity by internalizing Afghan gender expectations and norms.

The Future of Nature: A Reconciliation between Philosophy and Psychology for a Renewed Approach to Environmental Preservation

Bekah Holloway, Environmental Studies

Sponsor: Professor Benjamin Sachs, Environmental Studies and Bioethics

My research project focuses on the relationship between people and nature, specifically on three questions: What is “authentic” nature? Why do we value it? Why should we preserve it? I take a multi-disciplinary approach to these questions, integrating philosophical theories with psychological studies. My research draws heavily on, but is not limited to, the work of psychologists Rachel and Stephan Kaplan and philosopher Kate Soper. The results show considerable overlap between the two disciplines; in particular, they show that philosophical theories can, at least in part, be supported by psychological evidence. I conclude that there is scientific support for the philosophical view that the value of the environment cannot be captured fully within an economic or physiological framework. Furthermore, the psychological evidence and philosophical arguments support the conclusion that we have an obligation to preserve nature for future generations.

Narrative Analysis of the Role of Shared Perspective in Peer Wellness

Sophia House, Economics

Sponsor: Professor Bambi Schieffelin, Anthropology

Peer wellness specialists are individuals that have had experiences with mental illness, homelessness, or other social and psychological challenges, and who have demonstrated resilience in their own recovery. They then undergo training to provide wellness services to others. Much of the success of the peer wellness model has been attributed to the role that “shared experience,” or common background, plays in facilitating peer-consumer interactions. In this study, I draw from interviews with seven

peers at a non-profit housing organization in New York City. I analyze narratives in which peers credit shared experience with helping them to succeed in their roles. The evidence from my research suggests that shared experience does indeed play a critical role in the peer wellness model, yet is rarely the subject of direct discussion between peers and consumers. I reconcile this paradox by arguing that the importance of shared experience lies in the development of “shared perspective,” through which peers draw insight from their own experiences as recipients of mental health services. This insight shapes peers’ behavior as providers and renders them empathetic to consumers. The findings from this study argue against a reductionist “matchmaking” approach to the implementation of peer wellness programs that would pair peers with consumers on the basis of similar background.

Labels Interfere with Distributional Category Learning

Carol Jew, Psychology

Sponsor: Professor Todd Gureckis, Psychology

Studies of human category learning have primarily relied on two experimental paradigms: supervised learning and unsupervised learning. Recent research has begun to investigate the possibility that most learning is a combination of the two by using semi-supervised learning paradigms, which incorporate aspects of both supervised and unsupervised learning. Prior studies utilizing such a design have found mixed results in how well people are able to integrate these two streams of information. Our study seeks to further explore this topic via a category learning task to help investigate what types of strategies people formulate when presented with labeled and unlabeled items that suggest alternative organizations of categories. We expected to find that people successfully integrate information provided by both types of items, as demonstrated by their categorization strategy. Contrary to our hypothesis, unlabeled items in the learning phase of the semi-supervised conditions did not appear to influence participants’ categorization behavior during the test phase.

Getting Tough on Juvenile Justice: A Push for the Therapeutic Model

Evan Johnson, Film and Television, Tisch School of the Arts

Sponsor: Dr. Andrea McKenzie, Expository Writing

The majority of juvenile detention centers in the United States usually fulfill two basic duties: ensuring that young people appear at court hearings, and that they do not commit another offense before trial. Only a handful work to ameliorate the lives of the youth in their care. This minority offers alternatives to the typical punitive

structure. In this paper, I compare these therapeutic models to the widespread institutional model, and determine why America’s detention centers have yet to adopt the new reformative mindset. I analyze a specific center, the Florida Parish Juvenile Detention Center (FPJDC) of Southeast Louisiana, to explain the therapeutic model and its effectiveness. Interviews with administrative staff at FPJDC as well as professionals in the field reveal three reasons the therapeutic model has not yet been widely adopted: ignorance, fear of change, and economics.

Discourses of Family and Kinship in General Biology Textbooks

Lee Helen Johnson, Social and Cultural Analysis

Sponsor: Professor Crystal Parikh, English and Social and Cultural Analysis

Because textbooks have become integral to biology education throughout the United States, they act as both cultural texts and sources of academic knowledge. The use of these textbooks is predicated on the agreement that the content and descriptive language within them is accurate and constructive in the teaching of biology. Despite epistemological techniques to claim objectivity, however, biology textbooks are inevitably influenced by the structures of production that create them, hegemonic understandings of science as a field, as well as the social and cultural implications of explaining certain biological processes using discourses of family and kinship. For this study, I looked at commonly used high school and college biology textbooks in the United States as primary sources for textual analysis. As a way of examining how ideologies of family and kinship are used to teach biology, I examined references to family and kinship such as the use of terms like “parent cell” or constructions of family to explain pedigrees. I argue that biology textbooks are reflective of larger social and cultural structures of family within the United States.

Children’s Categorization: Reasoning Causally from Observable Features to Internal Processes

Cassandra Jolicoeur, Psychology

Sponsors: Professors Marjorie Rhodes and Robert Rehder, Psychology

Do children use causal reasoning as a classification strategy? Adults reason causally whenever they make an inference from an observable feature (e.g., sneezing, coughing) to an internal cause (e.g., common cold virus). This study examined whether children can do the same. In the present research, children were told new information that would cause them to be uncertain about information they learned earlier, a phenomenon known as discounting. Children learned about a new target feature

of a familiar kind of animal (e.g., giraffes have purple tongues). They were then presented with a description of an animal that included one feature and one behavior and asked whether that animal was a member of the familiar kind. The feature was either the same as (match trials) or different from (nonmatch trials) the target feature. On match/non-discounted trials, the behavior was irrelevant to establishing category membership (e.g., saw a flower today). On match/discounted trials, the behavior provided an alternative explanation for why the animal possessed that feature (e.g., the behavior “ate a purple popsicle” provides an explanation for why an animal might have a purple tongue). If children discount, they should be less willing to classify the animal as a member of the category on match/discounted trials. Children’s classification judgments did not differ across trial types. These results indicate that children may not make inferences from observable properties to internal causal processes.

The Effect of Early Experience on Adult Auditory Perception

Ramanjot Kang, Psychology

Sponsor: Professor Dan Sanes, Neural Science and Biology

Sensory experience during early development can shape the central nervous system and alter adult perceptual skills. Support for this idea comes from experimental manipulations, such as chronic exposure or sensory deprivation, which demonstrate that central nervous system function and behavior can be changed. For example, developmental hearing loss can interfere with the acquisition of normal auditory perceptual skills and communication abilities in humans. Here, we asked whether a brief period of supplemental sensory experience during development could rescue the perceptual deficits associated with developmental hearing loss. Juvenile gerbils, reared with normal hearing or developmental hearing loss, were briefly trained on a behavioral task to detect frequency modulation, and then were retested as adults. Using signal detection theory, we compared the depth detection thresholds for animals that received training as juveniles with those that were untrained. Our results reveal that juvenile training enhances adult performance and that in animals reared with developmental hearing loss, juvenile training rescues perceptual deficits. These results suggest that although the developing central nervous system is vulnerable to the loss of experience, it is also accessible to supplemental experiences such as perceptual learning.

The Effects of Positive Fantasies Depend on Task Complexity

Hannah Katz, Psychology

Sponsor: Professor Gabrielle Oettingen, Psychology

Positive fantasies lead people to think about the future in a way that omits images of obstacles. Whereas previous research found that generating positive fantasies about the future predicts less success and lower effort across many life domains, we examined the effect of task complexity on positive fantasies. The present experiment isolates task complexity (specifically, decision complexity), manipulated by varying the number of alternatives and the number of attributes per alternative, as moderating the effects of positive fantasies. Positive fantasies resulted in lower effort on complex tasks than questioning fantasies or a no-fantasy control condition. Additionally, results indicate that positive fantasies lead to an anticipatory failure, which causes people to be unprepared to invest sufficient effort later on.

Mind-Body Interactions: The Link between Motivation of Goal Pursuit and Self-Assessment Manikin (SAM)

Natalia Kecala, Psychology and English

Sponsor: Professor Gabriele Oettingen, Psychology

Previous research on motivation and goal setting has shown that the technique of mental contrasting provides an individual with strong motivation to pursue a goal. In the current study, researchers wished to determine if the technique had a similarly positive effect on emotions involved in goal-setting. Undergraduate volunteers were assigned to mental contrasting or to a control group and asked to think through an interpersonal problem. Each was led through guided imagery for an hour (according to assigned group) and asked to report feelings of pleasure and strength on a nine-point Self-Assessment Manikin (SAM), a measure that has been proven effective in understanding the constructs of pleasure, dominance, and arousal. Participants were measured throughout the experiment for levels of respiratory sinus arrhythmia (RSA), a measure of parasympathetic nervous system activation linked to feelings of calmness and composure. We expect those in the mental contrasting group to exhibit higher RSA levels and to report significantly higher feelings of pleasure and dominance than those in the indulging (control) group.

The Personality Mechanisms of Achievement: Self-Completion and the Type A Personality

Kristine Kelly, Psychology

Sponsors: Professors Peter Gollwitzer and Gabriele Oettingen, Psychology

The present study examines the potential mechanisms that give rise to achievement orientation in individuals. The achievement-orientated person is characterized here as exhibiting high ambition, goal setting and maintenance, persistence, and consistently high drive to achieve goals. The Type A personality holds these characteristics as definitional. The present study connects self-completion theory and goal-regulation literature as a description of the cognitive pattern that is present in Type A individuals, and directs the production of certain characteristic cognitions and behaviors, such as those consistent with high achievement orientation. Through manipulation of cognitive behavioral response style available to participants during distress-reduction efforts following experienced negative feedback, it is observed that Type A participants are better able to resolve resultant psychological distress when able to engage in a response style pattern consistent with self-completion. The Type A's ability to resolve or reduce psychological distress is weakened when the style available is incongruent to the characteristic underlying the individual's degree of Type A personality characterization.

Has Stressed "Been" Been Changing?

Donna Kiessling, Linguistics

Sponsor: Professor Renee Blake, Linguistics and Social and Cultural Analysis

Mood marking in language is the unique process of conveying a speaker's attitude through the use of sentence structure. Until recently, mood marking has not been thoroughly researched. In African American English (AAE) the word "come" ("He come making a mess") is considered a mood marker because it automatically conveys to a listener that the speaker is displeased. Another word that possesses the qualities of a mood marker in AAE is stressed "been" ("He BEEN done that"). This claim has not been supported by any data from native speakers of AAE, and my research seeks to test the claim that stressed "been" is a mood marker using native speaker judgments. Ten test sentences were constructed and a survey given to a group of fourteen self-identified native speakers of AAE. The data show that the use of stressed "been" in sentences has actually changed over time, because the use of the word varies according to the age of the speaker. The implications of this research provide insight into how AAE changes, and can also provide better means of educating children who speak this dialect.

Representation and Transfer of Motor Variance: Decision-Making in a Novel Visuo-Motor Task

Mila Kirstie Kulsa, Psychology

Sponsor: Professor Laurence Maloney, Psychology and Neural Science

This study investigated whether people could anticipate their individual motor errors and optimize their decisions based on their motor variances (the distributions of errors resulting from movements) in a novel situation. If people become skilled in a particular visuo-motor task and are placed in an unfamiliar condition, could they apply their prior experience and adjust their movements to a new, but related, task? Participants first practiced tossing beanbags at fixed targets presented on a touch screen from a given angle and distance in relation to the screen. Participants then saw pairs of targets differing in shape and size and chose which targets they were more likely to hit. Results revealed that most participants' target choices deviated from those predicted from their true motor variances. Participants did not demonstrate accurate representations of their own motor errors: they were insensitive to the shapes and orientations of their motor error distributions. Half of the participants succeeded in transferring their motor knowledge to adapt their motor variance to the unpracticed visuo-motor task.

Factors Influencing Asylum Approvals

Maria Fernanda Lancheros, International Relations

Sponsor: Professor Alastair Smith, Politics

Thousands of people abandon their homelands in search of refuge in other countries, hoping to begin a life free from fear and persecution. These people seek asylum and want to be identified as refugees. Asylum seekers can only be recognized as refugees once their claims are evaluated while they are in the host country. Although it should be the merits of the individual claims that influence the decisions of whether asylum cases are granted or not, past research has shown that factors not pertaining to those claims have influenced asylum approvals. This research, through regression analysis, investigated the effects of unemployment, government ideology, and elections in the host countries on the number of asylum cases approved per year. The findings indicate that as unemployment increases, fewer asylum cases are approved. Neither higher unemployment rates during an election year, nor government ideologies, appear to have an effect on the number of asylum cases approvals.

Are Yearly Physicals an Optimal Means of Delivering Preventive Services?

Ibukunoluwa Lawal, Biochemistry

Sponsors: Dr. Andrea McKenzie, Expository Writing

The American Medical Association, the United States Preventative Services Task Force (USPSTF), and the Canadian Task Force (CTF) recommend against annual physicals because many of the procedures performed during annual physicals are inefficient. Of the seventeen procedures assessed by the USPSTF, only four are recommended. As a result, USPSTF and CTF recommend what they call “selective testing,” a preventive service tailored to each individual’s risk based on age, gender, health condition, and other factors. I examined research about preventive services and found that many non-medical factors are involved, such as health insurance, cost, patient-physician relationship, and patient opinion of the varying test schedules. Therefore, I concluded that annual physicals currently remain the optimal means of delivering preventive services. More research is needed to determine the effect of selective testing on patients, based on these results. Until these factors are addressed, the value of selective testing cannot be fully assessed.

Bayesian Updating of Beliefs about Future Performance in a Simple Motor Task

Shoshana Leftin, Psychology

Sponsor: Professor Laurence Maloney, Psychology and Neural Science

The decision to embark on a motor task should follow evaluation of an individual’s probability of success; a climber would not want to discover that a rock is not climbable while already on the rock. After practice, humans are implicitly aware of their abilities to succeed on simple motor tasks, but little is known about how observing one’s own successes and failures leads to such estimates. We examined how participants update beliefs about their own motor performance explicitly on a simple motor task. Participants were instructed to hit a small target using their index finger within a short time limit over a series of one hundred trials. Prior to each trial, participants estimated their probability of success. Feedback about the outcome of each target-hitting attempt was given immediately after each attempt. We compared participants’ probability reports to that of an ideal Bayesian observer. We found that participants’ estimates converge with the Bayesian model when we allow them to distort probabilities, and that participants show s-shaped probability distortion functions. We estimated participants’ beliefs about their motor performance prior to the experiment and found them to be lower than their actual abilities. We tested for deviations from Bayesian

updating (besides probability distortion), in particular whether (1) evidence is over- or underweighted, (2) hits and misses are weighted asymmetrically, and (3) the Markov property is violated. We found that participants overestimate evidence, weight hits and misses symmetrically, and violate the Markov property. We speculate that these deviations may be beneficial human adaptations.

Crawling in Children and Adults

Shoshana Leftin, Psychology

Sponsor: Professor Karen Adolph, Psychology and Neural Science

Researchers know little about quadrupedal gait in humans—crawling on all fours—beyond the infancy period. Crawling poses a unique challenge for older children and adults because the skill is typically unpracticed; moreover, their larger body size and different body proportions alter the biomechanical constraints on locomotion. We observed eleven- to twelve-year-old children crawling on hands/knees and hands/feet over a 4.9-m walkway. The timing and placement of each limb movement was identified from video. Children used an astonishing variety of quadrupedal gait patterns, including some previously observed only in other species—such as galloping and practically flying with only one hand on the ground. I examined both qualitative (patterns of inter-limb coordination and gait) and quantitative measures (swing and support times for each limb) and examine how gait patterns and the timing of steps are affected by body dimensions and crawling speed. I will also present timing and gait pattern data from a group of recently discovered Turkish adults whose primary form of locomotion was crawling on all fours. Comparing gait patterns in highly practiced adult crawlers to those of children will help us understand the role of experience and body size in the coordination of locomotion.

Lives Worth Living, Lives Worth Killing: Disability in an Age of National Security, War, and Biomedicine

Tovah Leibowitz, Social and Cultural Analysis

Sponsor: Professor Gayatri Gopinath, Social and Cultural Analysis and Asian/Pacific/American Studies

In this study, I examine the process by which disability gets written into the logic of post-9/11 U.S. foreign policy and the War on Terror. By recognizing the U.S. national security apparatus as a vital site for disability critique, I propose that shifting medical and military paradigms now deployed in the War on Terror enable the incorporation of American disabled subjects into national and neoimperial projects. Simultaneously, however, the same ableist logics previously used to segregate and exterminate that population are now deployed to wage

war against a newly “crippled” population, namely, Middle Eastern “terrorists” who are formulated as having psychological and cognitive abnormalities; terrorists become “crips” who cannot be incorporated and must therefore be eliminated. More specifically, I examine the process by which disabled subjects in the U.S. are first constituted as threats to the nation and its global projects in the nineteenth century only to be later incorporated within a U.S. national defense system that guards against the threat of foreign “mutant bodies” in the twenty-first.

Parenting at Play: Adult Interactions in Playgrounds

Peixin Lin, Sociology

Sponsor: Professor Ruth Horowitz, Sociology

Theorists traditionally associate urban life with increased social isolation. Public spaces are thus seen by urban planners as especially important in facilitating sociability. My research examines adult interactions and the formation of social ties in playgrounds around New York City. How adults interact depends on how they perceive the neighborhood, and how ordered segmentation holds within the neighborhood. In areas where residents view other residents as untrustworthy, and where ordered segmentation does not hold to keep the perceived “dangerous elements” out of playgrounds, parents do not often use playgrounds, and when they do, they are cautious toward others. In “safe”, i.e. middle-class, areas, parents are more open to interacting with each other, but social ties rarely extend outside of the playground unless there are other ties between parents. This research also elucidates the idea of “doing parenting”—parenting behaviors performed for self-presentation governed by “parenting rules.” This research was based on observations and informal interviews with caregivers in five neighborhoods.

The Construction of Singapore’s National Identity through Museum-Going

Peixin Lin, Sociology

Sponsor: Professor Thomas Ertman, Sociology

Singapore as a nation-state only came into existence in 1965, but it was a city of immigrants who had histories that long predated Singapore itself. The state had to construct a national identity independent of history, ethnicity, and religion. Post-independence, the National Museum of Singapore changed its focus from natural history to forging a national identity. Combining primary and secondary research, I describe the mechanisms of identity formation through museum-going, comparing what is intended and how visitors really experienced the museum. Through interviews, I suggest that while Singaporeans are able to see what and how the museum hopes to achieve its identity-formation goal, they do not find it effective, but

could imagine it being effective on others. This is consistent with the idea that Singaporeans are apt at understanding the rationality behind state actions that they do not necessarily accept or are convinced of at the individual level.

Comparative Study of the Position and Scaling of the Occipital Condyles in Anthropoid Primates

Ellis Locke, Anthropology

Sponsor: Professor Terry Harrison, Anthropology

Previous research has shown that the position of the occipital condyles in primates shifts as a result of changes in the proportions of the face and brain case during growth and development. While a relatively anterior position of the condyles and foramen magnum has long been considered an indicator of bipedality, change in condyle position may be associated with adaptations of the cranium that are not necessarily functionally and behaviorally linked to upright posture. As humans evolved specialized cranial proportions associated with brain size expansion and facial reduction, repositioning of the head-neck articulation was required to maintain the integrity of head carriage. This comparative study documents the relative size and position of the occipital condyles in extant anthropoid primates to investigate the scaling relationships between body size, cranial proportions, and head carriage, as well as the functional relationships of the atlanto-occipital joint (AOJ). The results show that condyle surface area is highly correlated with body mass, and more influenced by allometric scaling than biomechanical or postural variation. The response of the cranial base to facial and cranial growth influences the position of the AOJ. Among primates there is a slight trend for shifting the AOJ anteriorly with facial reduction and braincase expansion.

Visual Perception of Tempting and Healthy Foods

Lindsay Macklin, Psychology

Sponsor: Professor Emily Balcetis, Psychology

When a person with healthy eating goals encounters a delectable chocolate cake, how does this person refrain from eating it? The present experiment explored how having strong healthy eating goals could influence people’s perceived distances to tempting and healthy foods. In the first part of the experiment, participants estimated distances between themselves and different food items through a visual-matching task. Half of the participants saw a snack table of only tempting, unhealthy foods. The other half saw a snack table of only healthy foods. In the second part of the experiment, participants took an online health survey that measured the strength of their healthy eating goals through questions pertaining to their dieting practices and eating behaviors. The results showed that people with

strong healthy eating goals who restrained their intake of unhealthy foods most efficiently saw the tempting snacks as farther away and the healthy foods as closer. In addition, we explored whether seeing tempting foods as farther away might influence people's eating behaviors. We found that participants who perceived tempting foods as farther away were also more likely to plan on engaging in healthier eating behaviors in the upcoming week. We suggest that seeing tempting foods far away might be a strategy that helps people refrain from giving in to temptations and to maintain wholesome nutrition.

Fighting at the Front Line for Love: Perceptual Biases in the Devaluation of Attractive Alternatives

Frances Marie Anolin Mallari, Psychology; Journalism
Sponsor: Professor Emily Balcetis, Psychology

Past research has shown that people in committed relationships evaluate other attractive individuals as less attractive than single people do. That is, in order to maintain their long-term relationship goals, committed people devalue people who could represent a threat to their relationships. This study sought to determine whether this devaluation process is necessarily an explicit or deliberate process, or whether it may occur on an earlier perceptual level. Indeed, past research has shown that visual perception is biased in favor of perceivers' goals. The current study sought to explore whether perceptual biases occur such that committed people literally see attractive alternatives as less attractive. Participants saw a photograph of an attractive target with whom they believed they would later interact. They then engaged in a visual matching task in which they had to choose the target's true photo from several versions of that face, which varied in attractiveness. Participants in relationships chose less attractive versions of the face than single participants, suggesting they saw the individual as less attractive. This research suggests that biased visual perception may be one tool to help perceivers stay on track with their long-term goals.

“More Dirty Work Than Ever I Do:” Taking Advantage of English Privateering in the Elizabethan Era

Caroline Marris, English; History
Sponsor: Professor Karen Kupperman, History

In an era prior to the establishment of professional navies, privateers of all kinds formed a major portion of the maritime resources a nation could count upon for both the protection of its shipping, as well as for national defense. The Anglo-Spanish War of 1585–1604 provoked a shift in the relationship between English privateers and the government, which had both to rely upon them and to keep them under control. This thesis attempts to define the nature of that relationship and explore how it impacted English

maritime ambitions globally. A comparative analysis of the resources and influence wielded by both parties forms the bulk of my work, with the reach of privateering into early colonialism, military events, trade, religious moralism, and identity politics set against the expansion of bureaucratic control exerted by the state and the difficulties of legally defining the phenomena of privateering and piracy in the period. Previous historiography dealing with the dynamics of state control over macroeconomics in the sixteenth century will inform my method of determining the balance between these two forces.

Evaluation of Cognitive Tests for Detection of Pre-symptomatic Alzheimer's Disease

Rouzbeh Mashayekhi, Psychology
Sponsors: Professors Steven Ferris and Stella Karantzoulis, NYU Langone Medical Center

Magnetic resonance imaging (MRI) of the brain and analysis of cerebrospinal fluid (CSF) are useful for diagnosis of presymptomatic Alzheimer's Disease (AD). These tests, however, are expensive, invasive, and not readily available in clinical settings. In this study, we evaluated two less expensive and non-invasive measurements, the AD8 dementia-screening interview and the Pittsburgh Sleep Quality Index (PSQI), on twenty-two cognitively normal elderly participants. All participants underwent comprehensive clinical evaluation as part of a longitudinal study, which included brain MRI, CSF analysis, and two novel cognitive tests, the Concurrent Discrimination and Generalization Test (CDGT) and the Spatial Discrimination Test (SDT). These participants subsequently completed the AD8 and the PSQI over the telephone to evaluate their perceived cognitive changes and their overall sleep quality, respectively. Correlation analyses showed that the AD8 scores were significantly related with the PSQI scores and there was a marginal relationship with the CDGT. The PSQI scores significantly correlated with CSF amyloid beta levels but not with MRI measures, CDGT, or SDT. These results suggest that the AD8 may not be sensitive enough for detection of early AD-related brain changes but further support the notion that sleep quality may be affected in the early stages of Alzheimer's Disease.

Politics of Power between Colonizer and Colonized: Implications of American Government Health Programs (Medicare/Medicaid) on Native Hawaiian Health

Rebecca Masutani, Social and Cultural Analysis
Sponsor: Professor Leyla Mei, Social and Cultural Analysis

Native Hawaiians, an indigenous population forcefully categorized as U.S. citizens following the 1898

annexation of Hawai'i, remain largely dependent on U.S. health insurance programs, specifically Medicare and Medicaid. They continue to suffer from higher rates of disease vis-à-vis other ethnic groups within Hawai'i. This thesis analyzes the impact of U.S. government health programs on native Hawaiians from the mid-twentieth to the twenty-first century, questioning the effects on a population formerly dispossessed of their own nation and thus forced to rely on American health care. Examining the effects of Medicare and Medicaid on persons whose histories have been influenced by legacies of colonialism elucidates the ways in which the relationship between these programs and indigenous beneficiaries reflect and reproduce dynamics of power embedded in relations between colonizers and colonized. Findings rely primarily on colonialist theory, textual analysis of health policies, and ethnographic data obtained from interviews. Revealing the colonialist tendencies of U.S. government health programs diffuses the notion that these programs are entirely benevolent and prompts further discussions about how to resolve the shortcomings of these programs and improve the health of indigenous populations.

After the Storm, before the Calm: The Determinants in the Selection and Allocation of Bilateral Emergency Disaster Relief

Ksenija Matijevic, International Relations

Sponsor: Professor Alastair Smith, Politics

Causing more than 3.3 million deaths and 2.3 trillion dollars in property damage since 1970, natural disasters have brought deadly and costly consequences in the immediate aftermath to nations. As the global population grows and as the question of climate change becomes increasingly relevant, the motivation behind emergency relief provision from the top providers—bilateral donors—becomes more important in this day and age. How do bilateral donors decide who receives relief, and how do they then determine how much relief to allocate? Through limited dependent variable and panel data analyses, this paper affirms that both recipients' need and donors' strategic interests significantly determine the selection of relief recipients and the allocation of emergency relief. Further analysis also indicates that relief decisions do not appear to depend on the donor type. Contrary to previous thought, both traditionally big aid donors like the U.S. and traditionally small to middle-sized aid donors like Sweden consider both their own interests as well as a recipient's need when deciding who will receive relief. Evidence suggests that the United States and Sweden are not just motivated by their strategic interests and humanitarian concerns.

Surveilling the Child, Assuring the Future: Gender Ambiguity, the "Threat" to Post 9/11 American Nationalism, and the Racialized Hierarchy of "Innocence"

Mallaigh McGinley, Gender and Sexuality Studies

Sponsor: Professor Gayatri Gopinath, Social and Cultural Analysis and Asian/Pacific/American Studies

This paper considers the recent surge of popular media attention directed towards American youth who demonstrate an ambiguous gender aesthetic in response to a perceived national instability following the trauma of 9/11. The current media panic about gender representation in children recalls a history of "deviant" scapegoats that have arisen during moments of cultural anxiety. The article interrogates the media's portrayal of several children who have been represented as both a "threat to" and "threatened by" gender identity and performance. I argue that such rhetoric is deeply entrenched within discourses of counter-terrorism and the lurking threat of ambiguity as it pertains to the transgender body. Finally the paper contends that the media attention adheres to existing racial hierarchies by prioritizing the innocence of the white child over children of color, hinting at a future in which only certain bodies are awarded the protection of full citizenship.

Power Struggle: Artificial Cranial Deformation and Brain Size

Rebecca Minorini, Anthropology

Sponsors: Professors Shara Bailey and Susan Antón, Anthropology

Artificial cranial deformation is a phenomenon best known from the bound and deformed heads of ancient South Americans. These deliberately misshapen skulls are often studied to understand cranial development, but the size and shape of the brain is also altered through deformation. Is it possible for the brain to grow to normal size under such constraints? X-rays taken from a sample of nearly one hundred ancient Peruvian crania exhibit two types of artificial deformation: (1) anteroposterior (AP), in which boards are applied to the front and back of the skull, and (2) circumferential, in which the entire top of the head is bound in textiles. Measurements taken from skulls exhibiting each type of deformation are compared to those taken from undeformed crania from the same sample. Findings include a smaller sagittal area and thicker bone at λ for anteroposteriorly deformed crania, although these results may be diminished by size standardization. Ultimately when size standardization is taken into account, there may be no significant differences in cranial capacity due to artificial cranial deformation. This is an important consideration in further studies of cranial development and the interplay, or power struggle, between the bone and the brain.

The Effects of Cognitive Depletion on Making Person Attributions

Rachel Mojdehbakhsh, Psychology

Sponsor: Professor Elizabeth Phelps, Psychology and Neural Science

Judging the cause of another's behavior (i.e. making attributions) is an inherently flawed process. People often attribute the cause of behavior to what they perceive as the individual's personality (i.e., dispositional factors). But we know that environmental factors (i.e., situational factors) can also affect how someone behaves. To accurately judge another's behavior, individuals should take into account both dispositional and situational information. Nevertheless, individuals often default to disposition-based attributions and fail to account for situational information. This failure is known as the Fundamental Attribution Error (FAE). Incorporating situational information requires cognitive resources and may be more difficult if cognitive resources, important in controlling behavior, are taxed. Here we examine whether taxing cognitive resources impairs an individual's ability to take into account situational information. To investigate our hypothesis, we examined participants' attributions of behavior made during an FAE task after taxing their cognitive resources with either a Stroop task or a stress task. Our results suggest that participants who were more challenged by the Stroop task made more dispositional attributions. When participants were stressed, they also made more dispositional attributions and therefore failed to take into account the situational information when judging others' behavior. These findings imply that individuals may be more likely to commit the FAE in daily life where individuals are constantly bombarded with cognitively draining tasks and life stressors.

Can Infants Learn to Discriminate Unfamiliar Speech Sounds?

Sandra Moy, Psychology

Sponsor: Professor Athena Vouloumanos, Psychology

Infants gain a foundation for their native language in the first year of life. At birth, infants can perceive virtually all phonemes (speech sounds), but by about ten months their perceptual ability becomes narrowed by the phonemes in their native language. We asked whether infants can learn to discriminate unfamiliar phonemes that are not in their native language. Specifically, we tested whether infants could discriminate two phonemes produced in an unfamiliar place of articulation, but with a feature found in their native language—voicing. This allows us to explore whether language acquisition is stimulus-specific or abstract. First, we trained infants to anticipate a visual cue after learning that each sound was

consistently accompanied by one of two visual cues. Second, knowing that infants attend longer when they hear an alternating stream of sounds (e.g., A-B-A-B) than when they hear a non-alternating stream (e.g., A-A-A-A), we hypothesized infants would look longer to the alternating stream of distinct sounds. Preliminary results show that infants did not exhibit significantly longer looking times when hearing an alternating stream of unfamiliar speech sounds even after the training phase. This suggests that phonetic learning is a difficult task that may operate using stimulus-specific mechanisms.

The Archaeology of Ritual and Religion: Finding Ritual through Materiality

Mariana Muñoz-Rodríguez, Anthropology

Sponsor: Professor Randall White, Anthropology

Archaeologists have recovered a considerable amount of information on the behavior of early *Homo sapiens* from artifacts and the use of modern ethnographic analogies. Ritual behavior (e.g. prayer, rites of passage, and trance) is, however, rendered archaeologically invisible by comparison. As a consequence, the origins of the earliest forms of ritual and religion are left to speculation. This study aims to examine the relationship between anatomical and behavioral modernity in early man, as well as how symbolic behavior is related to ritual practice. The juxtaposition of this data may not only help reshape how the archaeological record is approached, but it may also change our understanding of what it means to be religious in early human history.

The Effect of International Emissions Agreements on Actual Emissions

Maithreyi Nandagopalan, International Relations

Sponsors: Professor Peter Rosendorff and Professor Bernd Beber, Politics

International environmental agreements (IEAs) have proliferated in recent decades. Proponents view them as multilateral solutions to problems that cannot be addressed unilaterally; skeptics doubt their effectiveness, since such agreements often lack robust enforcement mechanisms. This paper examines the effect of membership in global emissions-related IEAs on state-by-state per capita emission. I test membership in the Vienna Convention on the Protection of the Ozone Layer against sulfur dioxide emissions (1975–1990) and membership in the Kyoto Protocol against carbon dioxide emissions (1990–2010). I find that IEA membership can reduce emissions, conditional on polity and regime type. Repressive and autocratic states, which face low costs for violating IEAs or have low emissions to start with, show no significant reductions due to IEA membership.

Democracies exhibit some minor effects of IEAs on emissions; the reductions, however, are not statistically significant, perhaps suggesting that emissions reductions in democracies are due more to domestic factors than IEAs. IEAs have the greatest impact in partially or transitionally democratic states, whose interest in establishing domestic and international legitimacy makes them more likely to align their behavior with international environmental norms and to bow to pressure from environmental civil society groups.

Children's Development of Social Essentialism across Cultural Contexts

Noey Neumark, Psychology and Religious Studies

Sponsor: Professor Marjorie Rhodes, Psychology

People form concepts about distinct groups, coming to view some types of social categories (e.g., gender, race) as more informative than others (e.g., hair color, favorite food). When we view a given category as more informative, we are said to have essentialist beliefs about that category. Essentialist beliefs about a category lead us to perceive category members as innately similar and to form deductions about them based on category membership. The present research studied the development of social essentialism by testing children's beliefs about the social categories of gender, race, religion, and occupation. Five- and ten-year olds were asked a series of questions to measure their basic category judgments, the degree to which they would accept alternate category judgments, and the degree to which they determined other category judgments to be objectively wrong. We compared children from Israel and the United States, and found that cultural context had an effect on children's essentialist beliefs, such that different degrees of exposure to social categories produced varying patterns of social essentialism. We found that while five-year-olds in New York exhibited essentialist beliefs about specific categories, five-year-olds in Israel essentialized a broad range of categories. Also interestingly, we found that children in both countries (ten-year-olds in New York and both age groups in Israel) were highly likely to essentialize the social category of religion, despite the differences in the prominence of religious groups between these two contexts. Knowing that social essentialism leads to stereotyping behaviors, this research is important because it can help elucidate the impact of culture on children's developing conceptions of the social world.

To Drink or Not to Drink? Effects of a Negative Association About a Positive Self-Concept

Milagros Neyra, Psychology

Sponsors: Professors Gabriele Oettingen and Peter Gollwitzer Psychology

The present study investigates the extent to which linking a negative association to a positive self-concept, which is referred to as the "black lining," influences self-concepts and related behaviors. We explored how the link between low alcohol consumption (a positive self-concept) and unsociability (a negative association) affects college students' alcohol and sociability-related self-concepts and behaviors. Alcohol consumption self-concept (low vs. high) and the "black lining" belief that low alcohol consumption is linked to unsociability (present vs. absent) were manipulated. We hypothesized that low alcohol consumers who were made to believe in the low alcohol consumption-unsociability link would report: 1) less commitment to the low alcohol-related self-concept, 2) more drinking behaviors, 3) more commitment to the sociability-related self-concept, and 4) more sociable behaviors three weeks later than low alcohol consumers who were made to believe in the lack of the low alcohol consumption-unsociability link. We expected no "black lining" effects for the high alcohol consumers. In contrast to our predictions, high alcohol consumers who believed in the "black lining" reported spending more hours drinking and less time with their friends than those who did not have that belief. There were no differences among low alcohol consumers for any of the alcohol consumption or sociability-related reports.

Political Trust in the Balkans

Skivjana Neza, Politics

Sponsor: Professor Eric Dickson, Politics

Trust in political institutions enables the growth of a young democracy and is a key indicator of the legitimacy of the actors in power. For this research project, I examined four countries in the Balkans—Albania, Montenegro, Macedonia, and Bosnia-Herzegovina—to determine what main factors account for the patterns of trust in political institutions in a region plagued by corruption and ethnic conflict as these countries struggle to establish and develop their democracies. Multivariate regressions of the integrated datasets of the European Values Survey of 2008 and the Armed Conflict Location and Event dataset, were used to assess trust in government, parliament, and political parties among the four countries. The data show that satisfaction with democracy and willingness to vote has a consistently strong positive effect on trust in all four countries, whereas corruption and ethnic fractionalization has a strong negative effect. Furthermore, Bosnians,

many of whom identify as Muslim and who come from regions that experienced greater levels of violence in the Bosnian War of the mid-1990s, display greater levels of trust, whereas Serbians and Croats are more distrusting as the exposure to violence increases.

Bringing the Old into the New: Transference in Romantic Relationships

Nina Owen-Simon, Psychology

Sponsor: Professor Susan Andersen, Psychology

The social-cognitive phenomenon of transference arises when an individual's mental representation of a significant other (SO)—someone who plays an important role in one's life—is activated in an interaction with a new person, leading the individual to interpret this person in ways that are consistent with his/her relationship with the SO. Although the effects of transference have been extensively examined in interactions with new people, no research has examined whether transference arises in the context of existing close relationships. We tested the hypothesis that transference arises in ongoing romantic relationships when the romantic partner somehow resembles a pre-existing SO. Subjects were randomly assigned to one of two conditions where their romantic partner's alleged communications did or did not resemble the SO, who did or did not have an achievement goal with the participant. Results showed that when the romantic partner resembled their own SO, participants made inferences about the romantic partner based on knowledge of this SO. Moreover, participants whose romantic partner resembled an achievement goal SO (vs. non-achievement goal) engaged in more behavioral goal pursuit in relation to their romantic partner. No such pattern arose in a control group.

Acute Stress Impairs the Cognitive Regulation of Fear

Laura Palazzolo, Psychology

Sponsors: Professor Elizabeth Phelps, Psychology and Neural Science

Stress may cause our hands to sweat, our pulse to race, and our mind to wander when concentrating on even the simplest of tasks. Learning to control our emotions while under stress can be a great challenge, but overcoming this obstacle is critical to healthy psychological functioning. Although the same part of the brain that allows us to control our emotions—namely, the prefrontal cortex—can be impaired by stress, a direct relationship between stress and emotional control has yet to be established. Here we tested how acute stress might impair one's ability to regulate emotional responses to threatening stimuli. During an emotional learning task, participants discovered which of two images was associated with receiving a mild electric

shock. They were then trained to reduce their fear response (as measured by physiological arousal) to the threatening image by reinterpreting it in a more positive light. The following day, half of the participants underwent an acute stressor and half underwent a no-stress control task. Afterwards, both groups repeated the emotional learning task with directions to recall the reinterpretation strategies from the previous day. Results revealed a trend toward stress impairing participants' ability to execute these fear-regulation strategies. By revealing obstacles to emotion regulation, the present research can help improve regulation strategies for healthy, as well as clinical, populations.

The Mirror Effect as a Regularity in Recognition Memory

Benjamin Palter, Psychology

Sponsor: Professor Andy Hilford, Psychology

Signal detection theory assumes that the presence of bias can influence response decisions. Previous studies presented repeated and non-repeated words in a standard recognition, and showed that the manipulation disrupted the consistency of the mirror pattern and supported a dual-type mirror pattern theory. In the current study, participants viewed a single class of words, with half repeated three times and half presented only once. During test, participants received feedback (in the form of a point score) intended to counter the effect of bias and reestablish the mirror pattern as a single-type regularity. Data showed that the repetition manipulation increased d' , but only for the old responses. No difference appeared in the responses to the new items. Although the study was unable to refute the dual-type mirror pattern theory, the presentation of feedback did not negate the presence of bias.

Economic Voting in the Wake of a Global Recession: A Study of the 2010 UK General Election

Vincent Parra, Politics and Economics

Sponsor: Professor Nathaniel Beck, Politics

The 2008 financial crisis and subsequent global economic downturn create an interesting backdrop against which to examine traditional theories of electoral accountability. In the United Kingdom, the Labour party was voted out of office in 2010 after thirteen years of power in favor of a Conservative-led coalition. This study explores which factors account most for the electoral shift away from the Labour party in an attempt to shed light on how the economy influences voters' decisions in times of severe recession. Was the decrease in Labour support from 2005 to 2010 mainly a referendum on Labour's perceived performance, in which the poor economic conditions led to negative assessments of the incumbent party? Did the

financial crisis cause a rightward shift of voters' economic ideologies, causing people to reevaluate which party would better handle the economy in the future? Or did other factors, such as the personalities of the candidates for prime minister or evaluations of the incumbent party on non-economic issues, play a bigger role in explaining Labour's loss in 2010? Using a six-year panel study, I contend that negative views of Gordon Brown and poor retrospective evaluations of Labour's performance, more so than a broad rightward shift in ideology, best explain the decline in Labour support from 2005 to 2010.

Twenty-Month-Olds' Understanding of Others as Monolingual or Multilingual

Casey Pitts, Psychology; Chemistry

Sponsor: Professor Athena Vouloumanos, Psychology

Adults recognize that people can understand more than one language and that speaking the same language facilitates communication. It is unclear, however, whether infants assume other people can understand multiple languages. We examined whether English-speaking monolingual 20-month-old infants expect an unfamiliar person to understand more than one language. Infants observed a speaker who spoke one of two languages (English or Spanish) tell a listener the location of a hidden object. The listener reached correctly, establishing that she understood the first language. A second speaker, using either the same or a different language as the first speaker, told the listener the new location of a hidden object. The listener then reached either correctly or incorrectly. When the two speakers spoke the same language, infants looked longer when the listener reached in the incorrect location. When the two speakers spoke different languages, infants looked longer when the listener reached in the correct location. Infants thus assume an unfamiliar person can understand only one language, although not necessarily the infants' own. These results suggest that infants may understand that different languages function as different conventional systems. Infants' assumptions about the linguistic capacities of others may affect their understanding of who is a knowledgeable and appropriate teacher, influencing later foreign language learning and knowledge acquisition.

The Feasibility of Solar Technology for Carbon Offsetting

Steven Rasovsky, Environmental Studies:

Sponsor: Professor Tyler Volk, Environmental Studies and Biology

A popular choice for mitigating personal carbon dioxide emissions is voluntary carbon offsetting. This industry is currently criticized, however, because it lacks

transparency and credibility; customers cannot be certain about their money's positive environmental impact. My research addresses this gap by assessing the feasibility of localizing carbon offsetting by utilizing solar photovoltaic (solar PV) technology. As a clean energy source, solar PV systems harness the power of sunlight to create zero-emission electricity. Thus, if an individual helps invest in solar installed in her local community, she both offsets carbon dioxide that would otherwise be released through energy production using fossil fuels, and also tangibly witnesses her impact by tracking the power production from the portion of the solar panel she bought. After exploring current and future trends for both the solar and carbon offsetting industries, I used several economic and solar efficiency models and interviews with industry experts to determine the potential for integrating solar into the carbon offset market. I conclude that the localization and tangibility of solar technologies serve as best practices for carbon offsetting; current prices of solar offsetting are within range of the offset market; and solar PV will make significant strides in market penetration by 2015.

The Influence of Attentional Scope on Distance Perception and Goal-Relevant Behavior

Matthew Riccio, Psychology

Sponsor: Professor Emily Balcetis, Psychology

Given the rising obesity epidemic in America, research must explore why people are exercising insufficiently and investigate strategies for increasing exercise behavior. If people with lower fitness levels perceive or understand distances as farther, discouraging continued movement or action, can changing perceptions of the environment increase exercise? We tested one strategy to induce perceptions that a target is closer, and asked whether perceived proximity encourages goal-promoting behavior. We induced a focused attentional style and tested perceptions of distance. We tested whether inducing perceived proximity encourages action that may help achieve fitness goals. Focusing attention leads targets to appear closer, increases participants' speed of walking, and increases self-reported ease in reaching that target while burdened with ankle weights. These studies suggest that not only can increased attentional focus make distances seem closer and, in turn, tasks more manageable, but doing so will also encourage the promotion of behavior such as faster, more intense walking.

The Mediating Effect of Schemas in the Relationship between Childhood Emotional Maltreatment and Social Phobia

Julie Ronés, Psychology

Sponsor: Professor Natalie Weder, NYU Langone Medical Center

This study is a part of ongoing research investigating relationships between childhood trauma, dissociation, and suicidal ideation. The aim of this study is to examine the mediating effect of maladaptive schemas in the relationship between social phobia and childhood emotional abuse and neglect. Early maladaptive schemas are pervasive expectations, beliefs, and fears developed during childhood that cause distress or impairment. Research has demonstrated that the schemas of shame, vulnerability, and self-sacrifice mediate the relationship between emotional maltreatment and anxiety symptoms; the goal of this project is to determine whether these schemas specifically mediate the relationship between emotional maltreatment and social phobia. Diagnostic batteries include the Mini-International Neuropsychiatric Interview, the Young Schema Questionnaire, the Childhood Trauma Questionnaire. We found that social phobia and childhood emotional abuse were significantly related; social phobia and childhood emotional neglect were also significantly related. These schemas did not mediate the association between emotional maltreatment and social phobia, but the self-sacrifice schema mediated one aspect of social phobia: fear of social situations.

A Whole New World: Goffman, Mourning, and Presentation of Self on Facebook

Bethany Schiffman, Anthropology; French

Sponsor: Professor Bruce Grant, Anthropology

Facebook.com allows individuals to post Status Updates (where a user shares any information they like with friends) and create Group Pages. The use of Status Updates to refer to the death of a loved one, and the creation of Memorial Pages, which are groups dedicated to the memory of a deceased loved one, are emerging trends on Facebook. In *Presentation of Self in Everyday Life* (1959), Erving Goffman develops a dramaturgical model for describing face-to-face interactions. Using his analysis as a framework, this thesis explores self-presentation related to mourning on Facebook and develops the concept of phantom-presentation on Facebook—the creation of an image of the deceased by others. What emerges is a paradigm for looking at these phenomena. This thesis uses R.I.P. Status Updates, and information from public Memorial Pages, to investigate and analyze questions of self-presentation and phantom-presentation. It concludes that Status Updates introduce constructs of audience

to an event that is solitary in the real world. Memorial Pages create a duality: presenting the deceased is self-presentation, and acts of self-presentation characterize the deceased. R.I.P. Updates and Memorial Pages are modified by the fact that presentation is composed before it is shared with an (imagined) audience; this absence of simultaneity creates a dynamic where presentation, once posted, becomes setting.

Causal Reasoning in Diagnostic Medicine

Benjamin Scoblionko, Psychology

Sponsor: Professor Robert Rehder, Psychology

Diagnostic medicine relies on understanding the causal relationships between a disease and its effects. Physicians must efficiently analyze symptoms and correctly infer underlying causes (i.e. diseases) to accurately diagnose and treat patients. To investigate this reasoning process, we examined the information-seeking ability of thirty-two New York University undergraduate students. Participants learned about six novel diseases, then diagnosed a series of hypothetical patients. I compared the information search responses of undergraduate students to the predictions of information theory, which describes how people seek information. Overall, participant responses were highly correlated with those predictions, showing that people are generally good at deciding which information to seek out to support a causal inference. Understanding this process is crucial to improving diagnostic accuracy and eliminating unnecessary costs, time, and resources.

Remembering a Just World: Motivated Recall of Victim Culpability

Sahil Sharma, Psychology; Politics

Sponsor: Professor John Jost, Psychology

Just World Theory argues that individuals often blame victims for their misfortunes because individuals are motivated to perceive their world to be fair and just. Less is known about how, and for whom, just world concerns operate. Recent evidence suggests that just world motivation may impact memory of the severity of harm, but it is not yet clear whether just world concerns impact recall of victim culpability. In addition, several studies have established gender differences in victim blame, but the findings are mixed regarding the direction of this difference. In this paper, we investigate whether individuals misremember information about victim responsibility for a sexual assault in order to satisfy the need to believe that the world is just. We hypothesize that individuals whose just world motive has been experimentally heightened will be more likely to misremember details of a sexual assault in a way that confers culpability on the victim. We

predict that this effect will be weaker for women, who we posit will identify more with victims of their own gender. Indeed, results suggest that men blame victims more and show more memory biases regarding victim culpability than do women, especially when just world motivation has been experimentally heightened.

Attitudes towards Mental Health

Pavita Singh, Gender and Sexuality Studies

Sponsor: Professor Crystal Parikh, English and Social and Cultural Analysis

The primary objective of this study is to examine how mental health professionals' perceptions of Indian immigrant women in the United States impact their treatment of and outreach towards this population. Secondly, this study aims to challenge the homogenizing notions about Indian immigrant women and their culture present in the existing professional literature on their mental health. The principal investigator administered audio-recorded qualitative interviews with nine South Asian mental health professionals in the U.S. who serve Indian immigrant women. Results show that changing the idea of Indian culture as a monolithic category is significant to creating effective treatment strategies. Changing homogenizing notions includes considering differences in language, religion, caste, and geographic region. Effective treatment strategies for this pluralistic population include helping clients make sense of the immigrant experience, involving family members in the treatment process, integrating cultural values and objects familiar to the clients into the process, and challenging assumptions about Indian women and Indian culture. These strategies draw on Social Cognitive Theory, the main proposed intervention for working with Indian immigrant women. Results should help inform suitable treatment strategies for this historically underserved—and often inappropriately treated—heterogeneous population.

The Effects of Mental Contrasting on Parents' Perceptiveness of their Children

Nicholas B. Sirlin, Psychology

Sponsor: Professor Gabriele Oettingen, Psychology

Mental contrasting is the cognitive strategy whereby one imagines a positive future and then juxtaposes this image with those obstacles of present reality standing in the way of achieving that future. The present study seeks to determine whether mental contrasting can improve one's perceptiveness of others' thoughts and feelings. To do this we used NYU students and their parents. We first measured all participants' tendencies to spontaneously use mental contrasting by content analyzing their responses to open-ended questions. Students were then

given a series of questionnaires asking them to elaborate on their own thoughts and feelings on a variety of life domains. Parents were asked to attempt to answer these same questions from their child's perspective. We expect that parents who use mental contrasting will produce answers that show a greater correlation with their children's answers which would imply that mental contrasting as a cognitive strategy can be used to help improve perceptiveness towards others.

A Study of Minor-Targeted State Abortion Laws

Lisa Smith, Politics

Sponsors: Professors Nathaniel Beck and Eric Dickson, Politics

How do changes in state abortion laws targeting minors affect teenage sexual behavior? Do parental involvement laws, as their advocates claim, help reduce the rate of teenage pregnancy? This is the central claim that my work interrogates. By measuring teen sexual behavior with rates of teenage pregnancy, I analyze the changes in teenage pregnancy rates in relation to the change in state abortion laws. I focus on the years 1988–2005, when nineteen states enacted minor-specific abortion laws. I find that passing minor-specific abortion laws did not lower the rate of teenage pregnancies. In fact, there is no statistically significant relationship between enacting minor-specific abortion laws and a change in teenage pregnancy rates. This means that parental involvement laws serve to limit minor's access to abortion services, but do not do anything to reduce the need for abortion services by reducing teenage pregnancy.

From Posting to Protest: The Effect of the Internet on Antigovernment Demonstrations

Jordan Malek Sotudeh, International Relations

Sponsor: Professor Alastair Smith, Politics

Political pundits have recently touted the power of the internet in fomenting unrest. I conducted a series of statistical analyses based on economic, political, and Internet-specific data drawn from multiple sources for over 190 countries from 1995 to 2010. My findings contradict media assertions on several counts. Most notably, there is no direct relationship of statistical significance between the spread of the Internet and the level of unrest. What's more, while indicating where and how the Internet really matters in relation to political unrest, I found that effects vary based on political organization. My research also highlights the wider political dimensions of cyber-warfare, which is also subject to different rules based on institutional structures. A total revision is necessary to grasp the effect of the Internet on political unrest and organization as most of the data contradicts commonly held beliefs.

Growth in Action: Predictors of Motor Skill in Middle Childhood

Vivian Song, Psychology

Sponsor: Professor Karen Adolph, Psychology and Neural Science

Middle childhood (six to twelve years of age) and adolescence (twelve to seventeen years of age) are periods of rapid growth and development. The dramatic physical growth and development of children's bodies during this period cause changes in body size (weight, height, torso length, and leg length), body proportions (weight relative to height, ratio of leg length to height, and ratio of head circumference to height), and body dynamics (strength, flexibility, and coordination). This study examined effects of body factors, age, and sex on motor skill proficiency in fifty-seven nine-to-thirteen-year-old children. We observed how children walked, how far they could leap, how high they could lift their legs, and how many monkey bars they could swing across—tasks that tap into varied aspects of motor skill. We also collected several measures of children's body size and calculated measures of body dimensions. Results showed that body factors are more strongly related to a variety of motor skills than are children's age and sex, suggesting that in middle childhood when children begin their adolescent growth spurt at different ages, the typical effects of age and sex are ameliorated.

Remembering Events: Accessibility of Information Following Spatial and Goal Event Boundaries

Nicole Spector, Psychology

Sponsor: Professor Lila Davachi, Psychology and Neural Science

In order to make sense of complex events in everyday life, people organize mental representations of experiences by breaking down ongoing activity into smaller, meaningful segments. Observing changes in physical space, or seeing someone complete a goal, can cause people to perceive boundaries between events, but there is little direct comparison in the literature between different boundary types and their effects on segmentation. This study compared spatial and goal boundaries and their influence on accessibility of information in working memory. Participants learned the spatial layout and artwork of a fictional museum. A day later, they read narratives about a protagonist moving through the museum galleries while completing goal-motivated actions. During the reading task, images of artwork from the museum appeared after boundary sentences that contained spatial transitions, goal completions, or both, and participants decided whether the artwork was from the protagonist's current gallery or a different gallery at that time in the

narrative. Participants responded to artwork probes faster and more accurately if they were located in the same room as the protagonist. This finding suggests that this information was most accessible in readers' working memory, therefore providing insight into how people mentally organize and comprehend stories.

Moral Foundations as Motivated Social Cognition: An Integrative, Empirical Approach

Michael Strupp-Levitsky, Psychology

Sponsors: Professor John Jost, Psychology

Moral Foundations Theory (MFT), which traces the source of individual differences in moral intuition to five distinct sources, has become increasingly influential in the study of individual differences in social and political attitudes. The present research integrates the findings of moral foundations theory with the broader motivated social cognition literature, which holds that individual differences in ideological preference can be explained by motivations to reduce threat, maintain epistemic certainty, and uphold social relationships. Survey data from two countries and a combination of regression analysis and structural equation modeling are used to explore the motivational underpinnings of the moral foundations. Consistent with expectations derived from recent work in political psychology, the three "binding" foundations (ingroup loyalty, respect for authority, purity) are related to epistemic rigidity and high threat sensitivity, while the two "individualizing" foundations (harm, fairness) are related to emotional sensitivity. Implications for moral and political psychology, as well as the future development of moral foundations theory, are discussed.

The Focus on Categories and Features When Making Inductions

Ching Sung, Psychology

Sponsor: Professor Gregory Murphy, Psychology

When we encounter objects, we decide how to interact with them by categorizing them; however, we also consider the object's specific features. Therefore, an object's category membership and its individuating features are both important for making accurate inferences (inductions). In this study, we investigated whether people give more weight to categories or features when making inductions. We presented subjects with brief scenarios consisting of both category and feature information about an object, and asked them to make an induction about it in the form of a probability. The categories and features were varied to influence the probability rating to be higher or lower. For example, a dog was described as either a pit bull or lab (category) and to be snarling or wagging its tail (feature). Participants rated how likely

one would be to pet the dog (the induction). Experiment 1 found equal influence of categories and features. Experiment 2 used social categories to investigate whether they dominate specific features in making social judgments. The results reveal that when people are given time, they access stereotypes about an entity but take individual features equally into account when making an induction.

Hate the Sin, Love the Sinner: New York Archdiocese's Role in the AIDS Crisis

Andrew Tepper, History

Sponsor: Professor Peter Wosh, History

During the early years of the AIDS epidemic, the general public and the medical profession did not understand the new exploding crisis. As sexual behavior became known as one possible mode of transmission, many religious communities began to mediate and facilitate people's understanding of the disease. Tensions emerged as the Catholic faith rejected homosexuality and drug abuse; at the same time, religious organizations were expected to act as havens, caring for and providing support for the sick and dying. This research represents a study of the New York Archdiocese and the role it played in the creation of a narrative surrounding the AIDS epidemic and its impact on the welfare of the epidemic's victims. The Archdiocese sought to detach AIDS from its homosexual connotations and desexualize the disease, preaching compassion for the disease's victims. I look at the media's conceptualization of AIDS, the narrative created by the Archdiocese, specifically Cardinal John O'Connor, and how St. Vincent's, a Catholic hospital, overcame the inherent tensions.

Do Twelve-Month-Old Infants Understand that Pointing Can Communicate Intentions?

Jacqueline Tin, Psychology

Sponsor: Professor Athena Vouloumanos, Psychology

Infants begin to communicate using speech and gestures by the end of their first year, but do they understand that these communicative modalities transfer different types of information? This study investigated whether twelve-month-olds understand that pointing can convey information about unobservable intentions. Infants saw a gesturer repeatedly attempt to place a ring on a funnel, but fail because the funnel was out of reach. During a test, the gesturer either pointed or directed her fist towards the ring while a recipient watched and responded by either successfully stacking or failing to stack the ring on the funnel. Infants looked longer when the recipient successfully stacked (intentional action) than when she tried but failed to stack the ring on the funnel (surface action); however, this difference did not reach significance.

Infants therefore did not show evidence of understanding that pointing can communicate intentions in the present scenario. Alternatively, they may have recognized that pointing requires a shared context between the actors for the gesture to be informative.

The Present, Relativity, and Quantum Mechanics

Lisa Tran, Physics; Philosophy

Sponsor: Professor Tim Maudlin, Philosophy

I investigate whether or not a "present time" can be substantiated by science, specifically physics. A naturalist is someone who believes philosophical questions are best answerable by science, and a presentist is someone who believes that all and only the things that exist "now" are real. I argue that naturalistic presentism is an implausible stance. It is a necessary condition for the naturalistic presentist that an absolute spacetime foliation exists, for an absolute simultaneity is not definable without such a foliation. An absolute or preferred spacetime foliation, however, does not arise naturally from the geometry of spacetime as described by Einstein's Special Theory of Relativity. The naturalistic presentist must then respond to this contradiction by claiming that special relativity is false. Three other theories, the Lorentzian aether, the General Theory of Relativity, and quantum mechanics, are explored to see if physics entails an absolute spacetime foliation at all. I then investigate whether or not this necessary condition alone is sufficient for naturalistic presentism to obtain by looking at the epistemological sources of both presentism and naturalism. I conclude that the differing epistemological bases of these two stances result in the incoherence of their union.

What's in a Noun Phrase? The Effect of Generic Language on the Development of Essentialist Beliefs

Christina Tworek, Psychology

Sponsor: Professor Marjorie Rhodes, Psychology

The way we think about categories is strongly influenced by language. This is especially true for the learning of essentialized categories, whose members are believed to share innate, nonobvious, and stable features (e.g., animal categories). Here we tested the effect of generic language, which conveys information about an abstract category or group (e.g., dogs, a dog) versus nongeneric language, which refers to a specific instance (e.g., this dog, he) on adults' (Experiment 1) and children's (Experiment 2) essentialist beliefs about a novel social category (e.g., "Zarpies"). This unfamiliar group of people, "Zarpies," was presented to participants via a picture book. In Experiment 1, Zarpies were described in one of two language forms: 1) indefinite singular generic (e.g., "A Zarpie") and 2) specific (e.g., "This Zarpie").

Experiment 2 included an additional language condition, the bare plural generic (e.g., “Zarpies”). Participants then completed a questionnaire assessing the extent to which they held essentialist beliefs about Zarpies. Adults and children held more essentialist beliefs when Zarpies were described with generic, rather than nongeneric, language. These findings indicate that language exerts an important influence on conceptual development and that the use of generic language may affect the way we learn and think about groups of people.

Eye Movements and Racial Bias in the Shooter Task

Diana Volpintesta, Psychology; Spanish

Sponsor: Professor David M. Amodio, Psychology and Neural Science

In the present study, we examined whether people display different patterns of eye movements when making decisions concerning members of a different race and whether these eye movements are linked with racially-biased errors. Participants performed the Shooter Task (Correll et al., 2002), a computer task in which participants viewed armed and unarmed black and white targets and used a videogame controller to shoot armed targets and not shoot unarmed targets. Participants’ eye movements were recorded during the task. Racially-biased responses were defined as faster responses to armed black targets compared with armed white targets, and incorrect shooting of unarmed black targets more often than unarmed white targets. Although behavioral data indicated racial bias, eye-movement data revealed no difference in the number of saccades (quick eye movements) between perceived lack and white armed and unarmed targets. Furthermore, participants who shot unarmed Black targets did not tend to look at a target’s face when shooting; instead, regardless of a target’s race, participants looked mainly at a target’s hand when deciding to shoot. These findings suggest that the racially-biased behavioral responses observed in the task may be driven by differences in eye-movement patterns that exist prior to shooting.

Egypt’s Military and the 2011 Uprising

Gilad Wenig, Middle Eastern and Islamic Studies

Sponsor: Professor Zachary Lockman, History and Middle Eastern and Islamic Studies

On February 11, 2011, following eighteen days of mass public protest throughout Egypt, longtime president Hosni Mubarak resigned. Egypt’s military command, represented through the Supreme Council of the Armed Forces, assumed political and administrative control of the state in his stead, where it remains until the present. By focusing on the literature regarding military interventions in politics, and the civil-military relationship

under Mubarak, I aim to understand the decision-making process of the military in the wake of the 2011 uprising through an interests-based lens. I argue that facing a near-total collapse in public order, Egypt’s top brass perceived an acute threat to its most precious political and economic equities and as such, decided to intervene. Since January–February 2011, the military has shown its inability to govern effectively; however, it still remains deeply entrenched both politically and economically. This study attempts to explain how and why.

TransFormations: Orientations, Affects, and Desires in Thai Surgical Tourism

Jackson Wimberly, Social and Cultural Analysis

Sponsor: Professor Gayatri Gopinath, Social and Cultural Analysis, and Asian/Pacific/American Studies

Thailand is widely regarded as the world’s leader in gender-related surgeries and medical tourism. Hundreds of transgender women from Western countries make the trip to see Thai surgeons every year. The simple explanation for this phenomenon has to do with improved cost and quality relative to what is available to most women in their country of origin. And yet, settling solely for this explanation would ignore several key cultural histories which have produced the conditions to incite Western trans migrations—be it contemporary discourses of transgender embodiment and transition, Orientalist constructions of Thai culture, or the rapid flow of goods, capital, knowledge, and bodies under globalization. Through an analysis of clinics’ marketing strategies and labor practices; a historicization of Thai gender, queerness, and medicine; and a close reading of several personal accounts of gender reassignment by Western transwomen visiting Thailand, my work will attempt to uncover the narratives, orientations, affects, and desires that shape how these women understand and feel their bodies. Within these spaces of transformation, I argue, the arrangements of nationality, race, class, gender, and sexuality produce a compulsory attribution of authenticity, coherence, happiness, and pride to their identities and embodiments.

Acting Communities: The Role of Professional and Amateur Theatres in France

Sarah Wipperman, Anthropology

Sponsor: Professor Susan Carol Rogers, Anthropology

State patronage of the arts has been an important part of French society since at least the reign of Louis XIV. During the twentieth century, the Ministry of Culture created policies that would promote the democratization and decentralization of the theatre. These initiatives aimed to make high art accessible to a broader French and international audience. The government provides

massive amounts of state support and funding for the creation, diffusion, and proliferation of new works as well as professional training and audience education. What benefit comes from allocating so much money to the arts, specifically theatre? In order to determine the social and civic value of theater in France, I chose a selection of amateur and professional theatres. Using mission statements and other information from their websites, I was able to determine what the theatres publically say their role in French society is and what measures they take to fulfill these roles. I found that the theatre is able to create communities and to give a sense of shared identity. Amateur theatres allow for active participation in theatre and encourage a passion for the arts, and professional theatres aim to create an educated spectator and to bring new works to different areas both in France and internationally. Together, amateur and professional theatres create social solidarity, promote national grandeur, and show the international community that France is a major cultural producer.

Resources to Engage Students in the Singapore GCE Advanced Level Geography Curriculum

Xin Ying Wong, Environmental Studies

Sponsor: Professor Tyler Volk, Biology and Environmental Studies, and Professor Chris Schlottmann, Environmental Studies and Bioethics

Enrollment rates in geography degree programs have been consistently low in Singapore. This can be attributed to the public's inability to understand geography's role in social life, as well as the perception that a geography degree limits job prospects and delivers content that is propagandistic in nature. Though changes, like the revision of the pre-tertiary geography syllabus, have been made to encourage the pursuit of geography at a higher level, this project presumes that engaging students in the subject at the pre-tertiary level can also help to serve this aim. Thus, the objective of this project is to produce an educational package that complements the pre-tertiary Singapore GCE Advanced Level geography curriculum. The educational package is developed based on feedback through two online surveys from six Singapore high school teachers and a representative from the curriculum planning department of Singapore's Ministry of Education. The first survey seeks to determine the contents of the package, while the second survey seeks recommendations to improve the package. It is hoped that the package will instill in students a greater appreciation for geography, and if so, that further refined versions of the package will be actively used by teachers nationwide.

The Cambodian Debates: Discussing Cambodia's Genocide Through the Lens of the American Press

Sharon Wu, History, Sociology

Sponsor: Professor Marilyn Young, History

In 1975, the Communist Khmer Rouge took over a war-torn Cambodia with the intention of recreating a self-reliant, agriculture-based state. Along the way, 1.67 million Cambodian people died as a result of famine, disease, torture, execution, and systematic murder. Approximately one-fifth of the Cambodian population perished during these years, making the Cambodian genocide one of the bloodiest events of the twentieth century. While the Khmer Rouge is directly guilty of genocide, the United States played an indirect role by creating the political environment from which the Khmer Rouge grew. This study explores the American role in the Cambodian genocide from the perspective of the American press. Cambodia's genocide was one of the most underreported events of the Cold War era because foreign correspondents battled many obstacles when researching Cambodia. These obstacles resulted in inaccurate and vague reporting, which led many to criticize journalists for unprofessionalism. Nevertheless, journalists still managed to gather enough information to warrant foreign attention. Press coverage reflected debates over how the United States could have handled and prevented genocide in Cambodia, ultimately spotlighting a disastrous failure in American foreign policy.



The role of a liberal arts education is to give broad knowledge to students to prepare them to face the world. Students can often graduate from college without gaining the most basic understanding of the sciences. Some may even prefer this, believing that science is reserved for a specific segment of our society. In fact, since Leonardo da Vinci, science has been infiltrating all aspects of society, from communication to energy to medicine, from the vineyards of Bordeaux to the classrooms where philosophical debates take place. Thus, scientific knowledge and an understanding of the basic principles of how it is obtained is absolutely essential for anyone hoping to understand and contribute to the world. As the ultimate goal of a University is to spread and foster knowledge and truth, it must provide a strong scientific education to all students.

—*Claude Desplan, Professor of Biology*

NATURAL SCIENCES

DNA Conversations: Structuring a More Functional 3D DNA Crystal Lattice

Victoria Adesoba, Biochemistry

Sponsor: Professor Nadrian Seeman, Chemistry

This project seeks to improve the resolution of the self-assembled 3D DNA crystal, based on branched DNA molecules. The 3D crystal lattice formed by these crystals consists of DNA tensegrity triangles as units, which interact through two base sticky ends. The tensegrity triangle is a rigid DNA motif with a three-fold rotational symmetry. It consists of three helices that are directed along linearly independent vectors. These helices are connected, pairwise, by three four-arm branched junctions. These connections produce a stiff alternating over-and-under motif, and are tailed by short single-stranded cohesive segments (sticky ends). These sticky ends connect the triangle units in space, thus resulting in a 3D DNA lattice. In an effort to improve the resolution of these crystals, the length of the sticky ends will be varied to three and four bases, respectively. In addition, the enzyme CircI-gase will be used to circularize the central strand of each triangle unit, in an effort to stabilize this new motif. The foremost use of a lattice of this kind is for the scaffolding

of biological molecules for crystallographic structure determination.

3D Crystallization of a 4-turn DNA Triangle with Variable Sticky End Lengths

Salman Ahmad, Chemistry

Sponsor: Professor Nadrian Seeman, Chemistry

This project aims to create new types of macromolecular building blocks, based on branched DNA molecules using 3D DNA crystals, which stem from a DNA tensegrity triangle with two base sticky ends. The tensegrity triangle is a rigid DNA motif consisting of three helices that are connected pair-wise to produce a stiff alternating over-and-under motif. The terminal single-stranded cohesive segments (sticky ends) allow for the helices to connect with those of six other molecules, resulting in a three-dimensional periodic DNA lattice. This project seeks to create a larger two-triangle system with a helical repeat of four turns of DNA and sticky-end lengths of two, three and four-nucleotides. Such three-dimensional nucleic acid crystalline systems may be used as the scaffolding of biological molecules for crystallographic structure determination, as well as the organization of nanoelectronics.

Design and Synthesis of an Effective Molecular Inhibitor of L-Cystine Crystal Growth for the Prevention of L-Cystine Kidney Stone Formation

Misha Bhandari, Chemistry; Physics

Sponsor: Professor Michael Ward, Chemistry

Cystinuria is an autosomal recessive disorder that is characterized by an abnormal buildup of the amino acid L-cystine in the urine, and the consequent formation of L-cystine kidney stones. The purpose of this project was to observe, analyze, and manipulate the crystallization of L-cystine (a process that is crucial to the pathogenesis of L-cystine kidney stones). L-cystine is found to grow by binding along the edges of hexagonal hillocks on the crystal surface, and past research in our group has confirmed that chemically similar structures can also competitively bind to these same sites, preventing the binding and consequent growth of L-cystine. This phenomenon is observed through the use of Atomic Force Microscopy (AFM), an extremely high-resolution form of scanning probe microscopy that can resolve images as small as a fraction of a nanometer. AFM was used to observe and collect images of L-cystine crystals growing with and without specific L-cystine mimics, and the objective was to identify which mimic had the most potent and irreversible effect on the pathogenesis of L-cystine crystals. Previous studies within our research group had revealed that CDME (cystine dimethyl ester, in which carboxylic acids groups were chemically cleaved and replaced with methyl ester groups) was the most effective inhibitor, but more recent observations indicate that CDPE (cystine diphenyl ester) is actually quantitatively more effective at reducing growth rate and distorting the crystals.

Cloning and Expression of HEAT Repeat Containing Subunits of Condensin Complexes in *C. elegans*

Christina Borchers, Music

Sponsor: Professor Sevinc Ercan, Biology

The various types of condensins that bind to regions on the chromosomes embody unique functions in the structure and transcription. *Caenorhabditis elegans* contain Condensin I, Condensin II, and a complex involved in dosage compensation (I^{DC}). The hypothesis is that the differential recruitment of various types of condensins to the chromosomes was achieved in part by recognizing different histone modifications. Two condensin subunits specific to each condensin type contain HEAT (Huntington, Elongation Factor 3, PP2A, TOR) domains, which may mediate interactions with histone tails. By cloning, bacterially expressing, and purifying the soluble recombinant HEAT repeat domains, it could be determined how they interact with different histone modifications. Histones, proteins in the eukaryotic cell nuclei, undergo

modifications that affect chromosome function. These histone modifications are the sites for protein modules and can be altered to modify the HEAT in condensin subunits. HEAT domains from condensin I subunits CAPG-1 and DPY-28 from cDNA were PCR amplified. The DNA fragments were then cloned into vector pET-51. The recombinant proteins encompassing CAPG1 275-377, CAPG1 704-822, DPY28 200-550, and PGEX were run on a protein gel and a GST pulldown was performed. The protein gel showed that CAPG1 275-377, CAPG1 704-822, and DPY28 200-550 were insoluble because the protein was expressed and existed in the pellet. Determining the interactions between condensins and histone modifications is important to understand how condensins function in chromosome condensation and segregation.

Effects of Posture on Infants' Visual Experiences

Julia Lily Brothers, Psychology

Sponsor: Professor Karen Adolph, Psychology and Neural Science

Vision is a whole-body process involving eye, head, and body movements; thus, the direction in which people look is constrained by the properties of their bodies. We investigated whether the transition from crawling to walking affects infants' visual experiences. Thirteen-month-old infants crawled or walked down a 490-cm walkway wearing a head-mounted eye-tracker that recorded eye movements and field of view. Walkers could nearly always see across the room to the opposite wall, but crawlers' visual fields were filled by the floor 22% of the time. When they could see the wall, walkers saw significantly better than crawlers ($M=138$ cm from the floor for walkers vs. $M=66$ cm for crawlers), and were twice as likely to see their mothers' faces at the end of the walkway. Conversely, crawlers had a better view of the floor: crawlers could see as close as $M=20$ cm in front of their hands vs. walkers' $M=87$ cm in front of their feet. In ongoing analyses, we are investigating the effects of the shifting visual field on infants' visual fixations, using gaze calculations from the eye-tracker. Results indicate that what infants see is intimately tied to body constraints and that infants' visual worlds are transformed with developmental changes in locomotor posture.

Oligooxopiperazines as α -Helix Mimetics: Design, Synthesis, and Characterization

Thomas Brewer, Chemistry

Sponsor: Professor Paramjit Arora, Chemistry

Protein secondary structures play a fundamental role in protein-protein interactions, and α -helices are important motifs featured in these interactions. Short peptide sequences require stabilization to adopt α -helical

conformation, so efforts have been made to mimic the conformation of an α -helix. I am designing a new class of α -helix mimetics, called oligooxopiperazines, derived from α -amino acids and featuring chiral backbones. We have shown that oligooxopiperazines are able to imitate the binding surface of an α -helix and inhibit protein-protein interactions. Such a mimetic provides a means to probe a diverse array of biological pathways by determining the influence of specific protein-protein interactions. The product is cleaved from resin, purified by high-performance liquid chromatography, and characterized by NMR and mass spectrometry. I synthesized several of these oligooxopiperazine molecules to mimic an α -helical portion of the p53 tumor-suppressor protein which is recognized by the regulatory protein MDM2. These oligooxopiperazine molecules' binding affinity to MDM2 was assessed using a fluorescence-polarization competition assay. The oligooxopiperazine with sequence Phe-Trp-Phe-Leu was the tightest binder, showcasing the success of both the oligooxopiperazine scaffold as a helix surface mimetic and the rational design approach based on the wild-type protein sequence.

Templated Crystallization of a DNA Trefoil Knot Using the Tensegrity Triangle

Kevin Cannon, Chemistry

Sponsor: Professor Nadrian Seeman, Chemistry

The double helical structure of DNA makes it ideal for constructing synthetic knots that can be used to learn about the properties of such unusual topologies. Currently, synthetic DNA knots have only been characterized indirectly by gel electrophoresis. The exact structure of a DNA trefoil knot has yet to be determined by direct observation. Immobile branched DNA junctions have previously been used as the basis of specific three dimensional structural designs in order to reach the goal of creating a macromolecular scaffold capable of binding, orienting, and juxtaposing a variety of molecules from cellular macromolecules to organic conductors and optical memory components. The goal of my project is to use the tensegrity triangle motif as a template for the attachment of a DNA trefoil knot inside the cavity of the triangle via triplex interactions. The resulting crystals of the DNA trefoil knot tensegrity triangle assembly will be subjected to single-crystal X-ray diffraction studies to obtain high resolution structural information. By crystallizing and solving the structure of the DNA trefoil knot, the exact coordinates of each and every atom in the motif will be determined without ambiguity.

A Genetic Analysis of Human ApoL-1 Variants in African Trypanosomiasis

Chelsea Canon, Biology; Classics

Sponsor: Professor Jayne Raper, Hunter College

Humans and some primates are able to resist most species of African trypanosomes due to an innate trypanosome lytic factor (TLF). The species *Trypanosoma brucei rhodesiense* is able to evade lysis by encoding a serum-resistant associated protein (SRA), which is able to bind and effectively neutralize the activity of apoL-I. It has been shown that baboons effectively resist infection by *T.b. rhodesiense* due to the change of one specific lysine on the C-terminal end of apoL-I that prevents the binding and neutralization of apoL-I by SRA. We have found a 6 bp deletion in the C-terminal end of apoL-I in the genome of some pygmies and Bantus in Africa, which causes a deletion that results in the generation of a lysine in the same position present in the baboon apoL-I. Two other point mutations have been discovered in African genomes, which may help provide resistance to SRA. Hydrodynamic gene delivery of these variations in mice has shown partial protection from human infective parasites, and both kidney and liver damage, when compared with the most prevalent human apoL-I sequence. The data show that these mutations, though contributing to resisting trypanosomes, may be toxic to cells and tissues.

Validation in vitro of Receptor-ligand Pairs for Reverse Pharmacogenetic Applications in Human Subjects

Daniela Cassataro, Neural Science

Sponsor: Professor Gordon Fishell, NYU Langone Medical Center

Research elucidating the underlying mechanisms of most neuropsychiatric disorders has not produced an increase in the effectiveness of treatments. This is largely because current treatment modalities can achieve either cell-type specificity or anatomic specificity, but not both simultaneously, which often results in limited efficacy or intolerable side effects. We propose to address this problem using the strategy of "reverse pharmacogenetics." While pharmacogenetics modifies a drug treatment to fit one's genetic profile, reverse pharmacogenetics uses gene therapy to modify the brain to respond therapeutically to a given drug. Using a viral vector, receptors are expressed ectopically in a specific population of neurons. When its corresponding ligand is administered, activity is modulated specifically in the cells expressing the receptor. Although this approach has been successful in animal models, numerous hurdles preclude the use of this existing technology in humans. The goal of this long-term project is to validate in vitro receptor-ligand pairs for

reverse pharmacogenetic neuromodulation that possess properties favorable for use in human patients. We have begun this investigation by expressing the candidate receptors in cultured COS-7 cells and measuring their activation in the presence of their ligands.

Getting Through: Gait Modifications for Navigating Openings

Emma Celano, Psychology

Sponsor: Professor Karen Adolph, Psychology and Neural Science

Walkers need to modify their actions to meet the demands of their environments, turning to slip through a partially closed door or ducking under a low-hanging branch. Navigating through openings requires gait modifications, especially if the size of the opening is too small relative to the body. Horizontal and vertical openings each require different gait modifications for passage, are specified differently by visual information, and involve different body parts and dimensions. To test walkers' sensitivity to demands for gait modification, we asked participants to judge whether they could walk through horizontal openings without shoulder rotation, and through vertical openings without ducking. Participants walked through the openings so that we could determine which sizes actually elicited gait modifications. Participants turned their shoulders when more space was available. Moreover, verbal judgments accurately predicted whether openings required gait modifications. The differences between horizontal and vertical openings illustrate that walkers account for the dynamic properties of walking and to scaling decisions to body dimensions.

Analysis of Homing Patterns and Tumor Rejection of Adoptively Transferred T-cells Matured Under Different Cytokine Conditions

Jaime Chao, Biology

Sponsor: Dr. Michelle Krogsaard, NYU Langone Medical Center

Adoptive Cell Transfer expands *in vitro* and reinfuses a patient's tumor-specific T-cells to mediate tumor regression. Cytokine signals and antigen-presenting cells differentiate naive T-cells into T-cell phenotypes with specific functions. We aim to determine how *in vitro* cytokine environments affect *in vivo* T-cell homing and tumor regression. T-cells isolated from mice expressing the V β 13 T-Cell receptor are expanded *in vitro*. T-cells and GVAX, a vaccine secreting the immunostimulatory molecule GM-CSF, are injected into irradiated mice with melanoma tumors. To analyze if homing had an influence, adoptively transferred T-cells were isolated from tumors. *In vivo* imaging studies are underway to further analyze

the homing of T-cells with the purpose of elucidating the differences in tumor rejection between T-cell subsets.

Behavioral Study of Fear and its Implications on Skin Conductance Recordings

Daanish Chawala, Neural Science

Sponsor: Dr. K. Luan Phan, University of Michigan Health Systems

We conducted a study using a within-subjects design, coupling a standard Pavlovian fear extinction paradigm and simultaneous skin conductance response (SCR) recording in ten healthy adult volunteers and tested extinction retention twenty-four hours after extinction learning. During fear acquisition, subjects were presented with three different colored squares (conditioned stimulus, CS); two of the squares (CS+s) were paired with an aversive noise burst (unconditioned stimulus, US), while the third square (CS-) was never paired with the US. Subjects showed an increase in SCR to the CS+s and maintained low SCR levels to the CS-. Twenty-four hours after fear conditioning, one CS+ was extinguished (CS+E) while the other CS+ was not (CS+U). At the beginning of the extinction session subjects showed high SCR, indicative of successful fear conditioning from the previous day, but over the course of the extinction session, SCR levels gradually decreased to the CS+E. Twenty-four hours after fear extinction, subjects repeatedly presented with the CS+E and CS+U in the absence of the US to assess success of extinction recall on SCR. Subjects showed lower SCR to the CS+E than compared to the CS+U, suggesting that successful within-session extinction was successfully maintained twenty-four hours after extinction learning.

Development of Transgenic Lines in *Arabidopsis thaliana* to Help Define Transcriptional Regulatory Network Controlling Fruit Growth

Johnathan Chen, Biology

Sponsor: Professor Michael Purugganan, Biology

Understanding the genetics that underlie fruit development will provide insight into the molecular basis of plant diversity, and has practical agricultural implications as well. Studies on *Arabidopsis thaliana*, one of the main model systems for studying fruit development, have recently yielded further details on how fruit size and shape are established within the plant. Recently, a MADS-box transcription factor called GORDITA (GOA) was shown to play an important role in determining fruit growth by repressing cell expansion; the loss of this gene produced significantly larger and wider siliques. Although GOA has been functionally characterized, little is known about the regulatory interactions and downstream targets

of this transcription factor. To identify the direct and indirect targets of GOA, we are using complementary approaches of ChIP-seq and RNA-seq. To perform these experiments, we first had to develop several transgenic plants using cloning and plant transformation techniques. To date, we have developed over fifteen independent lines for each plant construct. We are now currently validating the lines for homozygosity and proper gene expression. Ultimately, these transgenic lines will be used in future experiments to help define the transcriptional regulatory network underlying fruit development.

Structural and Physical Properties of Polycyclic Aromatic Hydrocarbon Tumorigen Dibenzo[a,l]pyrene-DNA Adducts

Neil Chen, Biochemistry

Sponsor: Professor Nicholas Geacintov, Chemistry

Polycyclic aromatic hydrocarbons (PAHs) are a family of compounds that are byproducts of fossil fuel combustion and are present in cigarette smoke. Many PAHs, such as benzo[a]pyrene (B[a]P) and dibenzo[a,l]pyrene (DB[a,l]P), are potent carcinogens. These compounds are activated in mammalian cells and tissues to become powerful genotoxic diol epoxide intermediates that react chemically with DNA bases guanine and adenine. Fortunately, the human DNA repair system, nucleotide excision repair (NER), recognizes damaged DNA bases and excises them from the genome. Recent experiments have shown that DBPE-dG adducts are moderately repaired, while the analogous adenine adducts are not repaired. This lack of repair can be understood in a structural context using fluorescence and UV spectroscopy to evaluate DB[a,l]P adducts' physical properties and structural features. UV and fluorescence spectroscopy revealed a strong red shift of (+) and (-)-*trans* DB[a,l]P-dA that reflected an internal, intercalated conformation. The strong red shifts also indicated a strong bonding interaction between the intercalated adduct and DNA base.

Use of Zelda Specific Shmir to Create Zelda Mutants

Jonathan Chung, Biology

Sponsor: Professor Christine Rushlow, Biology

Maternal gene products loaded into the oocyte control the initial events of embryogenesis. Zelda is a transcription factor that activates the zygotic genome of *Drosophila* embryo; transcripts are loaded into the oocyte while in the mother's ovaries and are later translated. Later in development, zygotic Zelda replaces the maternal Zelda. Female flies incapable of producing Zelda in their ovaries produce embryos that lack maternal Zelda or *zelda* mutants. In our lab, it is difficult to collect large amounts of *zelda* mutant embryos because generating

zelda mutants in the mother's ovary affects ovary development, causing the mother flies to lay poorly. A new method of generating *zelda* mutant embryos has been developed using a transgene encoding a double-stranded RNA hairpin structure targeting *zelda* sequence. It is expressed in the ovary where it will knockdown maternal *zelda* expression by the siRNA mechanism (referred to as *zelda-shmir*). To assay if *zelda-shmir* embryos are depleted of maternal Zelda and are affected for gene activation as that of *zelda* mutant embryos, antibody staining and in situ hybridization were performed. My results show that *zelda-shmir* embryos phenocopy that of *zelda* mutants; the mother flies producing *zelda-shmir* embryos lay much better, allowing us to obtain mutants more efficiently.

The Effects of Salinity Variance on the Invasive Species, Eurasian watermilfoil (*Myriophyllum spicatum*).

Jennifer Cocciardi, Environmental Studies, Scott Evans, SUNY Geneseo, and Marco Finocchiaro, Montclair State University

Sponsors: Professors Meiyin Wu, Paul Bologna, Montclair State University,

Eurasian watermilfoil (*Myriophyllum spicatum*) is an invasive species overtaking and disrupting the ecosystems of many freshwater lakes in the Northeastern United States. There is a concern that if this invasive species moves into brackish water and is able to survive, it could enter into estuarine systems and create more problems. This study, conducted at Lake Wapalanne in New Jersey, examines the toleration level of Eurasian watermilfoil to differing salinity concentrations, in hope of examining this concern. Eurasian watermilfoil samples were collected by hand and placed in tanks with varying salinities (parts per thousand) of lake water. Half the samples in each tank were rooted into the sediment and half left floating, to represent real-world conditions. The biomass of each specimen was weighed before and after being placed in the tanks. The percent biomass change in the rooted Eurasian watermilfoil showed a constant decrease in collaboration with higher salinity, while the floating specimens showed no trend as salinity increased. This can indicate that floating Eurasian watermilfoil specimens able to reach a stream can be carried to estuarine ecosystems and survive.

The Effect of Leptin Overexpression on Hypothalamic Feeding Circuits

Emma Crichton, Psychology

Sponsor: Dr. Rebecca Leshan, Rockefeller University

Leptin is a peptide hormone that is produced by fat cells in approximate proportion to energy (triglyceride)

content; low body fat=low leptin, high body fat=high leptin. In addition to leptin's effects on feeding, previous research has demonstrated roles for this hormone in other systems such as fertility, brain development, and arousal. For example, development of a particular neuronal circuit important to homeostatic regulation of feeding, projections from the hypothalamic arcuate nucleus to the paraventricular nucleus (ARC → PVN), is known to be affected by levels of leptin. Lack of leptin during a critical developmental period reduces ARC axon projections in PVN. It is not known how this development is affected by abnormally high levels of leptin, a condition common in the overweight and obese. Here we examine the effect of elevated leptin on the ARC → PVN feeding circuit using transgenic mice that overexpress leptin (LepTG). We especially focus on the projections of ARC neurons expressing agouti-related protein (AgRP), a potent orexigen. These studies will be important in determining how early exposure to high leptin may affect brain development (associated with feeding). The increased occurrence of overweight and obesity in children demands an understanding of how the exposure to abnormally high leptin may affect neural feeding circuits, and may lead to new treatments to prevent obesity and associated conditions, such as diabetes and heart disease.

Quantitative Analysis of *c-MYC* Overexpression on the Mutation Rate in Human Cells Using the *PIG-A* Gene

Kenneth Csehak, Biology

Sponsor: Dr. David Araten, NYU Langone Medical Center

Previous studies have demonstrated that deregulated expression of the proto-oncogene *c-MYC* is frequently seen in human tumors, including Burkitt's Lymphoma (BL), and may lead to genomic instability and increased cell proliferation. Here we have performed an analysis to determine if increased *c-MYC* leads to an increase in the mutation rate (μ) of human somatic cells. Using our previously developed assay based on the X-linked *PIG-A* gene, where a single mutation causes the loss of all glycosylphosphatidylinositol (GPI) anchored membrane proteins, seven BL cell lines were analyzed for μ . Here a bimodal pattern was observed, with three cell lines exhibiting μ above 200×10^{-7} mutations per cell division, and four with μ below 25×10^{-7} , compared to an average μ from normal donors of 10.6×10^{-7} . Using the P493 cell line, where *c-MYC* is expressed under the control of a tetracycline regulated promoter, we measured μ of P493 clones under both high and low *c-MYC* conditions. In three of the six sets of clones analyzed, cells grown in low *c-MYC* conditions exhibited a higher μ than that of the corresponding clone grown in high *c-MYC* conditions

and two sets showed no difference in μ between the two conditions. This suggests that *c-MYC* overexpression alone is not sufficient to cause hypermutability of human B cells.

Effect of Sticky Ends on Three-Dimensional DNA Self-Assembly

Esra Demirel, Journalism

Sponsor: Professor Nadrian Seeman, Chemistry

The tensegrity triangle is a rigid DNA motif with three-fold rotational symmetry, consisting of three helices that are directed along linearly independent vectors. The length of the sticky end reported previously was two nucleotide bases, and demonstrated the ability to program crystalline DNA arrangements. In the current study, triangle motifs having just one base in the sticky end and triangles with no sticky ends are studied for crystal formation. Sticky ends contribute to stabilize longitudinal interactions between stacked DNA molecules to provide pseudo-continuous DNA helices. This assembly might form a three-dimensional crystal giving a better resolution for structural analysis of DNA self-assembly and crystallization of triangular motifs with no sticky ends will indicate the influence of other structural parameters which might occur depending on the DNA helix geometry. Moreover, the length of the sticky ends may also provide a flexibility to reverse the assembly process, thus enabling us to create a reversible structural array.

Quantification of Lysosomal Polarization Rates in Differentially-Matured CD8+ T-Cells

Janna K. Dougherty, Biology

Sponsor: Dr. Michelle Krosggaard, NYU Langone Medical Center

Cytotoxic T lymphocytes (CTLs) are immune cells that destroy infected or damaged cells, and show promise for use in adoptive cell therapy (ACT), which uses the patient's own modified CTLs to eliminate tumors. Differentiation of CTLs from naïve to central-memory and effector-memory phenotypes affects their functional properties. Understanding the specific CTL activation components that determine these differences may guide selection and optimization of CTLs for ACT. The general research goal is to identify activation components that lead to functional differences between CTL differentiation states. An important phase of activation is the polarization and release of lytic granules, which induces target (tumor) cell apoptosis. The project's specific aim is to determine if differences in polarization rates between differentiation states contribute to overall functional differences. We used live-cell imaging to measure granule polarization of naïve-like, central-memory, or

effector-memory CTLs. The results indicate no differences in polarization rate between naïve and more differentiated states; however, more differentiated T-cell phenotypes have greater granule content. This suggests that higher-efficiency cell killing by more differentiated CTLs may be linked to increased granule content, but not to their rate of delivery. These results contribute to our overall understanding of CTL activation and may help refine CTL selection to optimize ACT.

ToRCH Pathogen Prevalence in Pregnant Women of Iquitos, Peru

Kathryn Elkins, Chemistry

Sponsor: Dr. Oralee Branch, NYU Langone Medical Center

Placental malaria and the ToRCH pathogens cause inflammation in the placenta and umbilical cord. The ToRCH pathogens are Toxoplasmosis, Rubella, Cytomegalovirus (CMV), and Herpes. These infections are suspected to cause congenital infection during pregnancy; in our study, we are interested in three of the ToRCH pathogens: *Toxoplasma gondii*, rubella virus, and CMV. In this investigation, we aimed to determine the frequency of Toxoplasmosis, Rubella and CMV (TRC) infections in women at time of delivery (*a partum* women) with and without malaria infection. Enzyme Linked Immunoassays (ELISAs) and multiplex cytokine assays were used to determine recent TRC infection and to differentiate a TRC diagnosis from a malaria diagnosis. By comparing demographic data with experimental results, women with TRC and malaria infections were associated with having definitive high inflammatory responses and adverse birth outcomes. In conclusion, we find a high prevalence of recent TRC infection in malaria positive and negative pregnant women. Tests for TRC and malaria during the third trimester could detect a significant number of infections. With these tests, we can predict adverse birth outcomes, and we can begin to treat mother and infant before delivery to lessen the effects of inflammation.

Concentration Dependence of Persister Formation in *E. Coli*

Derek Essegian, Biochemistry

Sponsor: Professor Neville Kallenbach, Chemistry

Antibiotics rarely exterminate the entire population of bacteria during an infection. A small number of cells that are resistant to antibiotics seem to persist; when these remainders are re-inoculated, they produce new colonies of bacteria with ease. Known as “persisters,” these bacteria are a phenotypic subpopulation that do not differ genetically from the resultant parent strain. Thus, one can conclude that antibiotic treatment to a non-resistant strain

cannot fully eradicate a bacterial infection. How does this persistent state occur and how can we work to eliminate a bacterial culture or infection? This study set out to see if the persistent state is concentration dependent: that is, do persisters “talk” to one another via a mechanism analogous to quorum sensing? If so, then theoretically, a quorum-sensing inhibitor could work in combination with antibiotic treatment to eliminate a bacterial infection. Bacteria were treated with antibiotics at concentrations that were five times greater than their MIC to ensure all non-persister cells were killed. They were then resuspended in spent medium from stationary phase culture to determine if the persister formation increased due to a higher concentration of said quorum sensing molecules.

An fMRI Study of Ketamine in Treatment-Resistant Depression

Shira Falk, Psychology

Sponsor: Dr. James Murrrough, Mount Sinai School of Medicine

Ketamine, an anesthetic agent, has recently shown promise as a therapy for treatment-resistant depression. When looking at photographs of human faces showing different emotions, depressed patients display overactive function in the subgenual region of the anterior cerebral cortex (ACC), as measured by neuroimaging. Functional MRI (fMRI) studies of the effect of ketamine in healthy volunteers have shown a decrease in activity in the ACC. This suggests that ketamine may improve outcome in depressed patients through its activity in this region of the brain. We hypothesize that the antidepressant response to ketamine will be associated with decreased activity in the subgenual anterior cerebral cortex, and with changes in associated areas of the brain, such as the amygdala.

The Role of the PICK1 Trafficking Pathway in Li⁺-Dependent Synaptic Regulation

Mobeen Farooq, Biology

Sponsor: Professor Edward Ziff, NYU Langone Medical Center

Lithium (Li⁺) is an important drug used in the treatment of depression and manic behavior. It is known that Li⁺ inhibits the protein kinase (GSK3), but how it relieves depression and mania is not understood. We evaluated the role of the PICK1 protein in Li⁺ treated neurons via the utilization a PICK1 knockdown system. It is our hypothesis that PICK1 is required for the increase in GluA2 trafficking to synapses when GSK3 is inhibited by Li⁺ and that there will be no increase in GluA2 levels at synapses in neurons that lack PICK1. Current results suggest that Li⁺ may not be dependent on the PICK1 trafficking system, as neurons that lacked PICK1 showed a

marked increase in their surface expression of GluA2. This raises the possibility that Li^+ stimulates the trafficking of AMPA receptor by a new or modified mechanism.

Brief Tools for Assessing Dietary Quality in Primary Care: A Pilot Study

Aisha Hasan Middle Eastern Islamic Studies

Sponsor: Dr. Melanie Jay, NYU Langone Medical Center

Several chronic diseases can be managed in part with dietary change. Such treatment is difficult to promote in primary practice, however, because of the lack of clinically useful and validated tools for assessing diet and physical activity. The purpose of this pilot study was to identify useful screening questions for targeting dietary change by asking primary care patients to report on the quality of their diets, and by comparing results with data from a standardized dietary recall. We recruited adult female patients in the waiting room of a public inner city clinic. Patients were given a questionnaire asking them to report on dietary behaviors and physical activity (thirty items) and to rate the quality of their diets (six items) on a four-point Likert-type scale. Within one month of the questionnaire, patients were contacted by phone and asked to provide detailed information in three twenty-four-hour dietary recalls. Compared to those who disagreed, patients who agreed with the statement “I generally eat a healthy diet” had fewer kcal (1073 vs. 1465, $p=0.06$), lower percent saturated fat (7.39 vs. 10.79, $p=0.02$), lower added sugar (27.87 vs. 45.99, $p=0.048$), and higher percent calories from protein (16.88 vs. 21.93). Patients who agreed with the statement “I usually control portions” had lower kcal (1122 vs. 1595, $p=0.06$) and lower saturated fat (10.47 vs. 17.7, $p=0.06$). Patients who agreed with the statement “I usually pay attention to fat in my diet” and “I eat plenty of fruits and vegetables each day” also trended towards having healthier diets as measured by the recalls. Future studies are needed to clarify these questions’ operating characteristics and validate them in larger patient populations.

Heterodimers of Deoxyhypusine Synthase in *Entamoeba Histolytica*

Harrison Hayward, Biochemistry

Sponsors: Professor Burt Goldberg, Chemistry; Dr. Daniel Eichinger, NYU Langone Medical Center

The purpose of this ongoing experiment is to determine the kinetic properties of the enzyme Deoxyhypusine synthase found in colonic parasites such as *Entamoeba histolytica* that cause the diseases colitis and dysentery. DHS is responsible for the post-transcriptional modification of eukaryotic initiation factor 5A (eIF5A), converting a conserved lysine residue into the amino acid hypusine. This mechanism has been found to be up-regulated

throughout the encystment process, which produces an infectious cyst that is transmitted from person to person. The enzyme has shown differing affinities for two isoforms of eIF5A, labeled 555 and 577. Through numerous protein assays, the Michaelis constant and maximum reaction rate for 555 and 577 have been calculated. It has been shown that the K_m for 577 is much lower than that of 555, while the V_{max} of 577 is a degree of magnitude higher than that of 555, suggesting that the enzyme has a higher affinity for 577, raising the question as to the circumstances under which either substrate is preferred. From this point, the enzymatic activity of DHS in the presence of inhibitors will be observed.

From Tail to Trunk: The Migration of the Heart Precursor Cells in *Ciona intestinalis*

Dylan Iannitelli, Neural Science

Sponsor: Professor Lionel Christiaen, Biology

High-content screening via complex phenotypic scoring systems is used to extract data from observed, genetically manipulated samples based on qualitative and/or quantitative parameters. In the simple chordate *Ascidian Ciona intestinalis*, we aim to characterize the migration of two cardiac progenitors, the Trunk Ventral Cells (TVCs), in their migration from the tail anteriorly into the ventral trunk. A previous characterization of the phenotype was demonstrated using a scoring system developed by Christiaen et al. in 2008, which captures information about the extent of the migration of the TVCs and their detachment from two Anterior Tail Muscle (ATM) precursors of the same lineage. We use wild-type, dominant-negative, and constitutively-active forms of Rho and Rab GTPases, genes integral to the cellular processes of actin dynamics and vesicle trafficking respectively, and both necessary for cell polarity and migration, in order to begin to characterize the variable migratory phenotypes of transgenic embryos. We hope to expand upon the current migration phenotype scoring system in terms of the number and quality of parameters assayed. This expansion will allow for potential use of high-content screening to form functional gene networks as well as expand our knowledge of the specific cellular functions of migration genes within the heart precursors.

Phosphorylation of the Androgen Receptor by PIM1 in Hormone Refractory Prostate Cancer

Niloy Jafar Iqbal, Biology

Sponsor: Dr. Susan Logan, NYU School of Medicine

A major focus of therapeutic interest in the treatment of prostate cancer is in the mechanism of action of the androgen steroid hormone receptor (AR), a master regulator of both androgen-dependent and castration resistant

prostate cancer. Integration of cell signaling pathways and the androgen receptor (AR) can be achieved through phosphorylation of AR by cellular kinases. The kinases responsible for the numerous phosphorylation sites of the androgen receptor and the functional consequences of phosphorylation remain to be elucidated. Bioinformatic analysis revealed AR serine 213 (S213) as a putative substrate for PIM1, a kinase overexpressed in prostate cancer. Therefore, phosphorylation of AR serine 213 by PIM1 was examined using a phosphorylation site-specific antibody. The results indicate that PIM1 specifically phosphorylated wildtype AR, but not an AR serine to alanine mutant (S213A) that cannot be phosphorylated. Catalytically inactive PIM1 K67M mutant also did not phosphorylate AR. An examination of AR mediated transcription showed that reporter gene activity was reduced in the presence of PIM1 and wild type AR, but not S213A mutant AR. Androgen mediated transcription of PSA and Nkx3.1 was also repressed in the presence of PIM1. Immunohistochemical analysis of prostate cancer tissue microarrays showed significant P-AR S213 expression that was associated with hormone refractory prostate cancers.

Quantum Reduced Three-Dimensional Analysis of a Water Molecule Confined in Carbon Nanocages

Brian Kaiser, Biochemistry

Sponsor: Professor Zlatko Bačić, Chemistry

The quantum dynamical analysis of a water molecule in a C60 carbon cage and also in a C70 cage was performed. A classical approach was used in order to obtain potential energy surfaces in one-dimensional cuts, two-dimensional contour plots, and three-dimensional isosurfaces. The original six-dimensional problem (three rotational dimensions with three translational dimensions) was reduced to a three-dimensional problem by averaging the rotational Euler angles in order to decouple rotational eigenstates from translational eigenstates. Using a method called discrete variable representation (DVR), an orthonormal basis function was used in order to accurately approximate the discrete energy levels and their associated wave functions. From here, degeneracies were analyzed, quantum numbers were assigned, and reduced probability density functions were calculated. The unique splitting of energy levels was analyzed by the comparison of wave function isosurfaces. The wave functions and probability density functions were visualized in three dimensions with such isosurfaces in Matlab.

Dysregulation of Tetrahydrobiopterin in the Etiology of Schizophrenia

Alexandra Kelly, Neural Science

Sponsor: Professor Catherine Clelland, Columbia University

Tetrahydrobiopterin (BH4) is an essential cofactor for amine neurotransmitters dopamine and serotonin. Deficiencies in BH4 can result in severe neurological disorders, causing a dysregulation of neurotransmitter systems, and has been suggested as an etiologic factor in schizophrenia. A highly significant biopterin deficit in schizophrenic patients compared to controls supports the hypothesis that dysregulation of BH4 biosynthesis is involved in the etiology of schizophrenia. We hypothesize a genetic basis behind the BH4 deficit in schizophrenia. Thus, we propose to sequence six BH4 biosynthesis pathway genes, plus thirteen additional BH4 regulation-associated genes from 180 patients to investigate the relationship between gene variants and BH4 levels in schizophrenia. Once the DNA has been accurately measured, and using the same quantity of DNA for each patient, we can perform a multiplex sequence assay of the nineteen genes, and test for the relationship with plasma biopterin levels also assayed in each patient. This could produce a link for early diagnostic testing and early treatment for those at risk of developing schizophrenia. Insight into the genetic basis of the schizophrenic biopterin deficit will be important to the development of medications and improving the overall clinical outcome for schizophrenic patients.

Crystallization of a PX motif

Jee Kim, Chemistry

Sponsor: Professor Nadrian Seeman, Chemistry

The PX motif (paranemic crossover) has been developed as an alternative to the sticky ends interaction for the cohesion of large DNA structures. It is a four-stranded motif in which the DNA strands interwrap around each other without any covalent linkage. This motif has been used as the basis for intramolecular and intermolecular cohesion in structural DNA nanotechnology. In the past ten years, many attempts have been made to characterize the motif. The goal of the project is to crystallize two types of PX motifs via standard crystallization protocol in order to obtain an X-ray diffraction of crystals.

The effects of Us3 on HSV-1 Activity

Kenneth Lam, Biology

Sponsor: Dr. Ian Mohr, NYU Langone Medical Center

The function of the protein Us3 in Herpes Simplex Virus -1 during infection is currently unknown. Based on prior research, it is known that the lack of Us3 in

HSV-1 is responsible for the attenuation of viral particle production in normal human dermal fibroblasts. The role of such a mutation in neurons, particularly rat superior cervical ganglia, is, however, currently not understood. By culturing neurons extracted from rat superior cervical ganglia, it becomes possible to culture an infection of HSV-1 in neurons in vitro. Through this culture, we seek to determine the effects of the lack of Us3 on the ability of HSV-1 to replicate. In doing so, a better understanding of how the virus acts upon entry into neurons can be achieved.

Proteomic Analysis of Nickel Particle Induced Vascular Dysfunction

Joanne Lee, Environmental Studies

Sponsor: Dr. Lung Chi Chen, NYU Langone Medical Center

Previous research found that Jinchang, China, an industrial city nicknamed the country's "nickel capital," exploits many of its mineral resources, creating pollution with high levels of particulate matter 2.5 μm in diameter. Zhangye, a city adjacent to Jinchang, is without the high concentrations of nickel due to its westward location and the Qilian Mountains that separate the two regions. My study explores the effects that nickel pollution has on protein expression. A previous study isolated forty-two proteins that showed significant upregulation or downregulation due to whole body nickel exposure of mice using 2-D gel electrophoresis. I was able to determine the particular functions of the proteins related to nickel exposure, group related proteins into pathways, and look for those that have a role in vascular dysfunction. This data provides a more comprehensive analysis of the effects that nickel pollution has on human health and will be later confirmed by genomic analysis.

A Parallel Stalmarck Prover

Jiao Li, Computer Science

Sponsor: Professor Clark Barrett, Computer Science

We present the design and implementation of a new parallel approach to solve the propositional satisfiability problem. Considerable research has gone into modern approaches to this important problem; however, our approach is inspired by the less-well-studied Stalmarck procedure for propositional logic. Today's desktop and laptop computers, and even mobile phones, now ship with multiple cores, and we argue that a Stalmarck solver is more naturally extended to utilize this hardware than other SAT solver designs, due to largely independent applications of its core reasoning apparatus. The expected result of this project is to produce a SAT solver that is able to utilize modern computing hardware and is therefore

faster than single-core-only solvers. We explain the satisfiability problem, contrast our design with others, provide intuition for why it is more naturally parallelizable, and report on initial experimental results from our implementation. The results confirm our hypothesis that linear speed-up can be achieved with this novel algorithm—and therefore that we can make use of multiple cores effectively.

Screening *Drosophila* Maternal mRNA-binding Proteins in *Nasonia* via pRNAi Knockdowns

Blair Matarlo, Biology

Sponsor: Professor Claude Desplan, Biology

In early embryonic development, the major axes arise from asymmetry within the embryo. To create these spatial distinctions, mRNA binding proteins and their cofactors transport mRNAs to regions in the embryo and regulate translation. Among insects, the long-term developmental model evolved independently in two distantly related lineages: *Drosophila* and Hymenoptera. Studies have revealed different embryonic mRNA gradients in the two lineages, indicating unique functions and localizations for maternal mRNAs. I am interested in mRNA binding proteins involved in anterior-posterior axis formation. I used *Drosophila melanogaster* (Dm) and *Nasonia vitripennis* (Nv) as models of the two lineages. I screened for differences in mRNA localization or function by creating knockdowns of homologous Dm genes in Nv embryos using pRNAi and comparing the phenotypes to known Dm mutants. Most knockdown phenotypes were similar to Dm, but four showed interesting differences: FTP3, Hrp48, sqd3 and Par3, with the presence of novel phenotypes with sqd3 and Par3 suggesting a divergence in function. The range of Par3 mutant phenotypes revealed a potential evolved function of Par3 in Nv. Determining the functions and targets of homologous RNA binding proteins can better elucidate new functions and the convergent evolution of these two systems.

The Role of the TORC1 Pathway in Yeast Cell Quiescence

Alicia Mastrocco, Biology

Sponsor: Professor David Gresham, Biology

The TORC1 pathway is a nutrient-sensitive signaling pathway conserved throughout eukaryotes. In *Saccharomyces cerevisiae*, the pathway plays a role in cell growth and quiescence by regulating diverse cellular processes including metabolism and protein synthesis. Chemical inhibition of the TORC1 pathway affects progression of yeast cells through the cell cycle, causing cells to exit active division and enter a state of quiescence. I examined mechanisms by which downregulation of

TOR1, which encodes TORC1 catalytic kinase, prolongs survival following leucine starvation. I tested whether a non-functional TOR1 results in increased levels of trehalose, a disaccharide thought to serve as a cell protectant. Trehalose levels were monitored in TOR1 knockout and wildtype cells and were found to increase similarly. I examined whether inhibition of protein synthesis suppresses lethality in leucine starvation conditions by pharmacologically inhibiting protein synthesis in cells with functional TOR1. Lethality was found to occur at an increased rate in treated cells, suggesting a critical role for protein translation in cell cycle exit and entry into and maintenance of a quiescent state. Better understanding the molecular mechanisms by which TOR functions may contribute to knowledge of mTOR, the homologous mammalian pathway, which plays a role in tumorigenesis.

The Role of Oxytocin in the Formation of Parental Bonds

Cyan McFarlane, Neural Science

Sponsor: Dr. Robert Froemke, NYU Langone Medical Center

Social interactions between parents and offspring are critical for normative child development. Negative social interactions between a child and caregiver have been shown to have both mental and physical consequences on development. My proposed experiments aim to understand if oxytocin increases paternal behavior in co-housed virgin male mice as it has been shown to increase maternal behavior in co-housed virgin females. The goals will be to determine from behavioral studies if: 1) co-housed, virgin male mice can learn to take care of mouse pups, and 2) if oxytocin treatment enhances or accelerates this learning. More specifically, we will look at whether repetitively pairing oxytocin with the sights, sounds, or smells of mice pups affects retrieval rate by the male caregiver. In addition, we will compare the retrieval rate between virgin female mice and virgin male mice to determine if oxytocin either positively or negatively affects paternal behavior in male mice. The ultimate goal of research in oxytocin-based social interactions is to understand the precise role oxytocin plays in the formation of interpersonal, social connections as well as its influence on social behavior. This insight may lead to new ways of treating social disorders such as autism and depression.

Trypanosome Lytic Factor-Mediated Innate Immunity against Leishmaniasis Infection

Maria Nelson, Biochemistry

Sponsor: Professor Jayne Raper, Hunter College

Trypanosome Lytic Factor (TLF) comprises one percent of high-density lipoprotein and provides protection

against African Trypanosomiasis as part of the innate immune system. TLF is endocytosed by the blood-borne parasite, where it is activated by the acidic environment within the parasite's lysosome and forms pores in the lysosomal membrane, leading to cell lysis. TLF has also been shown to protect against Leishmania, a kinetoplastid parasite that replicates inside the phagolysosome of host macrophages. TLF acts to opsonize the parasite for uptake by macrophages, where it is activated in the acidified parasitophorous vacuole. TLF is able to reduce parasite load by forming pores in promastigote-stage Leishmania inside the phagolysosome without activating the macrophage. The parasite is no longer susceptible to TLF, however, once it transforms to the amastigote stage inside the mammalian host. It has been shown that TLF binds the promastigote stage of the parasite, but does not bind the amastigote form. We investigated the role of Leishmania surface coat in differential binding to TLF through mutants lacking components of the surface glycocalyx and well as the kinetics of in vitro Leishmania infection under TLF pressure. In conclusion, TLF should be considered a mechanism in innate immunity as the transformation of Leishmania into a stage unsusceptible to TLF indicates the adaptive pressure TLF exerts on pathogens.

Reward Modulation of Local Field Potentials in the Posterior Parietal Cortex

Yevgeny Novikov, Neural Science

Sponsors: Professor Bijan Pesaran, Neural Science

One of the curious aspects of the brain is how it manages to take in and compare completely different types of information. How does it compare a donut to a coffee, a look to a reach? The Posterior Parietal Cortex (PPC) is known to be involved in polysensory integration as well as decision-making and seems to be important in this comparison for decision-making. Little is known about how neurons in the PPC interact while decisions are made. Examining coherent patterns of activity between cells and Local Field Potentials (LFPs) using spike-field coherence may reveal this interaction. High spike-field coherence indicates that the activity of cells and LFPs are closely correlated and points to a strong interaction, which may reflect a sharing of information. Although the reward properties of cells are well known, we found the novel result that LFPs in the PPC are also significantly reward-modulated. In addition, low frequency LFP reward modulation is non-spatial while high frequency reward modulation is spatially tuned. We also tested for significant decision-related spike-field coherence, and found it present in the 10-30 Hz frequency band. We classified PPC cells into two groups according to their coherence with LFPs

either within their region (local spike-field coherence) or in another area (distant spike-field coherence) and examined how the temporal profile of significant coherence differed between the local and distant cell populations. We found that choice selectivity occurs earliest in cells with distant coherence. We propose that neurons in the PPC share information to make a decision primarily using cells that exhibit coherence between areas.

Color-Luminance Inhibition in Striate Visual Cortex

Ahmed Ouni, Neural Science

Sponsor: Professor Robert Shapley, Neural Science and Psychology

This study examines perception of color and light. Saturation of a chromatic target could be increased by surrounding it with grey backgrounds. Black or white backgrounds, on the other hand, decrease apparent saturation. While neuronal signals for luminance and color have been found to remain segregated from the retina, several studies have highlighted their potential interaction in the striate cortex of Macaque monkeys. In the present study, we investigated this effect by performing electrophysiological measurements on human striate cortex. Using an experimental design of various hues and saturation levels, we found that chromatic saturation drives robust neuronal activity. Furthermore, maximal response was found to occur when luminance contrast between the chromatic target and the achromatic surround was equal to zero. Lighter or darker backgrounds decreased signal amplitude to chromatic saturation, and we found that this interaction is dependent on border conditions. These findings suggest that the presence of a highly inhibitory neuronal mechanism between color and luminance signals in the striate cortex could account for the perceptual interaction between these two signals.

Identification, Expression, and Binding Characterization of a Novel Sialic Acid Binder

William Pau, Steinhart School of Culture, Education, and Human Development

Sponsor: Professor Lara Mahal, Chemistry

Cell surface glycans act as mediators in biological functions such as cell-cell communication, cellular proliferation and differentiation, receptor binding, activation to host-pathogen recognition, and inflammation and oncogenesis. Glycans are recognized by a class of proteins named lectins, whose high specificity toward different glycans allows them to decode the biological information they comprehend. Lectin microarray technology is a recent technique used for glycomic profiling. By presenting a glycan analyte to a panel of immobilized lectins, a multitude of glycan-lectin interactions may be screened

simultaneously. Glycoproteins, cellular membranes, whole mammalian cells, pathogenic and non-pathogenic bacteria, viruses, or sera may be analyzed with lectin microarrays. A majority of lectins used in present-day microarrays are extracted from plants, and due to seasonal changes and purification protocols that affect their activity, they complicate the analysis of glycan structure and function. To resolve this predicament, we have produced stable recombinant lectins and introduced this set on the microarray. Herein, we present a multidisciplinary approach that combines bioinformatics, molecular biology, and chemistry techniques to identify, express and characterize a novel specific sialic acid lectin-like protein isolated from *Clostridium perfringens*, which has now been integrated into our lectin microarrays.

Self-Organization and Convection in Two-Dimensional Granular Packings Under Cyclic Shear

Christopher Peel, Abigail Polin, Bez Laderman, Physics

Sponsor: Professor Paul Chaikin, Physics

Recent computational simulations have shown that the diffusive chaotic dynamics of some two dimensional, non-equilibrium systems can cause particles to self-organize to avoid future collisions. This non-fluctuating, quiescent state is separated from the fluctuating diffusing states by a dynamical phase transition that depends on both the strain applied to the system and the volume fraction of the particles. To gain further insight into this predicted behavior, two dimensional packings of polydisperse, millimeter-scale particles were subjected to periodic, quasi-static shear deformation. The system was imaged after each shear cycle, and particle tracking software was used to determine the cumulative displacement, fraction active, and volume fraction, and also to examine the paths of individual particles. In particular, we determined threshold strains and compositions for which the emergence of a quiescent state is possible. Convective motion was also examined as a function of the strain and composition of the system.

The Activity and Structure of the Framework Nacre Protein, n16.

Christopher B. Ponce, Biochemistry

Sponsor: Dr. John S. Evans, NYU College of Dentistry

The n16 family of proteins is a member of the nacre framework native to the Japanese pearl oyster *Pinctada fucata*. These proteins are known to be involved in the formation of aragonite in the oyster's protective shell. The mechanism through which these proteins control the calcium carbonate polymorph is not well understood. This study focuses on the in vitro activity and on the structure of the recombinant version of the n16 isoform 3 (r-n16.3).

The products of mineralization assays containing r-n16.3 were identified to be predominantly vaterite with instances of single-crystal aragonite deposits. The protein was also found to assemble into aggregates and thin films in these assays. The results of dynamic light scattering studies reveal that r-n16.3 forms larger particle sizes in the presence of calcium. r-n16.3 is largely disordered (more than 50% random coil), but its secondary structure becomes more ordered in the presence of high concentrations of calcium. We conclude that r-n16.3 is an intrinsically disordered nacre protein that forms vaterite and aragonite in vitro through changes in its structure in response to calcium.

Electron Acceptor in Novel Organic Photovoltaic Solar Cell

Sydur Rahman, Biochemistry

Sponsor: Professor Adam Braunschweig, Chemistry

Current organic photovoltaics (OPVs) are plagued by low efficiency (< 10%), which limits their wider usage in generating power. The aim of this project is to raise the efficiency by manipulating the structure of the electron donor and acceptor molecules in a solar cell. Specifically, diketopyrrolopyrrole (DPP) derivatives are being prepared as the electron donors and perylene diimides (PDIs) as the acceptors. The PDI acceptor is created via a six-step synthesis on the starting material perylene-3,4:9,10-tetracarboxylic acid dianhydride. The acceptor hydrogen bonds to the DPP donor and forms stacks of repeating donor-acceptor complexes in the solid state. These complexes will ultimately be used to fabricate a solar cell that will support an electric current when irradiated by sunlight.

Mechanisms for Spatial Regulation of Gene Expression in Drosophila Development

Yekaterina Rempel, Biology

Sponsor: Professor Christine Rushlow, Biology

The Zelda zinc-finger protein is vital for activating transcription in early *Drosophila melanogaster* embryos by binding to a specific “CAGGTAG” sequence in the DNA. My gene of interest is *brinker* (*brk*), which is expressed in the lateral region of the embryo that becomes part of the nervous system. The *brk* enhancer contains one Zelda binding site. My goal was to determine if and how Zelda is responsible for establishing the width of the *brk* domain. My hypothesis was that the amount of Zelda binding sites determines the level of target gene expression. This hypothesis was tested by adding strong Zelda binding sites to the *brk* enhancer in the hopes that this would broaden the domain of expression. Constructs containing a wild-type and mutant enhancer were made and injected into embryos to make transgenic flies, which were then assayed for lacZ

reporter activity by in situ hybridization. It was found that the *brk* expression domain was widened upon addition of three strong Zelda binding sites to the *brk* enhancer. This finding is relevant to the field of genetics because it solidifies the fact that Zelda is a key protein for regulating the transcription of genes in early embryos that are vital to the survival of *Drosophila*.

A Comparative Analysis of Potential Treatments for Stargardt’s Disease

Celine Reyes, Music

Sponsor: Dr. Andrea McKenzie, Expository Writing

Stargardt’s Disease (STGD1) is a juvenile onset form of macular dystrophy. It is caused by a mutation in the gene known as ABCA4 and is characterized by an accumulation of lipofuscin pigments on the retina. STGD1 is autosomal recessive, meaning both parents of a Stargardt’s patient have the trait either as a carrier (having one allele) or a homozygote (having both alleles). Studies are being conducted to find an effective treatment for the STGD1 including stem cell transplants, gene therapy, a prosthetic eye, and pharmacological agents. STGD1 is closely related to other retinal diseases including age-related macular degeneration (AMD), cone-rod dystrophy, and retinitis pigmentosa, which are undergoing similar research towards a cure. The aim of this study was to determine the most promising treatment for STGD1 by evaluating potential treatments. I also investigated possible treatments for related conditions to gauge their compatibility for STGD1. I traced the development of treatments and weighed side effects, accessibility, cost, and practicality. I found that stem cell research, the only treatment being tested in humans, seems to have the most potential.

Adiponectin Action on Bone

Kyle Riley, Biochemistry

Sponsor: Professor Gerard Karsenty, Columbia Medical Center

The sympathetic nervous system, whose activity is regulated by signaling in the brain by an adipocyte hormone leptin, is a major regulator of bone mass accrual. Adiponectin, another adipocyte derived hormone, is regulated by the bone hormone osteocalcin. This suggests that there is cross talk between bone and adipose tissue through osteocalcin and adiponectin. The goal of this project was to examine adiponectin’s function on the regulation of bone mass. The majority of adiponectin studies have focused on the protein’s function in insulin sensitivity, but little information is available about its action on bone. We conducted a bone histomorphometry analysis and found that adiponectin-negative mice have increased bone mass. We then tested to see if adiponectin directly

signals in bone-forming cells, osteoblasts, through known signaling cascades. Since leptin acts on bone through the brain, we hypothesized that adiponectin could also act on bone in a similar fashion. Therefore we tested whether adiponectin crosses the blood-brain barrier and where it binds. We showed that adiponectin does not act on osteoblasts through known adiponectin signaling cascades; instead, it goes through the blood-brain barrier, and we have found preliminary evidence of binding.

Stunted Development of Rat Hippocampus in a Model of Anorexia

Mariel Rios, Neural Science

Sponsor: Professor Chiye Aoki, Neural Science

Anorexia nervosa (AN) is a psychiatric illness with no accepted pharmacological treatment, despite having one of the highest mortality rates. AN occurs in females in 90–95% of cases, especially in individuals with a history of anxiety disorders, and most commonly begins during puberty. This suggests that onset is triggered by hormonal modulation during puberty, causing changes in the way the brain handles stressful input. High incidence of relapse suggests that AN causes lasting changes in the brain's circuitry. Activity based anorexia (ABA) is an animal model of AN in which female rats at pubertal onset are given restricted food access and are given free access to a running wheel. Wheel running activity increases significantly once food restriction begins. We studied the morphological changes that occur in the caudal hippocampus of female rats that experienced ABA, female rats that were allowed to recover, and female rats in which ABA was induced a second time.

DNA-Functionalized Lock-and-Key Colloids

Kelvin Rodriguez, Physics; Biomedical Engineering, and Mark Korpics, Physics

Sponsor: Professor David Pine, Physics

The two main goals of this project are to synthesize colloidal gold-covered lock particles and to understand the depletion interaction of such particles when functionalized with DNA. This research project deals with the on-going research on non-biological materials designed to self-replicate artificially and undergo exponential growth. New functional materials can be created using colloids that self-assemble into pre-conceived structures through a programmable recognition and binding scheme. One method for guiding the self-assembly of colloids has been successful through surface functionalization with DNA. By attaching DNA strands to colloidal particles, one can use DNA hybridization to direct the structural ordering of the particles. Another method for guiding the self-assembly of colloids uses an alternative recognition

mechanism based on particles with complementary shapes. This method uses the lock-and-key principle, where colloidal spheres are keys and spherical colloidal particles with a spherical cavity are the locks. The key particles and the lock particles bind spontaneously and reversibly via the depletion interaction. The overall objective of this study is to characterize the lock-and-key interaction that occurs when the lock particles are not coated with DNA and when they are coated, excluding the spherical cavity, with DNA.

Analysis of Theo Jansen Mechanism

Mohamad Saleh, Physics; Philosophy

Sponsor: Professor Jun Zhang, Physics

What is it about animal movement that looks “life-like”? We often describe the motion of robotic mechanisms as jerky and less smooth than that of living organisms. The Theo Jansen Mechanism (TJM), however, is a mechanical composition of linked segments whose walking motion seems life-like. Our research focuses on providing a detailed analysis of the TJM. We first derive a system of mathematical equations that allow us to describe the TJM's motion. Then, we describe the TJM's physical aspects, specifically focusing on the amount of power it exerts when moving on sand, which we modeled as a viscous fluid. Finally, we present the results we have accumulated involving its motion's dependence on segment lengths, and we also present a qualitative assessment of how its motion is related to that of animals. We hope that by analyzing the TJM, we can contribute to a deeper understanding of life-like motion, and the dependence of an organism's motion on its construction.

Exploring New Polymers for Polymer Pen Lithography Tip Fabrication

Kevin Schesing, Chemistry

Sponsor: Professor Adam Braunschweig, Chemistry

Polymer Pen Lithography (PPL) is a recently developed scanning-probe contact-printing method that utilizes thousands of parallel polymer tips to generate features on a surface with sub-100 nm. diameters. PPL uses polydimethylsiloxane (PDMS), a low-cost polymer, for tip fabrication. The mechanical properties associated with PDMS make it a suitable material for printing organic and inorganic molecules, but unsuitable for generating sub-50 nm. feature sizes. Generation of sub-50 nm. feature sizes is important to the improved development of biosensors, chemical sensors, and high-density protein arrays. This project utilizes polymethylmethacrylate (PMMA), another low-cost polymer, as a substitute for PDMS. Also, mixtures of polymethacrylate-co-butylmethacrylate tips were made to systematically tune the Young's modulus

of the arrays. In this way, we hope to produce sub-50 nm. feature diameters, while maintaining the ability to print organic and inorganic molecules at a low cost.

Synthetic Lectins

Brian Schmatz, Chemistry

Sponsor: Professor Adam Braunschweig, Chemistry

The question of this research project concerns the selective binding of saccharides through the creation of synthetic lectins. Our aim is to synthesize a lectin-like molecular receptor that can exist within a water medium and bind one type of saccharide specifically. Our group has already created a molecule capable of selectively binding mannose in a ratio of 2:1 (Lectin:Mannose). In observance of the principle of multivalency, we believe that creation of a dimer (and subsequently a trimer and tetramer) will increase the binding affinity of this lectin by creating a ratio of 1:1 with both binding sites in close proximity. Simple and efficient syntheses are being explored to create these synthetic lectin receptors, which can then be tested for binding affinity using titration and NMR techniques.

Studying the Development of Contour Integration in Non-Human Primates Through Behavioral and VEP Measures

David Serrano, Neural Science

Sponsor: Professor Lynne Kiorpes, Neural Science and Psychology

Visual processing in the primate brain proceeds hierarchically from low- to high-level visual areas. The selectivity of neuronal activity becomes more complex with increasing levels of processing. This increasing complexity supports higher-level visual functions such as global form perception, which is the ability to integrate individual elements of an image into organized structures. Previous research has suggested that infant monkeys process images locally and only begin to show global processing at about 6 months of age, after basic visual functions have matured. To better understand how this development proceeds, we used visually evoked potentials (VEP) to measure neuronal activity from infant monkeys in parallel with behavioral measures of contour integration, a global perception task. We identified visual responses by analyzing waveform difference potentials between global form stimuli and random noise conditions. The VEP results were consistent with our behavioral data. Subjects showed an elevated pattern of VEP responses to form stimuli as age increased, which coincided with their ability to detect contours within increasingly dense random noise elements. This suggests that VEP responses serve as an accurate indicator of the

alterations in neural activity that underlies the perceptual changes taking place during visual development.

60 GHz Adaptive Wireless Systems

Jocelyn Schulz, Electrical Engineering; Computer Science, and George Wong, Mathematics; Physics

Sponsor: Professor Dennis Shasha, Computer Science

Developments in wireless communications have allowed millimeter-wavelength 60 GHz communication systems to be designed. These systems have the potential to allow high-rate data transmission but are substantially different than current wireless systems that operate at lower frequencies. Millimeter wavelength transmissions can be unidirectional, allowing for greater wireless security and transmission range; however, they are also incredibly sensitive to obstacles and environmental conditions. Our computer-simulation models allow for the development of new routines for the next generation of wireless systems to provide automatic coverage-enhancing solutions through adaptive beam-forming algorithms. The simulators include means for modeling the real world propagation patterns of 50+ GHz waves in addition to presenting adaptive-search algorithms for access point self-modification to increase network reliability. Such algorithms include rotational-time tasking, neighbor association and routing, and enhanced multiplexing routines. The techniques conceived by the simulation programs may serve as both launching points for further research and provide valuable, new, immediately-implementable ways to productively use the new technology in a variety of applications from the private to the corporate sector to the government.

Task-selective Trial Outcome Signals in the Hippocampus of Non-human Primates

Afaaf Shakir, Neural Science

Sponsor: Professor Wendy Suzuki, Neural Science and Psychology

Episodic memory organizes sequences of events and is dependent on structures within the medial temporal lobe. The formation of an episodic memory requires learning new associations and placing these associations within a broader context of time. Forming new associative memories, or memories for specific links between items, is crucially dependent on performance of a task and whether previous trials were performed correctly or incorrectly. Information about trial outcomes allows correct associations to be strengthened and incorrect associations to be weakened. To understand whether this trial outcome signal is also present during tasks that do not require new associative learning, we recorded single-unit activity from cells in the hippocampus of rhesus macaques that

performed a temporal order memory task. We found no significant proportion of cells signaling trial outcome during performance on this task (χ^2 test, $p=0.2227$).]. As this learning signal was not apparent during the temporal order task, we believe the hippocampus represents information about trial outcome in a task-dependent manner. This idea supports the current theory that the hippocampus functions in a dynamic way and changes its response properties to suit the task at hand.

A Method for the Rapid and Accurate Classification of Mutations in Proteins

Riley Simmons-Edler, Biology; Computer Science

Sponsor: Professor Richard Bonneau, Biology and Computer Science

We have constructed a protocol for predicting null (loss of function), neutral (no effect), and temperature sensitive mutations in proteins that uses machine learning and protein structural analysis to improve accuracy in understanding how changes in protein coding sequences affects biological function. Our protocol displays prediction accuracy that is comparable to or better than previous efforts in this area, while simultaneously achieving a roughly one-hundred- fold reduction in the amount of computational power required to achieve these results, making widespread use of the protocol feasible. We achieved a one-hundred-fold speed-up in the protocol by implementing an alternate approach to simulating the effects of each mutation on the structure of the protein, which greatly reduces the computational space explored and simplifies the computational model used. This improvement allows the protocol to be used to generate accurate and rapid functional annotations for large collections of mutations, such as those generated by the Cancer Genome Atlas or the 1000 genomes project.

Computational Chemistry in Fluorescent Riboswitch Design

Ken Sin, Chemistry

Sponsor: Professor Tamar Schlick, Chemistry and Courant Institute of Mathematical Sciences

Modular RNA elements called riboswitches function in a variety of bacteria as regulators of gene expression. Riboswitches terminate RNA formation by adapting a specific structure in the presence of small metabolite molecules in the cell. The goal of our project is to design a fully functional riboswitch with the ability to fluoresce so we can monitor cell activation/repression processes. Our approach is based on the hypothesis that we can synthesize functional riboswitches by replicating the folding properties of those found in nature. This is performed by scanning a large number of randomly generated sequences

for portions of the sequence critical for function and conserving them while mutating the variable regions. We narrow the list of possible candidates by comparing their energy landscapes to find those that most closely match the natural riboswitch. Results show that scanning for the conserved and fluorescent regions must be done after folding the entire riboswitch. If done prior, the interactions with the general riboswitch that will affect the formation of the region are not accounted for. Although its energy landscape may match that of a riboswitch, its folded state will lack the desired structure.

The characterization of ursine GM1 gangliosidosis

Catherine Uy, Biology

Sponsor: Dr. Edwin Kolodny, NYU Langone Medical Center

Over the last fourteen years, New England scientists have observed three cases of wild American Black Bears exhibiting strange behavior. These bears were found to have exhibited neurological symptoms, including seizures and ataxia, similar to those characterized in humans with GM1-gangliosidosis, a lysosomal disorder caused by deficient activity of the lysosomal enzyme, β -galactosidase. The goal of this project was to perform biochemical analyses to determine the glycolipid composition of brain tissue of affected bears (compared to control bears) via lipid extraction from fresh-frozen samples. Lipids were analyzed via thin layer chromatography (TLC) and quantitative comparison via sialic acid assay. TLC revealed that the biochemical composition of the affected bear contains increased concentrations of GM1-gangliosides and cerebrosides, both of which are characteristic of GM1-gangliosidosis. Increased GM1-ganglioside was quantified with sialic acid assay, revealing GM1-ganglioside concentrations to be approximately ten times that of the normal control bear. Confirming GM1-gangliosidosis in the American Black Bear allows for future identification of the β -galactosidase gene and the mutation responsible for the disease in this species. A carrier screening can then be designed and implemented in the New England population to remove carriers from the breeding program, leading to a healthier population and ecosystem.

The Role of *Irf4* in Regulation of Alternatively Activated Macrophage Priming

Lauren Ward, Chemistry

Sponsor: Dr. P'ng Loke, NYU School of Medicine

Interferon regulatory factor-4, *Irf4*, is a DNA-binding factor that has previously been studied for its role in regulating various mechanisms of immune responses, such as in differentiation of monocytes into dendritic cells

and in mature T cell function. This research studied the role of Irf4 in regulating Th2 immune responses in infections caused by helminths, specifically by *Schistosoma mansoni*, in mice. Alternatively activated macrophages (AAMs), which are immuno-regulatory cells that secrete molecules that promote wound healing and dampen harmful inflammation, have been found to be present during Th2 conditions. Recent research has implicated Irf4 as being involved in regulating the priming of macrophages into AAMs. The absence of Irf4 is expected to result in reduced Th2 cytokine production and increased levels of mortality in mice infected with *S. mansoni* due to a decreased number of AAMs. The presence of AAMs in liver and spleen tissue of infected wild-type and heterozygous mice has been confirmed through qPCR, by looking at expression of AAM markers Arg1, Fizz1, and Ym1. In infected Irf4 knockout mice, expression of AAM markers decreased significantly, indicating that the presence of AAMs was reduced and that Irf4 is involved in the regulation of AAMs.

The Cis-Regulatory Logic of a Critical Regulator of Rhodopsin Expression in the *Drosophila* Eye

Jenny Yan, Biology

Sponsor: Professor Claude Desplan, Biology

Development of sensory systems requires regulatory networks that induce differential receptor gene expression to allow organisms to react to environmental cues. The transcription factor Defective Proventriculus (dve) is critical for the expression of light-detecting Rhodopsin proteins in specific photoreceptors of the *Drosophila* eye. The goal of my project is to elucidate the cis-regulatory logic governing the cell-type-specificity and temporal dynamics of dve expression. I examined dve reporter gene constructs in different cell types at distinct stages of development (larva, pupa, and adult). I found one construct in a subset of inner photoreceptors, suggesting the presence of a regulatory element that interacts with transcription factor Ss. Control of dve expression in this construct begins in the larval stage. Another construct in outer photoreceptors was found to suggest the presence of regulatory elements. Control of dve expression in this construct begins in the pupal stage. Therefore, my data suggest the presence of at least two critical cis-regulatory elements that govern dve expression, and the regulation is independent and temporal; cis-regulatory elements can interact with distinct transcription factors and regulate dve expression in different cell types of different developmental stages.

Cloning and Expression of HEAT Repeat Containing Subunits of Condensin Complexes in *Caenorhabditis elegans*

Calvin Yoon, Biology

Sponsor: Professor Sevinc Ercan, Biology

Condensins play an integral role in chromosome assembly, which is crucial for proper cellular development. We explore the mechanism in which condensins are allied with chromosomes, mediated in part by interactions with various histone modifications. To aid the long-term goal of determining the molecular interactions between condensins and different histone modifications, I purify and clone HEAT repeat containing condensin subunits in *C. elegans* using the following methods. I PCR-amplify condensin subunits from cDNA, clone the subunits into plasmids to fuse a GST/his tag, bacterially express the recombinant protein and purify the soluble recombinant protein using the appropriate tags. These recombinant proteins will then be hybridized to histone peptide modification microarrays. In doing so, we will be able to determine which histone modifications interact with which specific subunits. The specific *C. elegans* subunits that I work with are CAPG-1 and DPY-28 of condensin I and CAPG-2, HCP-6, and KLE-2 of condensin II.

Does HSV1 Reactivation by interruption of Trk Signaling Involve Apoptosis?

Alvis Yuen, Biochemistry; Economics

Sponsor: Dr. Pamela Roehm, NYU Langone Medical Center

Neurotrophin signaling is critical in maintaining latent HSV1 infection in neurons. Neurotrophins achieve these functions by signaling by binding specific cell surface receptors (Trk). When neurotrophins are removed or signaling through Trk receptors is otherwise blocked, HSV1 reactivates in latently infected cells. K252a, a known general Trk inhibitor, was added to cultures to induce reactivation. Cultures were fixed and stained at 24, 48, and 72 hours after inhibition. The data shows that apoptosis in K252a treated cultures does not occur at greater levels than in control cultures.

NOTES