ACKNOWLEDGMENTS

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* supported by Dean’s Undergraduate Research Fund
† winner of Phi Beta Kappa/Albert Borgman Prize for Best Honors Thesis
Located at the center of a premier research institution, the College of Arts and Science at New York University has the opportunity—and the responsibility—to involve undergraduates whenever possible in the production of knowledge. We do this by putting students in direct contact with the scholars on our faculty, active researchers who routinely teach undergraduate courses. We do this also by empowering our students to conduct their own inquiries, for a liberal arts education is not only about transmitting knowledge but also about teaching our students how to learn for themselves throughout their lives.

NYU’s College of Arts and Science has long been at the forefront of promoting undergraduate research. All of our majors, for instance, offer Honors tracks to which original inquiry is central. The College’s annual Undergraduate Research Conference was established over 30 years ago and now encompasses projects in the humanities, natural sciences, social sciences, and creative writing. In addition, the Dean’s Undergraduate Research Fund, created through the generosity of alumni, parents, and friends, provides students in the College with the material support necessary to carry out their inquiries. Finally, departmental funding is also available, particularly in the sciences, through individual faculty members’ grants.

The annual journal Inquiry showcases abstracts of selected student research. This issue contains abstracts of projects undertaken in the 2005–2006 academic year. Some projects were presented at the Undergraduate Research Conference held that spring, some were supported by the Dean’s Undergraduate Research Fund, and some were conducted with the assistance of various departments. Several projects also took advantage of NYU’s study abroad programs. These abstracts represent only a very small fraction of the research undertaken by College students, both as individuals and in groups, under the close mentorship of faculty. All attest to the crucial importance of independent inquiry as a paradigm for a liberal arts education for the 21st century. We are very grateful to the students, their faculty mentors, and the generous funders who have made this sort of educational experience, and this journal, possible.

Matthew S. Santirocco
Seryl Kushner Dean, College of Arts and Science
Associate Provost for Undergraduate Academic Affairs
Professor of Classics
Angelo J. Ranieri Director of Ancient Studies
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

Afro-Peruvian Folklore in the Twenty-First Century
La June Barnes, Politics and Spanish
Sponsor: Dr. Gerard Aching, Spanish and Portuguese

Perplexed by the failure of African folklore to be incorporated into Latin American literature outside of the Caribbean, I decided to study this phenomenon in Peru because it has a practically intact African community in the coastal city of Chincha. I spent several weeks reviewing old texts and analytical essays at the National Library in Lima and at the libraries of Catholic University and the University of San Marcos. I coupled this research with interviews with blacks in Lima and Chincha and with the prominent artist Victoria Santa Cruz. Through my research I realized that Afro-Peruvians and other Afro-Latinos are overwhelmed by the “minstrel man” syndrome. They have the subjugated mind-set that they can only serve as entertainers, particularly in song and dance, which in turn limits the depth of their folkloric expression. The written word, however, gives people a “voice,” the ability to break free of expressing only what is expected. Moreover, it allows them to develop a deeper sense of consciousness. Another major factor that has stifled the African voice in Latin American literature has been the focus on seemingly more “important” minority groups, particularly the indigenous peoples of the region.

Battery Park City and the Political Economy of Regulation in New York City
Clara Brenner, History
Sponsor: Dr. Paul Mattingly, History

I have attempted to document the startlingly large number of government planning bodies that have exerted some form of control over twentieth-century downtown development. These expensive and sometimes overlapping authorities made ordinary, smaller development extremely difficult. The only private developers that were and are able to participate in city development projects in lower Manhattan have been those with extremely deep pockets and political clout to engage in mega-scale developments. Yet many urban commentators accept without question this complicated regulatory environment as permanent and necessary. This environment freezes out the spontaneous, mixed-use environment that these same commentators lament as missing from the mega-scale development they ironically see as inevitable—and which they mistakenly attribute to a failure of the real estate market rather than a failure of government. The unregulated market alone, however, will not deliver the kind of consistent quality that people want. Instead, the municipal government must create a simpler regulatory machine to oversee development which does not require the participation of mega-developers to work. I conclude that, if there is
a role for public financing, it may be in creating financing vehicles to protect private investment in projects that have a public interest component which the market won’t finance.

**Displacing Realism: Romance, Superstition, and Realist Narration in* Wuthering Heights, Jane Eyre, and Uncle Silas**

*Natalia Carrizosa, English and French
Sponsor: Dr. Denis Donoghue, English*

Emily Brontë’s *Wuthering Heights*, Charlotte Brontë’s *Jane Eyre*, and Sheridan Le Fanu’s *Uncle Silas* are each novels that play with expectations of genre. In so doing, they present a conflict between realism and romance. In realism, boundaries of plausibility are delineated in order to generate a representation of a perceived reality, often through the depiction of hierarchical social relationships. In romance, however, idealized characters, emotions, and actions represent a system of signification unavailable to realism. The first-person narrators in these novels are preoccupied with rationalism and social rules, but the stories they tell are not congruent with the boundaries by which the narrators function, particularly in relation to the presence of supernatural elements. In the same way that nineteenth-century folklorists in Britain and Ireland sought to capture and preserve oral traditions while simultaneously distancing themselves from them, these narrators detach themselves from beliefs that they associate with a lower class. At the same time they relate narratives which derive much of their significance from folklore and supernatural elements. I argue that the relationships between realism and romance in these novels expose the problematic nature of the realist gaze, which claims a monopoly on truth but fails to apprehend the signification of the romance.

**Redefining Violence: Changing Notions of Political Resistance in Modern South Africa**

*Caitlin L. Chandler, Comparative Literature and History
Sponsor: Dr. Michael Gomez, History*

In this study I set out to investigate how the various forms of violence that emerged in South Africa in the 1980s among ordinary citizens destabilized the apartheid state and how this violence was the genesis of a historical process of state violence and an ensuing trajectory of violent political resistance that continues to this day. To complete the project, I traveled to Cape Town and Johannesburg in January to conduct archival and interview-based research. My results have led me to argue that the more anomic violence which developed during the last ten to fourteen years of struggle played a very pivotal role, more so than other forms of violent resistance, in damaging the South African state by undermining all appearances of a stable nation. I argue that the diffusion of the political into the personal under apartheid was mirrored by a similar diffusion of violence—from the state, to major resistance groups which formed outside armies, to local gangs, groups, and organizations. The normalization of violence in all spheres of life under apartheid and during the resistance movement helped facilitate the mass acceptance of violent political resistance. This gradual and pervasive “diffusion” causes violence to remain a lingering (but not permanent) feature of South African society and poses great difficulty in its subsequent eradication.

**G: La Caída de Artilugio (The Fall of Gadget)**

*Miguel Díaz, History and Music
Sponsor: Dr. Louis Karchin, Music*

*G* is a small-scale opera based on “Inspector Gadget,” a mid-eighties cartoon show. This work adds one more “episode” to the series and also creates an interaction between the world of Western art music and popular culture. The story and concept of the opera are only loosely related to the show. This darker look at Gadget, in which he is manipulated by sinister forces and ultimately dismantled, is a fusion between cartoon subject matter (altered to accommodate more adult themes) and a fairly free operatic form. The music for the opera uses highly rhythmic and harmonically dense textures and a juxtaposition of tonal and atonal elements to place the listener in Gadget’s confusing and tumultuous point of view. The libretto is based on a concept developed by Tomás Díaz and myself. Tomás Díaz wrote the majority of the text, with additional text written by five other authors. I recorded six songs from the opera with three singers and piano. The results showed me the strengths and weaknesses of my compositional methods and gave me valuable experience working with musicians.

**A Supermarket in Santiago: Market, Memory, and Consensus in the Work of Diamela Eltit and Alberto Fuguet**

*Melissa Gasparotto, Spanish
Sponsor: Dr. Sibylle Fischer, Spanish and Portuguese*

This thesis will examine the literary responses to the neoliberal economic transition of Chile from 1973 to the present. Since these economic changes were
implemented under the Pinochet regime, my analysis incorporates issues relating to dictatorship such as autonomy, democracy, and memory. In the two novels analyzed, Mano de obra by Diamela Eltit and Mala onda by Alberto Fuguet, I find that despite vastly different literary and political approaches, a consensus appears with regard to the social legacy of the economic structure imposed upon the country beginning in 1973 and which remains largely intact today. That consensus is a suggestion that the free market policies instituted under dictatorship have created a social environment which fractures collective action and prevents meaningful participation in government by the public.

**Penetrating the Female Brain and Body: Tainting Flesh and Cleansing Minds in Dracula and Dora**

*In this paper I present two works of the fin de siècle, Sigmund Freud’s *Dora: An Analysis of a Case of Hysteria* and Bram Stoker’s *Dracula*, as companion texts. In both, women are represented as contaminated. Hysteria and vampirism provide mysteries that Freud and Dr. Van Helsing attempt to solve. Although the afflictions are traced to predatory male forces, such as the father and Herr K. in *Dora* and the vampire in *Dracula*, the female body and female sexuality are ultimately presented as the forces that must be conquered. I employ close readings to illuminate the parallels between these texts. I situate my findings within contexts provided by critical work done on the texts, as well as late nineteenth-century psychical research. Doctors in both texts create spaces in which they are sanctioned to delve into mysteries through penetrating the female brain and body. Their methods are analogous to those of the predatory male forces. Although on quests to reestablish female purity, the doctors convey a sense that this purity never existed, and instead cast the females as infinitely penetrable receptacles.*

**Curing Femininity: A Model of Femininity as an Infectious Disease**

*The pathology of breast cancer illuminates the extent to which the construct of femininity is deeply ingrained in our psychology. The social and cultural construction of femininity is made all too apparent to Audre Lorde during her experience with breast cancer, which she recounts in *The Cancer Journals*. An analysis of this text, in combination with several other sources of historical and contemporary medical literature, allows for an investigation into the idea of framing femininity as a disease with which women are systematically infected. This inquiry calls into question the supposed objectivity of medicine. In this paper, I examined historical representations of breast cancer, as well as theories about breast cancer developed during the 1980s, the time of Lorde’s illness. I found ample evidence with which to view femininity as a disease, characterized by the terms of its mode of transmission, its most common symptoms, and the possibilities for treatment and/or cure. The “disease of femininity” is primarily transmitted through the media. It attempts to instill hetero-normative values in its victims and, according to Lorde, can be cured only through a woman’s ability to achieve a state of self-actualization.*
A Comparison of Ireland’s Musical Tradition of Sean-Nos to Sacred Chant Music
Kathryn Hall, Music
Sponsor: Dr. Michael Moloney, Irish Studies and Music

Looking especially at Ireland’s vocal music, one can see in its sean-nos traditions a strong relationship to Gregorian chant and other ancient European modal songs. In a comprehensive study of Joe Heaney’s album and a transcription of ornamentations in “Oiche Nollag,” I was able to compare and contrast its musical and technical relationship to sacred chant. The examples I used were mostly Gregorian, which consisted of anonymously recorded conductus, kyries, and sacred monophony, which laid a foundation for composers like Leonin, Perotin, Machaut, and Monteverdi. Since I also wanted to look beyond Western Europe and its Latin heritage, I examined as well recordings of Tibetan Buddhist chants and medieval Russian Orthodox music. The results are strikingly similar. It seems that most European countries have almost identical characteristics in their chant music, but each has modified it slightly for its particular culture.

The International Situationists
Sarah Hoover, Fine Arts
Sponsor: Dr. Pepe Karmel, Fine Arts

The May 1968 riots in France shut the country down for a month: no mail system, trash pick-up, factory, or school operated until President De Gaulle’s triumphant return to power. The International Situationists (1957–1972), a group of politically active artists led by Guy Debord, have been held partially responsible for instigating these riots from their headquarters in Paris. Because it attributed this near-revolution to boredom and oppression caused by the architectural environment and the lifestyle it facilitated, the IS developed a plan, expressed in artworks and essays, for revolutionary architecture allowing a new type of existence.

My study explores the interplay between the group’s art and its texts, concluding that only by seeing the IS as elements of a single oeuvre can one understand its vision. Though I conclude that this vision was too flawed, imprecise, and poetic to be used as a practical blueprint for change, and though they have remained relatively obscure after the peaceful end to May ’68 and Debord’s suicide, the Situationists have by no means been a failure. I illustrate that the Situationists have provided us with ways to enhance our experiences in the city. Their ideas have many exigent counterparts and have influenced many disciplines. The group has created and disseminated a vocabulary that is now ubiquitous.

Returning to the Homeland: The Past and Nostalgia in Korean Modernist Short Fiction from 1940–1942
Kanako Iwahara, East Asian Studies
Sponsor: Dr. Janet Poole, East Asian Studies

As a reaction to the possibility of the loss of the Korean nation due to colonialism, three Korean modernist short story writers between the years 1940–1942 attempted to capture a pure Korean homeland unaffected by the Japanese occupation. This was a crucial period, since it was already three decades into the occupation, as well as the beginning of World War II. My research has shown that these writers all attempted various ways of returning to a true homeland in their literature, either through memory, the past, or nostalgia. In the end, however, what they find is that the Korean situation is a mere product of and a reaction to the present conditions of the occupation. Interestingly, this method of writing enabled them to come to terms with their situations because it allowed them to capture and experience the pleasure and beauty of that yearning for the Korean past. I have researched my topic through extensive reading on modernism and Korean short fiction in both English and Japanese, and carefully selected four pieces that are appropriate for the question at hand. The four that I used for my research are Kojiki no haka (A Beggar’s Grave) and Kökyō wo omou (Remembering the Homeland) by Kim Saryang; The Clear Water Pavilion by Yu Chin-o; and Evening Sun by Yi T’aejun.

Chora L Works: The Intersection of Deconstruction and Architecture
Gregory Keener, Comparative Literature and French
Sponsor: Dr. Emily Apter, French

In 1983, Bernard Tschumi won the international competition for the design of Parc de la Villette. Instead of a single form or composite plan, Tschumi based his design on the concepts of “dissociation” and “combinatory transformation.” What we see in this plan made up of its intersecting grids and twenty-eight “fol-
lies” is the deconstruction of design arising from a revision of traditional architecture, or that which is always subjugated to program, plan, and anthropocentrism. This revision is neither an attack on traditional design nor the gesture of replacing one convention with another. Instead, it is design which always is open to revision, or as Tschumi suggests, a certain “re-reading.” Parc de la Villette is therefore the arena of a certain interruption in conventions which is not a single reconstituted effect, but rather the opening-up of design to future possible effects.

One such effect was the collaboration of Peter Eisenman and Jacques Derrida, and the way in which their work together constituted a kind of intersection for both of their respective disciplines of architecture and philosophy. This intersection of philosophy with architecture, however, should not be constituted as such, but rather is a “new space” that arose as a rupture from within both disciplines. What is most fascinating about the park is the open and closed circle of referral that it contains. Tschumi’s “text” refers to an earlier Eisenman design, which in turn refers to Derrida, who in turn refers to Plato. This circle then is not so much circle as it is spiral, a spiral that is not represented visually in the park, but which can be read thematically in its design. The park is then not so much an example of deconstructionist “technique,” as one critic points out, as it is a deconstructionist “critique” of architecture through design.

**The Means and the End: Style, Structure, and the Question of Narrative in Proust’s *À la recherche du temps perdu***

**Xiaochang Li, Comparative Literature**  
**Sponsor: Dr. Keith Vincent, Comparative Literature and East Asian Studies**

Proust’s novel, *À la recherche du temps perdu*, renowned for its prodigious elaborations, functions uniquely as both an embodiment and a subversion of the classical narrative model as defined by theorists such as Roland Barthes, Gerald Genette, and D. A. Miller. Despite possessing an “end” which, as expected, unifies and gives meaning to what has come before, the *Recherche* does so without inscribing a text that anticipates, and therefore functions only in service of, such an end. In short, the text manages to unify without dismissing everything that does not build towards closure. It thus produces a creative tension between the logic of containment of classical narrative and a more open approach.

Through close textual analysis of the novel and examination of theories of narrative structure, I have come to locate the “openness” of the *Recherche* not in the ending that does not close, but in the associative, non-teleological movement of the rest of the text. I focus specifically on forgetting and repetition as the two central thematic and structural mechanisms responsible for the production of this unconventional movement. In further research I hope to examine the ways in which the *Recherche* does not so much escape the confines of classical narrative as transform them, thus rehabilitating narrative by altering what can be considered narration.

**Sex in the Medieval Polemic: Images of Muhammad and the Saracen***

**LeRoy Taylor Long, Middle Eastern and Islamic Studies, and Religious Studies**  
**Sponsor: Dr. Philip Kennedy, Middle Eastern and Islamic Studies**

The language of sex has framed a substantial portion of popular and scholarly Western discourse on Islam for well over a thousand years. This paper intends to explore the origins, intentions, and significance of sex in Christendom’s depiction of Islam, not just in theological treatises and clerical discourses, but also in significant works of late medieval and early modern literature. This exploration introduces the relationship between sex and power in the polemic. Through a gendered reading of influential texts, I argue that the Christian process of “Other-ing” Islam in Western Europe capitalized upon the masculine (and occasionally androgynous) visages of Mother Church that many scholars have overlooked in their studies of sex as a socioreligious boundary in medieval Europe. My research concludes that the Church and other establishments of power used their ideas of sex and the metaphors that expressed them to create a polemic that created, protected, and sustained a distinct Christian identity that was often defined in terms of being not-Muslim. This polemic marked changing ideas of the body, especially the social position of the female’s body. It utilized its gendered rhetoric in metaphors of sex within a pervasive patriarchy in order to socially, psychologically, and theologically place the Muslim below the Christian.
The Media and the Military in the Korean War
Dana Love, History and Journalism
Sponsor: Dr. Marilyn Young, History

Prior to the Korean conflict of 1950–1953, the relationship between the American print media and the military was usually friendly, though at times discordant. In the Korean War, when the United States experienced limited warfare for the first time in its history, the relationship between these two bodies underwent a marked change from World War II. By examining the consequences of this fluid relationship, it is possible to understand better how the strained and hostile relationship between the media and government during the Vietnam War period came about. It was the confused and chaotic nature of the Korean War that began to turn the previously amicable relationship between correspondents and the military into the acrimonious one experienced in Vietnam. In order to supplement this conclusion, I have drawn information and quotations from both primary and secondary sources. My primary texts include newspaper articles, published memoirs by both correspondents and government officials, and military documents.

The Epistolary Nurse: Florence Nightingale
“Coming out of a War”
Evan O’Connell, English
Sponsor: Dr. Martha Rust, English

I close read Florence Nightingale’s published primary documents, her Letters from the Crimea, as her written attempts to rationalize the fragmentary experience of war. Drawing on scholarship in war studies and in narrative medicine, I term Nightingale an “epistolary nurse.” She is not simply a nurse who writes, but a type of writer whose genre, the letter, in all its pauses, problematics of delivery and reception, and inherent fragmentations (of time, place, memory, sender, and recipients), reflects her wartime subject. For Nightingale, a critique of systems, as well as the healing of individuals and the reconstitution of wartime fragmentation, is implicit in her epistolary project. Epistolotherapy, or healing through letters, becomes for Nightingale a negotiating tool in a war milieu which she feels increasingly “will fall to pieces. . . .” I use fictional and nonfictional accounts from Michael Ondaatje’s The English Patient to Veneta Masson’s Ninth Street Notebook to suggest that letter writing can have a curative effect on health professionals who, under stress, are often also patients requiring their own therapeutic outlets.

Postmodern Autobiography: Reshaping Identities through Emergent Forms
Jackie O’Dell, English and French Linguistics
Sponsor: Dr. Patrick Deer, English

In examining the author-reader relationship in Dave Eggers’ A Heartbreaking Work of Staggering Genius, I explore the complexity of emergent autobiographical forms, such as blogs, that aspire towards an interactive readership. Looking primarily at Eggers’ novel, it becomes apparent that emergent and blended genres best serve socially marginalized voices. As an “identity product,” this textual vehicle is crafted to complement the author’s individual aspirations and not fit a generic type. Though celebrity is often derived from such autobiographical representations, the form in which the creator’s persona takes shape and the extent to which it relies on audience interaction are as important as the autobiographer’s personal story. Eggers’ work is ultimately a generic orphan that redistributes meaning to the process of forming emergent roles and forms both within and without the text.

Memories and Imagined Identities: Remnants of the Colonial Past
Chandani Patel, Comparative Literature
Sponsor: Dr. Ana Dopico, Comparative Literature

Through my research, I examine literature of postcolonial Egypt and India in an effort to unearth notions of national identity: how it is formed, what constitutes it, and how memory affects its construction. Contradictions and discrepancies constantly surface as citizens of these lands attempt to present their new national identity. There are discrepancies between hatred of and nostalgia for the past, hope and confusion about the future, and discontent and complacency towards the present. As these conflicts are perpetuated through genealogical memories, it becomes even more difficult to ascertain what holds the nation together. The implementation of postcolonial boundaries as manifested through religion, politics, language, and ethnicity create closed spheres of identification. These hinder the development of a unified nation, and instead further complicate its representation and definition. By comparing Naguib Mahfouz’s The Cairo Trilogy with Siddhartha Deb’s Point of Return and Salman Rushdie’s Midnight’s Children, I demonstrate that the definition of the nation lies in the shared memory of a colonial past which is unable to give any meaning to the present. These novels unmake meaning, since individuals cannot decipher the
inconsistencies of the nation-state. It is this recollection of a shared colonial past which is lacking in any relevant meaning for the present that binds individuals within the space of the nation.

Progressive Regression in the Search for National Identity: The Neo-Colonial and Pre-Hispanic Architectural Language of Mexico’s International Pavilions
Dana Perrotti, Comparative Literature
Sponsor: Dr. Carol Krinsky, Fine Arts

After overthrowing its dictator during the Revolution, Mexico was still far from having a national identity. The period’s architecture reflects the search for a national identity that would reinforce governmental ideals about progress. In international exhibitions of the 1920s, post-revolutionary Mexico needed to define itself. Architects looked to the past for inspiration, from the neo-Colonial language of Carlos Obregón Santacilia, based on Colonial Spanish style, to the pre-Hispanic forms of Manuel Amábilis, whose language renounced Spain’s presence by returning to Mexico’s indigenous roots. My research analyzes how these two disparate styles of Mexico’s international pavilions reinforce governmental policy of the time. Obregón’s neo-Colonial pavilion of 1922 corresponds to the social theories of the prominent political figure Jose Vasconcelos, who saw colonialism as a means for national elevation. The views of President Plutarco Elias Calles, who wished to purge Mexico of Spanish influence, are exemplified by Amábilis’s pre-Hispanic pavilion of 1926. By examining the speeches and essays of both Vasconcelos and Calles and by comparing their agendas with the respective architectural styles, I explain how aesthetic tendencies to regress to the past become visual manifestations of the changing political landscape and its goals for the future.

“If You Would Regain Your Freedom, You Must Agree to Do Whatever We Stipulate”: Knights, Clergy, and Spiritual Assistance in the Illustrations of the Yale MS 229 Queste del Saint Graal
Brendan Sullivan, Medieval and Renaissance Studies
Sponsor: Dr. Kathryn Smith, Fine Arts

My study is an examination of the Yale Beinecke Library MS 229, an illuminated manuscript that was produced in the diocese of Thérouanne towards the end of the thirteenth century. This profusely illustrated manuscript contains what is approximately the last third of the immense Vulgate Cycle: the Agravain, the Queste del Saint Graal, and the Mort le Roi Artu. I confine my analysis to the section containing the Queste del Saint Graal, examining the relationship between image and text in Yale 229. How does the program of images in Yale 229 present the Queste del Saint Graal? What is illustrated, what is left unillustrated, and how do these illustrations subtly reinterpret the accompanying text?

Yale 229 was produced at a moment in the Middle Ages when the laity began to develop a stronger and more independent sense of spiritual worth, an independence that challenged the authority of the clergy. I argue that the programming of Yale 229 is a reaction to this growing sense of independent spirituality on the part of the lay nobility and that the designer of the visual program emphasized the importance of the spiritual assistance provided by the clergy.

Lynching Reports and the Italian-American Press in New York, 1891–1899
Desirée M. Suo, History and Italian
Sponsor: Dr. Marion Casey, History

During the 1890s both Italian-Americans and African-Americans were the targets of lynchings throughout the United States. Through close examination of lynching reports published in L’Eco D’Italia and Il Progresso Italo-Americano, I set out to determine whether the Italian-American press was biased in their reporting of lynching or whether Italian-Americans supported African-Americans in a united racial-ethnic struggle. In the close analysis of the word choice, metaphors, and imagery used in both Italian-American and African-American lynching reports, I have found that the Italian-American press denounced lynchings alongside a critique of the American government. In differentiating between the failures of particular parts of this system, the Italian-American press created a distinction between African-American and Italian-American lynchings. Throughout reports of African-American lynchings, the writers exposed the problems with American democracy in a localized setting. In contrast, reports of Italian-American lynchings revealed the inadequacy of the Federal Government in an international context. By establishing this distinction, the Italian-American press noted the inherent differences between Italian-American and African-American lynchings. As an ethnic group which had the Italian government fighting for them in Washington, Italian-Americans held a privileged and powerful status in bringing an end to the lynching of their paesani.
The Breaking Point: Combat Exhaustion and the U.S. Psychiatric System in World War II
Jun Tashiro, History
Sponsor: Dr. Marilyn B. Young, History

World War II proved to be not only the most all-encompassing conflict in modern history, but also one that tested the emotional capacities of humanity through horrific instruments of destruction. One of the most severe consequences, especially for front-line infantrymen, was the psychological effect on those who survived. “Combat exhaustion,” as emotional breakdown was understood at the time, presented a major operational obstacle for the U.S. Army throughout the war. Army administrators attempted to eliminate predisposed “psychotics” through stronger screening measures, thereby ignoring the fact that war-related psychological effects on soldiers were inevitable. Until the last years of the war, treatment systems were absent from field medical services, although the concepts for effective treatment had been available since World War I.

By investigating sources on the development of the Army psychiatric system, I have found that administrators were negligent in properly addressing the issue of combat exhaustion; they simply did not allocate adequate resources toward the cause. The unique conditions of the old-fashioned administration helped to encourage advancements beyond treatment of neuropsychiatric disorders. These developments have had a profound effect on psychiatry as it is practiced today.

The Death Instinct and Richard Hell’s Punk Subject
Kristi Tillett, English and French
Sponsor: Dr. Bryan Waterman, English

Beginning in the 1960s with the groundbreaking work of the Velvet Underground, a tradition of subversive and innovative rock ‘n’ roll music evolved as an alternative to the dominant hippie music culture. These creative impulses developed into a full-fledged musical and artistic “scene” with the rise of New York punk in the 1970s. The major figures of New York punk and their forerunners worked at the intersection of diverse and contradicting traditions and ideologies—ranging anywhere from the New York avant-garde and the rock ‘n’ roll mainstream to the legacy of European and American bohemianism. Despite the aesthetic and intellectual priorities of its pioneers, the common consciousness of punk often focuses on its British counterpart, known for its angry, adolescent snottiness and socially critical bent.

Richard Hell, one of the founding members of the first band on the scene that later spawned New York punk, has received widespread credit for his invention of punk style, as well as for his prototypical model for the darkness and nihilism that permeates punk aesthetics. There are multiple ways to interpret the nihilistic tenor of Hell’s participation in the genesis of punk, a movement that has since taken on endless layers of significance in the spheres of youthful angst, mindless self-destruction, and willful absurdity. Yet the impulse to label Richard Hell’s will to nothingness as straightforward punk haughtiness and nothing more threatens to miss the distinct methodology with which he stages his own boredom and agony. My project takes on the need for a systematic analysis of Hell’s formulations of death and subjectivity through a Lacanian perspective on his demonstration of the death instinct, as well as his more general views on subjective experience. By bringing these two systems to bear on each other, the analysis reveals Hell’s complex combination of the alienating tendencies of the death instinct and the possibilities for performativity in the formation of a distinct punk subjectivity.

Suspicious Spaces in Ariosto’s Cinque canti
Troy Tower, Italian
Sponsor: Dr. Jane Tylus, Italian

The traditional premise that the Cinque canti (Five Cantos, composed around 1521) attach directly to Ludovico Ariosto’s epic masterpiece, the Orlando furioso (first published 1516), has restricted criticism of these cantos to issues of chronology and classification. Proceeding with the recent thesis that they begin a separate yet unfinished poem, I hope to contribute to a new phase of scholarship which appreciates the literary elements unique to the Cinque canti. Through close reading, I first examine the geography and the poetic structures used, and often subverted, for the purpose of relating this work to the treacherous political philosophy which corrodes Charlemagne’s court and which qualifies Ariosto’s anxieties for the stability of his Europe and the future of the romance tradition. What has emerged from my analysis is a pervasive motif of enclosure: by land, as warfare becomes more deceptive; by soldiers, who increasingly work for their own benefit; and by suspicion, which exposes the confines engendered by political underhandedness. In narration which exhibits a correspondingly deceptive style, Ariosto uses
ambiguous experiments with generic expectations to belie an ultimately distrustful conception of modern literary and political values.

**Shifting Boundaries: Arabization and Christian Communal Identity in Medieval Syro-Palestine**

*Lev Weitz, Middle Eastern and Islamic Studies*

*Sponsor: Dr. Philip Kennedy, Middle Eastern and Islamic Studies*

With the seventh-century Islamic conquest of Syro-Palestine, a process of cultural assimilation began that led to the adoption of Arabic as a common language in previously Aramaic-speaking communities. As Muslims, Christians, and Jews interacted more frequently and grew closer in social custom, what effect did this Arabization have on Christian conceptions of communal identity?

The writings of Chalcedonian Christians in Syro-Palestine during the Abbasid period are among the earliest of Arabic Christian texts and excellent sources through which to analyze these cultural shifts. As evidenced by Theodore Abu Qurrah’s ninth-century *On the Veneration of the Icons* and the anonymous *Summa Theologiae Arabica*, the adoption of Arabic led to Islamic and Jewish influence on Christian practice. In these cases, Christians began to neglect ritual prostration to icons and use Islamic terminology to generalize specific tenets of their faith, thus blurring established boundaries between Christians and other religious communities. While theologians like Abu Qurrah saw this effect of Arabization as a threat to their Christian identity, Christians simultaneously employed the new *lingua franca* to re-identify Christianity for medieval Syro-Palestine’s Arabic-speaking communities. The predominance of Arabic proved both a challenge to Syro-Palestinian Christian notions of communal identity and a means through which it could be redefined.

**Righteous Justice or Vendetta Justice? The Meaning of Revenge in Friedrich Dürrenmatt’s Detective Fiction**

*Ashley White, German and International Relations*

*Sponsor: Dr. Paul Fleming, History*

Very little attention has been paid to Friedrich Dürrenmatt’s detective novels. What little there is tends to be focused on drawing broad themes out of the novels as a whole rather than in-depth analysis of individual texts. My study takes the traditional reading of two of these novels, *Der Richter und sein Henker* and *Justiz*, and expands on it. Instead of focusing simply on the concept of justice and the subsequent failure of the justice system, as is the most common interpretation, I focus on the idea of revenge. I introduce the idea that the protagonists in both novels go outside the traditional rules of the justice system and take revenge on their enemies. Thus, rather than just functioning as corrupt players in the defunct legal system, a proof of Dürrenmatt’s lack of faith in the human race, the characters are forced to act outside the system. This renders them if not blameless, at least eligible for reevaluation and possible redemption. While this allows for a much gentler depiction of Bärlach, the protagonist in *Richter*, Kohler, the protagonist in *Justiz*, is still as corrupt as scholars suggest. This confirms the notion that Dürrenmatt’s fatalism and nihilism grew as he aged.

**Sovietization and the Jews in the Muslim Regions of the USSR, 1920–1940**

*Rufat Yunayev, History*

*Sponsor: Dr. David Engel, History, and Hebrew and Judaic Studies*

Historical accounts of Soviet Jewry have implicitly equated them with the Ashkenazi communities of Eastern Europe, thus eschewing a systematic approach to the experiences of Jews in largely Muslim areas, such as the Caucasus and Central Asia. I investigate how these Jews were brought into the Soviet orbit, how their case differed from that of the Ashkenazim, and what their experience illuminates about the way the Soviets established their hegemony.

Having examined autobiographical accounts and contemporary publications, I conclude that the regime’s initial approach to these communities fit into its policy of accommodating the minority nationalities in order to facilitate ideological indoctrination and cultural modernization. Thus, until the late 1920s, the Soviets provided schools in the Jews’ native language, encouraged development in drama and literature, and worked for improvements in women’s rights. With the rise of Stalin, however, the regime accelerated its efforts to create an advanced industrial state, instituted intensive economic regimentation, and scaled back its concessions to ethnic groups. As a result of these changes, these Jews had their Hebrew alphabets abolished, their periodicals and theater groups shut down, their cultural leaders persecuted, and their very Jewishness called into question.
The central concern of the social sciences is people. Social scientists try to understand what motivates people’s behavior, how people interact and communicate in society, how they produce and distribute goods and services, how they govern themselves, how they create norms, institutions, cultures, and languages, and, in turn, how these institutions and cultures shape their thoughts and their actions. The vast scope of this inquiry, aimed at understanding human behavior and the functioning of our societies, requires a variety of diverse perspectives and approaches. The methodologies of the social sciences range widely from ethnographic studies to historical investigation, formal and mathematical modeling, survey techniques, and statistical analyses of data.

—Jess Benhabib, Paulette Goddard Professor of Political Economy

SOCIAL SCIENCES

The Effect of Entitativity on Control over Spontaneous Trait Inferences about Group Members
Rebecca Ahdoot, Psychology
Sponsor: Dr. James S. Uleman, Psychology

My research investigated the effect of perceived entitativity of a group on control over effects of spontaneous trait inferences (STIs) made about individual group members. I hypothesized that high entitativity would decrease control for the effects of STIs, based on the finding that high entitativity increases stereotype application to group members and decreases the uniqueness of the individual members (Crawford et al. 2002). I used an adaptation of the false recognition paradigm (Todorov and Uleman 2002) to the Process Dissociation Procedure (PDP) (Jacoby 1991) in order to distinguish between the controlled and automatic processes involved in STIs. Participants were given entitativity information about a group and saw individual faces paired with a trait-implying sentence. Afterwards, they were shown faces along with single traits and were asked whether the trait either described the word in the photo or was explicitly stated in the previous sentence about the photo. The difference between performances on these trials yields an estimate of control. Contrary to my hypothesis, there was no effect of entitativity on control. This may suggest a number of possibilities, including that participants did not distinguish individual group members more in the no entitativity than in the high-entitativity condition.

Infants’ Use of Perceptual and Social Information for Descending Slippery Slopes
Antonia Baumgartner, Psychology, and Anna Koren, Biology and Psychology
Sponsor: Dr. Karen E. Adolph, Psychology

Infants have two available sources of information for guiding motor action under challenging conditions: perceptual information generated by their own exploratory activities and social information provided by caretakers. In previous work, eighteen-month-old infants relied primarily on perceptual information when deciding whether to walk barefoot down safe or risky slopes. They used social information from their mothers (encouraging and discouraging messages) selectively only when the probability of walking successfully was uncertain. In another experiment, eighteen-month-olds walked under low-friction conditions. They wore slip-
Teflon-soled shoes, which hampered their walking abilities so that shallow slopes were impossibly risky.

The current experiment examined infants' use of perceptual and social information under low-friction conditions. We asked whether low-friction conditions make infants more uncertain or whether they detect the limits of their diminished walking abilities. Eighteen-month-olds wore Teflon-soled shoes while walking down slopes (0°–50°) as their mothers provided encouraging and discouraging social information. Preliminary results suggest that infants defer to mothers' advice on a wider range of slopes than in previous work. On steep slopes, infants relied on perceptual information such as depth cues and avoided descent. On shallow and intermediate slopes, however, infants deferred to mothers' social message. This suggests that the low-friction conditions increased infants' uncertainty causing increased reliance on social information.

How Well Do People Make Motor Decisions Based on Their Own Motor Abilities?
Yana Bekker, Psychology, and Olga Eydlin, Fine Arts
Sponsor: Dr. Laurence T. Maloney, Psychology

In decision-making under risk, subjects choose between lotteries: for example, A (probability 0.42 of $3,000) versus B (probability 0.84 of $1,500). Human subjects typically violate normative principles in these tasks (Kahneman and Tversky 1979). In motor tasks equivalent to lotteries, however, performance is close to optimal (Trommershäuser et al. 2003). We examined this discrepancy using motor and classical decision tasks that were trial by trial equivalent. There were two sessions, practice and choice. In the practice session, subjects repeatedly tossed a bean bag at baskets placed two to fourteen feet away from them until we could estimate the probability that the subject could hit the basket as a function of distance. We could then translate a lottery pair, such as A and B above, into a choice between baskets labeled $1,500 and $3,000, placed so that the probabilities of hitting them were 0.84 and 0.42, respectively. In the choice session, eight of the subjects chose between sixteen lottery pairs in motor form, and then between these same pairs in the same order in classical form. The remaining seven subjects did the classical series first. Subjects tended to choose the riskier lottery in the motor task. This pattern was reversed in the classical task.

Local Collaboration in Ukraine and Lithuania during the Holocaust: A Comparative Study
Natalie Belsky, History and Spanish
Sponsor: Dr. David Engel, Hebrew and Judaic Studies, and History

Undoubtedly, the aid rendered by local collaborators throughout the Soviet Union during the Holocaust contributed to the enormous Jewish losses in German-occupied Soviet territories. By comparing the degree of local collaboration in Soviet Ukraine, West Ukraine, and Lithuania, I hoped to uncover some of the forces behind this phenomenon. By studying eyewitness accounts and German reports, I found that collaborators in Lithuania and West Ukraine tended to play more significant roles in the implementation of the Holocaust than did collaborators in Soviet Ukraine. While seen mostly as “auxiliary” or “secondary” forces in the latter area, West Ukrainian and Lithuanian collaborators are often depicted as the “partners” of the Nazis in carrying out the Holocaust. In order to address these differences, I explored the interwar historical background of these areas. In West Ukraine and Lithuania, the Germans were able to take advantage of preexisting trends, such as an exclusionist nationalist movement and growing ethnic tensions, in recruiting collaborators. Soviet repression in the Soviet Ukraine, however, largely succeeded in stifling the development of these tendencies. Thus, I argue that local collaboration must be seen as a phenomenon grounded within the interwar historical context of these areas.

“Today, Legal Defense Became an Issue in the Federal German Republic”: The “RAF Lawyer” and His Implications
Athena Bochanis, German and History
Sponsor: Dr. Molly Nolan, History

Much controversy surrounds the way West Germany responded to those affiliated with the Red Army Faction (RAF) “terrorist” group in the 1970s—and perhaps no group was more under fire from the state and right-wing media than the RAF’s lawyers. In my paper, I uncover the various ways the “RAF Lawyer” figure was portrayed in the media. First I analyze depictions of the “RAF Lawyer” by the right-wing press and the state, which portrayed him as a terrorist “accomplice” and “murderer.” Most interesting to me is how differently
the “RAF Lawyer” was presented in mainstream leftist publications around the same time, which made him into an “organ of legal duty” and a “win” for democracy. Comparing these to the actual writings and activities of the lawyers, I found that the “RAF Lawyer” figure came to represent something much greater than what he actually was or did. I present these finds within the greater context of West Germany in the 1970s, which was characterized by political tensions yet unknown to the Republic, and by fanatical fears of terrorism. I suspect that the “RAF Lawyer” was embraced by the left precisely because of his historical context: that is, because he could fill the ever-widening gulf between extreme leftist violence and right-wing reaction in the public sphere. By focusing on the “RAF Lawyer,” we can perhaps begin to understand some of the greater fears that plagued the young Republic in the 1970s.

**Risk and Remittance Flows: The Case of Mexico**  
Rodrigo Camarena, Economics and Philosophy  
Sponsor: Dr. Donghoon Lee, Economics

Migrant remittances have increasingly attracted the attention of economists and policy makers alike. Building upon past and current literature on the macroeconomic determinants of immigrant remittance flows, my research considers the relationship between remittances and various financial risk variables.

Taking the case of remittances from the United States to Mexico, I use information obtained from the International Country Risk Guide (ICRG) to construct a model that takes into account the financial, political, and economic risk in the remittance-receiving nation, along with other factors, to explain the behavior of remittance flows to Mexico over the past decade. My results prove conclusive with respect to all risk variables, albeit with some proving more outstanding than others. Furthermore, my research has led me to believe that the seemingly phenomenal behavior of remittance flows to other nations can also be explained by the use of financial risk variables and that this tool has much room for further application.

**Learning a Second Language: Is Your First Language a Plus or Minus?**  
Jennifer C. Y. Chen, Psychology  
Sponsor: Dr. Doris Aaronson, Psychology

Immigrants in the United States face the challenge of learning English as a second language (L2). My study examined how this learning is influenced by the linguistic structures of immigrants’ native language (L1). Participants were 84 Russian, 89 Mandarin, and 113 Spanish bilinguals. They received computer-based grammaticality judgment tasks testing six English grammatical structures in oral and written forms. These structures may be absent or present in the three L1. Accuracy was recorded to assess participants’ performance. The results indicated that the three groups experienced different amounts of difficulty processing the various structures. Their difficulty in processing an English structure was partially predicted by whether the structure exists in L1 or not. Within each language group, older arrivals (those who immigrated at age twelve or older) performed significantly worse than younger arrivals (those who immigrated at age eleven or younger). Such age differences were stronger for L2 structures...
that do not exist in L1. Older arrivals had more difficulties than younger arrivals because they received more L1 exposure, which led to a greater amount of L1 transfer. The current findings support the hypothesis that L1 transfer affects L2 performance and also indicates that other linguistic cues may play a role.

**French Bilateral Aid Allocations: Does Trade Mean Aid? Searching for Evidence of Recent Shifts in the Pattern of Giving Aid**  
*Natalie Colbert, International Relations*  
*Sponsor: Dr. Michael Gilligan, Politics*

France has long been found to favor its former colonies when giving development assistance. There have been indications, however, of shifts in French foreign aid policy during the 1990s, possibly in response to a variety of events, including the devaluation of the CFA franc. The focus of this paper is on the role of trade, when compared to historically dominant former colonial ties. Is France beginning to give more aid to countries with which she has trading partnerships, regardless of the recipient’s former colonial status?

Studying variables affecting aid commitments in the period after 1994 presents noticeable differences when compared to the entire period 1960–2004. In particular, using standard regressions and predicted values tests to attempt to estimate the effect of both trade and former colonial status over time produces negative coefficients on time trend interactions over the period 1994–2004. The results for the trade variables proved difficult to interpret and do not seem to support the conclusion that trade partnerships are having an increasing effect on aid allocations. The results do provide, however, some evidence of shifts in French aid patterns, specifically concerning the possibility that former colonial heritage had a less dominant effect on aid allocations in recent years.

**Intranasal Oxytocin Challenge in Borderline Personality Disorder**  
*Carla Correia, Psychology and Spanish*  
*Sponsor: Dr. Doris Aaronson, Psychology*

My study examines the effects of the hormone oxytocin on patients suffering from borderline personality disorder (BPD) compared with healthy controls. BPD is characterized by a large degree of instability with personal relationships and social attachments that result in impulsivity, anger, and often self-abuse. Given its trust-enhancing and stress-reducing qualities, oxytocin, a hormone found in the brain, is believed to cause an increase in trust-based cognitions and social behaviors of normal controls, as well as of patients with BPD. All subjects randomly receive one dosage of oxytocin and one of placebo on two separate visits. I then measure levels of trust using a variety of measures, including self-report questionnaires, implicit attitudes tests, and a game involving social scenarios and trust-based behaviors. While both groups are expected to show increased trust with oxytocin compared to placebo, borderline patients are expected to benefit more from the oxytocin than are normal controls due to the unstable personal relationships characteristically found in their disorder. Positive results would provide preliminary evidence for the effects of oxytocin on BPD, and further research then will be conducted.

**Queer Male Mexican Immigrants and Their Access to Health Care in New York City**  
*Michael Crachiolo, Metropolitan Studies*  
*Sponsor: Dr. Gerald Lopez, Clinical Law, NYU School of Law*

The Mexican immigrant population in New York City has quadrupled in the last ten years alone, bringing it to 122,500 people in 2000, and this is with much underreporting. Within this group are queer males who are not finding adequate health care options. The purpose of this study was to explore the access barriers to health care, and to learn how Mexican queers in NYC obtain health care. I also wanted to investigate how Mexican culture and other social influences impact this process here in the United States. This research was conducted in New York City and various cities in Mexico, using both personal interviews and ethnographic methods employing participant observation. I found a clear link between the way queer Mexican men behave in Mexico and in the United States. I also found that queer Mexican immigrant men have a more difficult time accessing adequate health care in New York City. Mexican men do not feel comfortable looking for queer-specific medical care not only because of familial influences, but also because of lack of access to information. This means that there needs to be more effort to educate the population as a whole and to conduct culturally specific health-care outreach.
Use of Visual and Tactile Information for Walking Down Slopes
Victoria A. Dietz, Psychology
Sponsor: Dr. Karen E. Adolph, Psychology

In everyday locomotion, walkers must cope with simultaneous changes in friction conditions and surface layout. In this study, I investigate whether adults can integrate information for friction and slant to control locomotion adaptively. I tested participants in two tasks. In the perceptual judgment task, they stand on a platform covered with carpet, low-friction vinyl, or high-friction rubber while viewing an adjustable sloping walkway covered with the same surface. They estimate the steepest slope they think they can stand on without slipping or falling. In the ability task, participants stand on the slope to verify the accuracy of their perceptual judgments.

Current results (n = 12) show two major trends. First, perceptual judgments are sensitive to changes in friction. Participants judged that they could stand on steeper slopes on higher-friction carpet (M = 31.92°) and rubber (M = 32.92°) than on the lower-friction vinyl (M = 25.73°). Second, despite sensitivity to friction, participants’ locomotor decisions were based primarily on slant. Participants underestimated their ability to stand on high-friction rubber (M = 4.33°) and overestimated their ability on low-friction vinyl (M = 10.40°). The range of judgments was similar and overlapping across carpet (11–44°), rubber (13–48°), and vinyl (8–39°), suggesting that friction information plays only a minor role in everyday locomotor decisions.

Exploring Implicit Influences on Social Judgments: Ruling Out Social Judgeability in the Effects Attributed to Spontaneous Trait Inferences
Vanessa L. D’Orio, Psychology
Sponsor: Dr. James S. Uleman, Psychology

Spontaneous trait inferences (STIs) have been shown to occur automatically when one person is presented with behavioral information about another (Uleman et al. 2005). These inferences have been found implicitly to affect later judgments of the people who performed the behaviors. It is possible, however, that these impressions may also be influenced by response biases. Social judgeability is a response bias by which interpersonal judgments are influenced by how judgeable a rater considers a target person to be (Yzerbyt et al. 1994). In STI studies, participants are often given behavioral sentences describing actions, along with a picture of the target or actor. Social judgeability may influence participants to rate the targets higher on traits simply because they were given information about these people. The present study attempted to separate the effects of STIs from the effects of response biases—like social judgeability—by using a multinomial model known as the Quadruple Process Model (Conrey et al. 2005). Both the results from the analysis of trait ratings and the results from the Quad-Model analysis suggest that social judgeability influences may not be strong, but that other response biases may be contributing to these judgments.

Learning Words: Is Recall of Labeled Items Facilitated by Statistical Information in Speech?
Rebecca Dreyer, Psychology
Sponsor: Dr. Gary Marcus, Psychology

A person learning a language must acquire an inventory of words (sound-forms paired with meanings). One reason this is challenging is that it requires extracting sound-forms out of continuous speech. Previous research suggests children and adults may use statistical cues such as transitional probabilities and frequencies of syllable co-occurrence to isolate sound-forms (Saffran, Aslin, and Newport 1996). However, it is unclear whether the sound-forms extracted using these cues facilitate word-learning.

To address this question, adults were taught and tested on novel sound-object associations after hearing speech streams in which the target sound-forms occurred with varying frequencies and/or transitional probabilities (TPs). Experiment 1 contrasted “words” (high-TP syllable-triplets) and “part-words” (low-TP syllable-triplets) of varying frequencies. Results showed a significant effect of frequency, but not, contra Saffran et al., of TP’s. An additional experiment compared only “words” from a frequency-balanced speech stream. Participants performed significantly above chance, but there was no significant difference between individual “words,” suggesting that item-specific salience was not a factor. Comparison between experiments revealed a significant effect of TP and frequency together, but not of TPs or frequency alone. These results suggest that TPs do not facilitate word-learning unless the “words” are also high in frequency.
Controlling Implicit Impressions: Trait Transference within Groups

Jason Feirman, Journalism and Psychology
Sponsor: Dr. James S. Uleman, Psychology

I tested in this study the extent to which participants can control implicit effects of within-group trait transference using Jacoby’s (1991) process-dissociation procedure. One hundred and two undergraduates were presented with pairs of photos and behavioral vignettes that implied traits. These actors were characterized as belonging to groups that were either highly entitative or not entitative. In a subsequent task, participants were asked to rate how well previously implied traits described the target individual. These ratings provided an estimate of the contribution of controlled and automatic processes. The prediction was that participants would be able to control implicit effects to a greater extent when the opportunity for transference occurred within a group of unrelated individuals rather than a highly entitative group. The data, however, did not support these findings. The validity of my results depends largely on how well participants were able to comprehend complicated instructions and process a large amount of information. Analyses indicate that it was too difficult for participants to perform the complex set of mental operations that was required to complete the experiment. The study also touches upon implications about the interaction between entitativity and group impression formation.

The Effects of Temporal Distance and Type of Concession on Tentative Agreements

Beryl Filton, Gender and Sexuality Studies, and Psychology
Sponsor: Dr. Yaacov Trope, Psychology

This study examined how the type of concession (high-priority issue versus low-priority issue) and temporal distance from a tentative agreement made in the past affected negotiators’ feelings and behaviors in relation to that agreement. The present research approached this question through four primary frameworks: temporal patterns of regret, norm theory, time-discounting theories, and construal level theory. This experiment asked participants to imagine themselves tentatively committing to a lease agreement in the near or distant past. This agreement contained a concession on either a high-priority or low-priority issue. Participants were then asked a variety of questions to measure their reactions to the tentative agreement they made. The current study found that people who reached a tentative agreement in the distant past expressed less positive feelings about committing to the lease than people who reached a tentative agreement in the near past. Additionally, results showed that people who reached a tentative agreement containing a concession on a low-priority issue reported less positive feelings and a greater likelihood to renege on the lease than people who reached a tentative agreement containing a concession on a high-priority issue. The results of this study showed support for norm theory and partial support for time-discounting theories.

Revanchist Realtors: The Tension between the Real Estate Industry and the Latino Community in South Park Slope, Brooklyn

Claudia Flores, Metropolitan Studies
Sponsor: Dr. Daniel Walkowitz, History, and Social and Cultural Analysis (Metropolitan Studies)

In light of the recent wave of gentrification throughout various neighborhoods in New York City and in Park Slope specifically, this study examines how gentrification is proceeding in South Park Slope and how realtors are shaping the neighborhood’s future. It also examines how the South Slope’s realtor-driven gentrification is at odds with the neighborhood’s population, about half of which is Hispanic. This study uses research from real estate advertisements, real estate discussion Web sites, and community meetings in order to analyze how realtors are marketing the neighborhood, and how residents—both white and Latino—are responding to the changes. It also examines how Hispanic-owned businesses in the neighborhood are coping with an influx of new residents buying into recently built luxury condo buildings. Drawing from literature on gentrification, realtor practices, and Latino struggles, the research finds that the South Slope and its working-class Latino population are experiencing a sort of revanchism, or revenge from local realtors. The study concludes that in marketing new condos, realtors who are eager for gentrification to proceed are luring middle-class newcomers, regardless of the consequences for the Latino population. The study links these conclusions to a larger dialogue involving gentrification, race, and the working class in New York City.
What Women Want: A Study of the Factors That College Women Describe as Influencing Their Aspirations and Decision-Making Process

Elena Frank, Gender and Sexuality Studies, and Psychology
Sponsor: Dr. Anne Rademacher, Social and Cultural Analysis (Gender and Sexuality Studies)

My research project sought to uncover how undergraduate women currently attending prestigious universities describe the factors that are influencing their aspirations with regard to future choices involving work and family. Data were obtained through the administration of a multiple-choice survey questionnaire to a representative sample of New York University’s undergraduate female population. Both descriptive statistics and statistically significant correlations that were found from the survey data were used to draw conclusions in this study. Many factors were found to be influential on an individual young woman’s work/family aspirations and decision-making process, including her motherhood ideologies, personal ideas and politics about feminism, and conception of women’s status in the working world. In addition, a mother’s attitude regarding her own employment situation was found to have an extremely strong tie to the daughter’s attitude regarding her mother’s employment situation, regardless of what that employment situation was. Romantic relationship status was found to be influential on a young woman’s work/family aspirations as well. The main conclusion that can be drawn from this study is that decision-making regarding the work/family dilemma is a unique process for every individual. There are many different influences on each young woman that may cause her to aspire to one option over another.

Dynamic Psycholinguistics: The Continuing Need for Interdisciplinary Research

David Glod, Psychology
Sponsor: Dr. Ray C. Dougherty, Linguistics

I examine the fluctuating dynamic between the positions of Noam Chomsky and Marc D. Hauser, two leading researchers in linguistics who have traditionally been at odds. One month after writing that Hauser’s work made “little sense,” Chomsky collaborated with Hauser and W. Tecumseh Fitch on a provocative paper, “The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?” (2002). They suggest dividing the faculty into broad and narrow areas and hypothesize that only the latter is unique to humans. Moreover, they propose that the narrow faculty includes only the mechanisms of recursion. I analyze the characteristics of the argument within the paper as the product of two linguists with wildly opposing viewpoints. I then follow their discussion with Steven Pinker and Ray Jackendoff over the course of three subsequent papers, discussing the strength of the proposed paradigm and hypothesis within a larger linguistic context. Finally, I further broaden my perspective to suggest an alternate theory of language evolution which tries to bring these divergent views together, incorporating also their pertinent research. Throughout, I stress the importance of interdisciplinary cooperation as the field of linguistics expands to include psychology, biology, anthropology, and other disciplines.

Exploring Memory Consolidation with the Distributed Learning Paradigm

David Glod, Psychology
Sponsor: Dr. Lila Davachi, Psychology

About twenty-four hours after learning, the synapses underlying a memory begin to respond more reliably at retrieval. This is the result of memory consolidation. It is also well known that distributed learning is far more effective than massed learning. I hypothesized that this was due to consolidation—that in distributed learning, memory had a chance to consolidate, and thus was stronger with each subsequent encoding. I conducted two experiments. Experiment 1 used a distributed learning paradigm to investigate the consolidation effect. Subjects studied lists of word pairs twice, with a twenty-four-hour or a five-minute break between study sessions. On an immediate memory test, subjects did not perform differently by condition. Memory, however, actually improved on a test given twenty-four hours later for the distributed learning group. This suggests that memory consolidated over the twenty-four-hour interval. I also examined how the consolidated memory is organized by looking for several memory types (relational memory, familiarity). Experiment 2, following the same paradigm, did not generate the usual consolidation effect, but instead showed a decrease in reaction time between the first and second memory tests. Memory consolidation is usually thought to reorganize memory, not to increase the strength of a memory trace. This result questions that assertion.
Effects of Goals on Control over Spontaneous Trait Inferences
Jonathan P. Gorman, Psychology
Sponsor: Dr. James S. Uleman, Psychology

People spontaneously infer dispositional qualities of actors when they encounter behaviors performed by those actors (Uleman, Blader, and Todorov 2005). What factors mediate one’s control over spontaneous trait inferences (STIs)? The present study examined how goal instructions affect one’s ability to control STIs’ effects. In particular, participants saw instructions to memorize behavioral information either in order to use it in forming an impression about the actor or to familiarize themselves with the information provided. A false recognition paradigm (Todorov and Uleman 2002) and the Process Dissociation Procedure (PDP) (Jacoby 1991) were used to estimate the amount of control participants had over their judgments of actors. Expanding upon research by Hamilton, Katz, and Leirer (1980), I predicted that if an impression formation goal led to a better recall of behavioral information, then participants in this condition would have more control over STIs’ effects than participants who memorized the information. If, however, impression formation led to a better overall integration of the behavioral information, then control would be reduced for participants in this condition relative to those who memorized. My results support the former hypothesis, showing that participants have greatest control under impression formation instructions. Control under memorization and familiarization instructions did not differ from one another.

The Role of Economic, Human, and Social Capital in Predicting Homelessness in Older Adults
Jamie Gottlieb, Psychology
Sponsor: Dr. Beth Shinn, Psychology

This study examined predictors of homelessness in older adults by comparing homeless older adults (n = 74) with older adults who were poor, but housed (n = 58). I hypothesized that housed adults would have higher levels of economic, human, and social capital and that homeless adults would have experienced more stressful life events during the last year each group lived in regular housing. I interviewed homeless adults over fifty-five from a drop-in center (a first step in the shelter system) and housed adults from a housing project. Homeless adults experienced more stressful life events. Housed adults had greater social capital, including both social and organizational ties. Indicators of human capital were mixed, with housed adults having longer job tenure but homeless adults having better educations. Disabilities, such as mental illness and substance abuse, and economic capital were relatively unimportant. Although some homeless older adults had always had tenuous ties to housing, about half had lived conventional lives before becoming homeless in later life. Information about the precursors of homelessness is important for planning effective prevention programs.

Political Determinants of Population Wellness and Morality: A Cross-Country Analysis of Three Governance Theories
Anurag Gupta, International Relations, and Middle Eastern and Islamic Studies
Sponsor: Dr. Shankar Satyanath, International Relations and Politics

This study observes the relationship between governance and health outcomes. Using modernization, statist, and principal-agent theories, it employs measurements of economic openness, government effectiveness, and corruption to create three separate governance models that observe the impact of “governance” on health. The empirical analysis I used was biannual data from 194 countries from 1996 through 2004. Measurements of health are attributed by two dependent variables, child mortality and population undernourishment, that are regressed on the three governance measures. The regression estimates display a significant relationship between level of government effectiveness and both health measures; and also between the level of corruption and undernourishment rate. Regression estimates control for economic determinants (level of income, level of income inequality); political determinants (level of democracy, level of political stability); population composition (ethnic and religious fractionalization); health infrastructure (percentage of population with access to water, births given by skilled health professionals, percentage of population with measles vaccination, public spending on health); and social development (literacy). To illustrate the empirical findings qualitatively, I studied the economic reform experience of Africa, Latin America, and South East Asia in the 1980s, and contemporary health conditions in India. I found that on a cross-country level, health security, quality, and safety are positively related to a nation’s level of government effectiveness or corruption. The level of economic openness and democracy, however, does not directly determine health outcomes.
Improving Self-Discipline and Self-Esteem in College Students: Mental Contrasting and Implementation Intentions Intervention

Katie Guttenberg, Psychology
Sponsors: Dr. Gabriele Oettingen, Psychology, and Dr. Peter Gollwitzer, Psychology

In the present intervention I combined two self-regulatory strategies known to facilitate goal pursuit, Mental Contrasting and Implementation Intentions, into a single strategy (MCII). I trained college students to implement this simple exercise during their daily lives. Students received either the MCII training or a comparable control training on the first day of the intervention period. They subsequently completed a brief MCII (or control) journal each day for a week. As dependent variables, students completed measures of self-discipline and self-esteem both before and after the one-week intervention period. Students also completed several measures of overall well-being (e.g., depression, life satisfaction, etc.), which served as control variables. Students who received the MCII intervention reported greater self-discipline and self-esteem after the intervention period than their control counterparts. Controlling for demographic differences and individual differences in baseline overall well-being, condition remained a significant predictor of both dependent variables. I therefore suggest that the MCII exercise is an easily implemented and highly effective tool for enhancing self-discipline and improving self-esteem in college students.

An ERP Study on Visual Versus Auditory Language Processing in Bilinguals and Monolinguals

Diana Herrera, Psychology
Sponsor: Dr. Scott Johnson, Psychology

This study was designed to investigate the extent to which visual language comprehension compares to the auditory form with regards to speed of processing and electrical peaks in brain activity. It examined as well differences in the relative activity in certain areas of the bilingual brain when processing Language 1 and Language 2. Event-related potentials (ERPs) were used to detect patterns of brain activity in English monolingual and Spanish-English bilinguals. Participants were asked to answer whether they knew the meaning of words that were either presented on a screen or through speakers. English words were presented to monolinguals, and randomized Spanish and English words were presented to bilinguals. The ERP component of primary interest is the N400. This study tries to extend the applicability of the N400 in language comprehension by observing its amplitude without the presence of contextual information. A higher N400 amplitude in bilinguals may suggest a more extensive search through a larger number of word candidates.

Investigating Predictors of Attention-Deficit Hyperactivity Disorder in Foster Children

Stephanie Hope, Psychology
Sponsor: Dr. L. Oriana Linares, Psychiatry, NYU Child Study Center, School of Medicine

Why do foster children have higher levels of Attention-Deficit Hyperactivity Disorder (ADHD) than the general child population? Through partnerships with thirteen foster care agencies in New York City, I investigated predictors of ADHD symptomatology in a sample of full-sibling (61 percent) and half-sibling pairs placed together in foster care. Participants (n = 160) were predominately African-American (45 percent) or Hispanic (36 percent), and ranged in age from three to fourteen years. Each child’s Child Protective Services record was coded for the presence of maternal substance abuse and child maltreatment. Child ADHD was defined as the mean of the biological mother and foster mother reports of child ADHD criteria count on the Diagnostic Interview Schedule for Children Version IV. A significant intraclass correlation for ADHD criteria count was found between siblings; full-siblings and half-siblings, however, did not differ in their intracorrelation. This indicated a familial, but not genetic, component to ADHD in this sample. Parental alcohol abuse was positively and significantly associated with child ADHD criteria count. Maternal drug abuse, physical abuse, sexual abuse, neglect, and failure to protect the child from violence, however, were not. These findings identify maternal alcohol abuse as a salient risk factor for ADHD in foster children, and possibly implicate prenatal alcohol exposure as an underlying risk factor.

Association between Implicit Stereotypes and Socioeconomic Status in Ethnic Minorities

Antonio Infante, Psychology and Sociology
Sponsor: Dr. David Amodio, Psychology

Social Dominance Theory and System Justification Theory propose that social stereotypes help to perpetuate a social hierarchy that favors the dominant group. In essence, stereotypes limit socioeconomic success in subordinate groups. These stereotypes may be held at
an implicit, or unconscious, level. This current project examined the relationship between socioeconomic status (SES) and implicit stereotyping of one’s ingroup among Asian-Americans and African-Americans. I hypothesized that SES moderates implicit ingroup stereotyping for both Asian-Americans and African-Americans. I measured individual differences in implicit stereotyping by using the Implicit Association Test. Participants reported their parents’ educational attainment and explicit (i.e., conscious) attitudes toward their ingroups. Parents’ education was the primary measure of SES. Regression analysis showed that the interaction between race and SES approached marginal significance as a predictor of implicit ingroup stereotyping. SES was not significantly correlated with implicit ingroup stereotyping for Asian-Americans, but was significantly correlated with implicit ingroup stereotyping for African-Americans. Higher implicit stereotyping was related to more positive ingroup attitudes for African-Americans. I further show how Social Dominance Theory and System Justification Theory fail to explain implicit ingroup stereotyping patterns for Asian-Americans and African-Americans.

The Effect of Education Level on Memory and Gait Tests of Alzheimer’s Disease
Rula Kanj, Psychology
Sponsor: Dr. Alan Kluger, Psychiatry, NYU School of Medicine

Alzheimer’s disease (AD) is a debilitating form of dementia that causes brain deterioration, leading to problems with cognition, memory, and motor abilities. Current diagnostic tools for AD include memory tests that demonstrate a bias according to education level. In these, more highly educated persons perform better. My study investigated whether measures of gait (walking patterns) can more accurately evaluate the functioning of normal elderly and AD patients. I expected that scores on gait and memory tests would both worsen at higher levels of dementia, but that gait measures would not show an educational bias. I used three different tests: a timed gait measure; the GAITRite program, which evaluates step length, symmetry, and foot pressure; and paragraph recall tests to evaluate memory.

As expected, lower scores on all measures were associated with higher levels of dementia. Lower recall scores, however, were also associated with lower education level, whereas the GAITRite measure showed no association with education, and timed gait showed only a small association. Because gait measures are reliable indicators of dementia and demonstrate less educational bias overall than recall tests, a combination of gait measures may be most useful for the early detection of AD, especially in less-educated patients.

Dissociating General Mood and Feelings about Emotions in the Context of Romantic Relationships
Ammara Khalid, Psychology
Sponsor: Dr. Patrick E. Shrout, Psychology

Individuals can sometimes compartmentalize their feelings about intimate relationships from their general moods. Insofar as one kind of mood affects the other, we say a spillover has occurred. This study examined daily emotional spillover in 326 individuals. I predicted that spillover would be less among persons who have high self-esteem. My analyses made use of data from a study of recent law school graduates who were preparing to take the New York State Bar Exam. Examinees provided daily diary reports of their individual and relationship moods for thirty-five days. Multilevel regression analyses indicated that (a) people varied in their mood associations; (b) mood spillovers occurred in both directions across days; (c) relationship mood was a stronger predictor of individual mood than vice versa; and (d) self-esteem was related to the strength of association between moods. The direction of the relation of self-esteem to degree of spillover depended on the valence of emotion. Those with high self-esteem had less negative mood spillover, but more positive mood spillover. In addition, females experienced greater mood spillover than men. My study helps to understand how people regulate their moods in romantic relationships.

Queer Penalties: Lesbian, Gay, Bisexual, and Transgender Youth in the New York State Juvenile Justice System
Tyler Kinder, Metropolitan Studies
Sponsor: Dr. Harvey Molotch, Social and Cultural Analysis (Metropolitan Studies), and Sociology

Research has revealed that the adoption of a marginalized social identity can generate chronic stress in the lives of lesbian, gay, bisexual, and transgender (LGBT) young people. This stress has been associated with family problems and criminalized behaviors that put LGBT youth at heightened risk for involvement in the juvenile justice system. My study explores seven interviews with LGBT-identified young people who have
spent time in New York State juvenile detention facilities. These young people report rampant homophobic and transphobic harassment and physical abuse, discriminatory treatment plans, and unequal placement practices which target sexual orientation and gender identity.

I also review the debate over juvenile justice policy and draw on insights provided by participants to argue for policy reform oriented towards tailored rehabilitative services in community-based settings. Participants suggest that LGBT-specific community-based programs are the best option for delivering tailored correctional plans because these are informed by considerations for the relationship between sexual orientation, gender identity, and self-destructive behavior. Identity-based programs have been successful in reducing recidivism by offering counseling and support services that affirmatively address individual service needs. Shifting public funds towards community-based correctional programs has the potential to assist all young people by reducing reliance on incarceration and to be especially beneficial to those young people with unique needs like those presented by LGBT youth.

Champuruu Culture and Okinawan Identity in Museums
Keiko Kitagawa, Anthropology
Sponsor: Dr. Lok Siu, Anthropology

My study involved ethnographic research in Okinawa, Japan, to understand how locals relate to museums and how cultural sites affect their identity as Okinawans. I came to the conclusion that Okinawans narrate their history and culture by consciously noting that their culture is champuruu (mixed), partially as a strategy to attract tourists. This concept, however, did not directly link to public displays and exhibitions. In contrast to my expectation, the term was incorporated in people’s discourse just recently. Museums may have been perceived as inappropriate sites to narrate their champuruu identity, which finds and builds upon the idea of fluidity and transformation. This differs from people’s general understanding of culture in museums, which are associated with folklore and tradition that are fixed in time and static. From this observation, we can understand people’s different approaches to culture and what they refer to as “cultural,” which is the case with music and performers. This instance revealed various interpretations of culture which, on the one hand, retains its essence and invariability, and on the other, promotes the idea of change and innovation. Music at the moment may be the key component to their idea of champuruu, but nonetheless museums may prove to be an instrumental means to promote Okinawa’s cultural identity in the future, as people become more aware of cultural sites as emblematic venues through which people adhere and create new meanings.

Examining the Differences in Parent-Child Relations between Anxious and Non-Anxious Youth with Asthma
Qortni Lang, Psychology
Sponsor: Dr. Jean-Marie Bruzzese, Psychiatry, NYU Child Study Center, School of Medicine

For my research, I examined the parent-child relationship in anxious and non-anxious children. A sample of 116 parent-child dyads, drawn from four NYC public middle schools, completed the Parent Adolescent Relationship Questionnaire (PARQ) and the Conflict Behavior Questionnaire (CBQ), two self-report measures that examine parent-child relations. I used the communication, warmth, and problem-solving subscales of the PARQ. Children also completed the separation and social anxiety subscales of the Screen of Child Anxiety Related Emotional Disorders (SCARED), a screening instrument for child anxiety disorders. A large proportion of students fell into the clinical range for social (46.6 percent) and separation anxiety (61.2 percent), replicating previous research findings of elevated anxiety among youth with asthma. There were no significant differences by anxiety status on measures of parent-child relations as reported by children. Parents of children who met the criteria for social anxiety, however, reported fewer problems in parent-child communication than did parents of children without social anxiety. There was no other effect for social and separation anxiety on parenting variables as reported by parents. Further studies are necessary to determine the relationship between parenting factors and the development of child anxiety.

China’s Income Inequality Gap: A Growing Issue
Wing Yin Maggie Leung, Economics
Sponsor: Dr. Cengiz Onuk, Economics

Recent economic reforms in China have successfully produced a staggering and unprecedented GDP growth rate of 25 percent over the last twenty years. Concurrently, however, the income disparities between the urban and the rural regions of China have also in-
creasingly widened over the past two decades (Zhou 2003). My study examines in theory and in practice how the hukou system—a household registration system in China that restricts labor mobility—is the fundamental factor that contributes to the unequal income distribution. Using the production function and statistical data from all thirty-one provinces in China, the findings of my study indicate that the relaxation of China’s labor immobility policies can not only slow down the growth of the income inequality gap, but can also increase China’s current GDP even further.

**Gauging Affordances for Fitting through Apertures**

*Grace C. Lin, Psychology, and Alison S. Myers, Psychology*

*Sponsor: Dr. Karen E. Adolph, Psychology*

Affordances—possibilities for action—are constrained by the fit between physical properties of the actor and the environment. Adaptive motor decisions depend on the ability to detect affordances. For example, fitting the body through an opening is constrained by the dimensions of the aperture and the actor’s body dimensions and contractibility. In three experiments, we examined the correspondence between motor decisions and actual affordances for fitting through apertures. Participants fit their hands through diamond-shaped apertures (0 cm–40 cm) to retrieve small candies. Using psychophysical methods, we estimated an affordance threshold for each participant (smallest aperture they could fit their hand through 50 percent of the time). Affordance thresholds were highly correlated with the width of participants’ flat and contracted hands. Experiment 1 showed that people scale motor decisions for fitting their dominant hand through apertures to their hand size. Experiment 2 suggested that habitual practice increases willingness to err; participants attempted smaller apertures while reaching with their dominant hand rather than nondominant one. Experiment 3 showed that people recalibrate their motor decisions to take changing body dimensions into account; attempts to reach were similar with and without a prosthesis to enlarge participants’ dominant hand.

**Learning and Applying Rules in Infancy**

*Justin P. Little, Psychology*

*Sponsor: Dr. Gary Marcus, Psychology*

Children acquiring language must learn rules for constructing sentences and learn to apply these rules in new situations. By seven months, infants can learn “rules” like the ABB rule inherent in sequences like la-

ni-ni but have difficulty learning such rules from nonspeech sequences, such as those of musical timbres (e.g., piano-saxophone-saxophone). This suggests the possibility of a domain-specific rule-learning mechanism. I considered whether this contrast between speech and nonspeech arose from peripheral (processing) factors such as the discriminability of the sounds, or a task-specific lack of engagement.

Using a preferential-looking paradigm, in Experiment 1 I examined whether infants could use a rule (e.g., ABB) learned from speech to differentiate between that rule and a new rule instantiated with timbre sounds. Infants (n = 16) looked significantly longer at the novel rule. This suggests that discriminability is not a limiting factor. In Experiment 2, I investigated if priming infants with speech would better engage infants’ attention and facilitate their learning rules from timbres. Infants (n = 18) did not look significantly longer at the novel rule. The results of these experiments suggest that the difficulty in learning rules from timbres may not arise from perceptual or processing restrictions. The findings support a distinction between a domain-specific mechanism for rule learning and a domain-general mechanism for rule application.

**An Analysis of the Costs and Benefits of a Local Currency System**

*Krissy Mayer, Economics*

*Sponsor: Dr. Guillaume Frechette, Economics*

This project studies the Gorge Local Currency Cooperative, which circulates a local currency called RiverHOURS (RH) in and around Hood River, Oregon. It asks two questions with respect to the currency’s users: what were the primary benefits and costs of using RH; and did people receive a net benefit or incur a net cost using it?

To answer these questions, I conducted an experiment to measure how many dollars people would accept for one RH, and constructed a survey about costs and benefits RH users experienced. These data are used to analyze the degree to which RH users experienced several benefits and costs, and the average value RH users placed on one RH. The data prove that RH users experienced a net benefit from using the currency and indicate this benefit was primarily social. They also show there were almost no economic benefits to using the currency, but there were significant economic costs.

Economic reasoning suggests local currencies create unavoidable inefficiencies. Thus, while RH users received a net benefit, it was an exclusively social ben-
efit derived from an economically inefficient activity. Accordingly, my study concludes that the benefit might have been better delivered through means other than a local currency.

The Power of Press Freedom and Telecommunications/Media Penetration in Predicting Violent Civil Conflicts in Africa
Molly McGrath, Economics
Sponsor: Dr. Ennio Stacchetti, Economics

My project examined two hypotheses: first, that countries with more press freedom—freedom in the law and freedom from government attacks, violent and non-violent—will be less likely to experience violent civil conflicts, and second, that countries with more telecommunications and media penetration and stronger telecommunications industries will also be less likely to experience violent civil conflicts. Although a great deal of research has been done on the causes of civil wars, the research is lacking in these two areas. Using averages from 1980 to 1990 to predict conflicts in 1991 to 2001 in a logistic regression, I find that countries with governments that severely attack the press have higher odds of experiencing violent civil conflicts. Using averages from 1993 to 1996 to predict conflicts in 1997 to 2001 in a logistic regression, I find that countries with more press freedom have lower odds of experiencing violent civil conflicts, when press freedom is measured on a numerical scale of 0 to 100. The results for the second hypothesis are unclear. The percentage of the population considered rural is associated with an increase in the odds of experiencing a violent civil conflict, and the level of telecommunications/media penetration is significantly and exponentially related to rural population, with the higher the rural population, the lower the penetration. I find that communications services as a percentage of service exports averaged from 1980 to 1990 is positively associated with an increase in the odds of experiencing a violent civil conflict in 1991 to 2001. The opposite is true for communications services as a percentage of service imports. Neither of these variables is significant in the model using averages form 1993 to 1996. The conclusion details the results of each model.

Semantic Distance in the Processing of Polysemous Words
Jacqueline Mikhly, Psychology
Sponsor: Dr. Gregory Murphy, Psychology

Polysemy refers to a word having two or more related senses (paper can refer to a publication or a writing material). On one view, polysemous senses have a general, core meaning which is later specified. Others suggest the senses are listed separately in the mental lexicon. Klein and Murphy (2001) showed that inhibition occurred when a polysemous word was used in one sense and then immediately used in another. This suggests that little semantic overlap exists between polysemous senses; therefore, they must be listed separately.

My study investigated the role semantic distance plays in the processing of polysemous words. Thirty-two subjects were presented with a priming phrase containing a polysemous word used in either a close or distant sense, followed by a target phrase containing the same polysemous word. For example, for the word bill, the target phrase was electric bill, which was preceded by either dollar bill (close sense) or senate bill (distant sense). Subjects responded to whether the phrase that appeared second was sensible. While response times were not significantly different between conditions, there was a higher accuracy in the close condition. These results suggest that polysemous senses semantically overlap and that they are separately listed.

A Morbid Affair: Death and Dissection in Nineteenth-Century America
Eleanor Miller, French and History
Sponsor: Dr. Walter Johnson, History

Death as a concept and a reality differed in the nineteenth century from today. For much of the nineteenth century, and into the twentieth in some cases, it was illegal to dissect the bodies of anyone but executed criminals for medical research. Dissection was seen as a worse punishment than death; it was considered a desecration, an intrusion. The expansion of formal medical education, however, meant a shortage of dissectable cadavers and a mushrooming in the illegal trades of bodysnatching and selling.

By examining a variety of primary sources ranging from literature to archaeological finds, to political cartoons, I found that the way bodies were regarded in death was a direct manifestation of how people existed in life. Women were rarely dissected, while blacks were far more likely to be than whites. There was both a growing fear of death and an expansion of medical curiosity. The mind-body disconnect, as historian Michael Sappol writes, was not simply a struggle between the intellect (or the “spirit”) and the mortal body, but was yet another example of class, racial, and intellectual divides in a rapidly evolving society.
Explorations in Empathic Accuracy: Is There Anything Functional about Transference?
Nicole Montero, Psychology
Sponsor: Dr. Susan M. Andersen, Psychology

Positive transference describes the unconscious use of mental representations of positive significant others to evaluate a new person. My research focused on the effect transference has on empathic accuracy, the ability to infer the thoughts and feelings of another. I suggest it is possible that transference will not only make taking the perspective of the new person easier, but that taking the perspective of a friend of that person will be facilitated as well. This increased perspective-taking may result in greater empathic accuracy. I further hypothesized that different significant others would result in different levels of accuracy. My method was a combination of the transference paradigm used in previous studies and a modified version of the unstructured dyadic interaction paradigm by Ickes et al. (1990). Although no support was found for the theory that the type of significant other affects accuracy, I did find that participants in transference more accurately inferred the behaviors and affect of the friend and more accurately predicted the way that friend would describe him/herself. These are forms of accuracy and suggest that my hypotheses may be correct and that positive transference can result in greater empathic accuracy. Further support for greater empathic accuracy has yet to be found.

Political Institutions and International Terrorism
Robin Morse, French and Politics
Sponsor: Dr. Anna Harvey, Politics

I hypothesized that the Selectorate model developed by Bueno de Mesquita et al. could be used to explain levels of international terrorism produced by various countries. The independent variables were states’ winning coalition size (W), selectorate size (S), and ratio of W/S, as in The Logic of Political Survival database (Bueno de Mesquita et al. 2003.) The dependent variables were states’ levels of international state-sponsored and non-state-sponsored terrorism as in the ITERATE database (Mickolus et al. 2003.) A multiple regression was performed and the coefficients for each independent variable were estimated, controlling for other variables affecting terrorism. From 1968 to 1989, with control variables, there was a significant positive correlation between W and terrorism by non-state actors. From 1990 to 2000, control variables could not be taken into consideration because they were not available in The Logic of Political Survival database. Without control variables there were significant negative correlations between W and W/S and state-sponsored attacks, and a significant negative correlation between S and attacks by non-state actors. The Selectorate theory was thus unable to explain international terrorism as a function of a country’s political institutions, but it was useful in identifying trends in the relationship between political institutions and terrorism.

Probability and Temporal Construal
Jonathan Naysan, Psychology
Sponsor: Dr. Yaacov Trope, Psychology

Construal level theory proposes that psychologically distant events are represented in a more abstract manner than are psychologically near events. Conceptualizing probability as a form of psychological distance, the present study examines the relationship between likelihood and abstraction. Specifically, I examine the impact of probability mindset on the tendency to emphasize abstract traits over situational constraints when forming social judgments. Participants engaged in a two-part study. In the first part, participants were given a scenario that depicted either a highly probable event or a highly improbable event, and were asked to describe the given event. In the second part, participants completed a correspondence bias paradigm in which they read an essay supporting the institution of comprehensive senior exams. Half of the participants were told that the author of the essay was forced to write an argument supporting comprehensive exams (constraint condition). The other half were told that the author was free to take any position he/she wanted to (no constraint condition). Participants then completed several questions measuring the extent to which they attributed the essay writer’s views to dispositional characteristics. As expected, results showed that perceivers’ dispositional judgments were influenced by the presence of situational constraints in the high probability condition, but not in the low probability condition.

Low Gender Group Identification and Increased Gender Stereotype Flexibility
Michele A. Nelson, Psychology
Sponsor: Dr. James S. Uleman, Psychology

People encounter stereotypes that impact initial impressions and relationships. How do reactions to inconsistent stereotypic behavior differ based on one’s
association with that stereotyped group? I investigate how one’s strength of gender identification and the amount of viewed stereotype-inconsistent behavior impact on gender stereotype flexibility. I hypothesize that low gender identifiers exhibit more flexible stereotypes than high gender identifiers when confronted with more stereotype-inconsistent information. When exposed to less inconsistent information, however, low and high gender identifiers do not differ. Under the guise of a memory experiment, I made participants, classified as low or high gender identifiers, view a series of face-behavior pairs, which consisted of faces paired with (gender consistent, neutral, or inconsistent) behaviors. Participants viewed the same number of face-behavior pairs, but the two conditions, low and high inconsistency, differed in the ratio of gender stereotype-inconsistent behaviors to total behaviors viewed. Overall results indicate that low identifiers attributed more inconsistent traits to people than did high identifiers when exposed to a large percentage of inconsistent behaviors. These groups did not differ when exposed to a small percentage of inconsistent behaviors. These findings suggest that group identification impacts the formation of spontaneous trait inferences, which leads to changes in stereotype flexibility.

The Role of Government in Temporary Disaster Housing
Erik Nevala-Lee, Metropolitan Studies, and Urban Design and Architecture Studies
Sponsor: Mosette Broderick, Fine Arts

In 1999 environmental refugees fleeing from drought, floods, deforestation, and degraded land totaled twenty-five million worldwide. In the U.S., only the federal government possesses the necessary resources to provide adequate aid, specifically housing, to the growing number of natural disaster refugees. The federal government must determine the extent of its role in housing aid and what its goals are for housing relief. These goals are defined through the relationship with the local communities and government. The case study of Hurricane Charley in Punta Gorda, Florida, exemplifies how the federal government responds to disasters. FEMA, the agency that currently provides housing during disasters, uses mobile homes to house temporarily victims. The nature of the housing settlements and the government’s management of the sites relate to the historical precedence of housing in Japanese internment camps during World War II and Hoovervilles during the Great Depression. Research reveals that the federal government does not account for the social experiences in temporary housing. Temporary housing is a placeholder, and government actively pushes victims to alternate housing solutions. The need for temporary housing is linked to failures in the housing market. Until permanent housing issues are resolved, adequate temporary housing is necessary for the victims of natural disasters.

Neuroendocrine Effects on Behavior during Interracial Interaction
Abisola Odunmbaku, Psychology
Sponsor: Dr. David Amodio, Psychology

How does stress from interracial interactions affect one’s ability to inhibit automatic racial biases? I hypothesized that stress from an interracial interaction would impair one’s ability to inhibit automatic racial biases. White participants were interviewed by either a white or black experimenter, and then completed a stereotype inhibition task on a computer. The computer task presented a black or white face, followed by a picture of a gun or a tool. Participants quickly indicated whether they saw a gun or a tool. There were faster responses to guns following a black face, and slower responses to tools following a black face, which I took as evidence of implicit stereotyping. I examined stress by measuring self-reported affect and changes in levels of the hormone cortisol, collected before and after the interview. Preliminary results show that interracial interviews led to greater self-reported stress and that the race of the interviewer marginally affected behavioral control on the stereotype inhibition task. Indications suggest that cortisol levels are higher following the interracial interview and that they predict performance on the stereotype inhibition task. Future studies will examine the theoretical link between circulating cortisol and neural mechanisms for automatic stereotype inhibition.

Biased Judgments of Meritocratic Information under System Justification Threat
Carol Pak, Psychology
Sponsor: Dr. John Jost, Psychology

Prior research on system justification theory suggests that people under system threat are directionally motivated to justify the status quo. It has also been suggested that system threat can lead to biased cognitive processes. My study investigated individuals’ judgments of both pro- and anti-meritocratic information under either low or high system threat. I found that people
generally favor pro-meritocratic information and disfavor anti-meritocratic information. After receiving a high system threat, this bias was even more extreme. People were also extreme in their judgments when they read anti-meritocratic information prior to the pro-meritocratic information. Finally, women were more biased toward pro-meritocratic information and against anti-meritocratic information compared to men. Evidence here supports a system justification framework which posits that people would further bolster the status quo by showing a preference for system justifying ideologies such as pro-meritocratic information, especially after system threat and if they are a part of a disadvantaged group such as women.

**Cross-Correlations with EEG during Free Viewing of Natural Stimuli**

*Joseph Palter, Psychology*

*Sponsor: Dr. David Heeger, Psychology*

Are different brains capable of processing complex stimuli in a similar manner? Recent functional magnetic resonance imaging (fMRI) studies used complex stimuli and found significantly correlated inter-subject brain activity. The purpose of this study is to extend this fMRI methodology to electroencephalogram (EEG). My goal is to establish an analysis that includes fMRI (superior spatial resolution) and EEG (superior temporal resolution) analysis that achieves a more complete understanding of brain activity. Subjects outfitted with a 128-channel geodesic sensor net (recording at 500 Hz) viewed two movies: a nine-minute segment of *The Good, the Bad, and the Ugly*, and a five-minute segment of *The Ticker*. Preprocessing involved the use of data filters and independent component analysis to remove noise and artifacts, respectively. Cross-correlation performed on EEG data detected significant similarities both within and across different subjects. Next, a sliding window of correlation indicated that correlation levels were not uniform throughout the stimulus. I used “reverse correlation” to determine which scenes of the movie elicited the highest levels of correlation. Movie segments with rapid scene changes possessed the highest correlation values. This suggests that a global attention phenomenon causes the majority of the significantly correlated results.

**“I Ride a Little Bike”: An Ethnographic Examination of a Youth Subculture in the Urban Environment through a Case Study of BMX Bike Riders in New York City**

*Nicole Pandolfo, Metropolitan Studies*

*Sponsor: Dr. Daniel Walkowitz, History, and Social and Cultural Analysis (Metropolitan Studies)*

The BMX bike rider subculture of New York City is composed of a group of young men who utilize the creative and improvisational elements of the urban environment. This paper examines the riders’ self-perception in the urban world, their relations with one another, and the way that style influences these relationships. Through a process of both participant observation and interviewing active BMX bike riders, I came to find that the BMX bike riders face specific challenges, including the formation of an informal hierarchy; struggles for fame; conflicts with city authority and other residents; the creation of an urban style; and finally, a competition over style among members within the subculture. In the case of the BMX bike riders, I found that style was being used not only as a means of cohesion within the group and a way to separate itself from mainstream culture, but interestingly also as a catalyst for competition among members within the group. Conflicts over style can challenge the relationships between members within a subculture in a way that can be both aggressive and isolating. It can, however, also bind members together and be a force that imparts a unifying identity upon the group.

**Consuming Race: Biracial Identity, Consumer Capitalism, and Historic Economies of Difference**

*Annelise Parham, Anthropology*

*Sponsor: Dr. Aisha Khan, Anthropology*

The issue of “multiracial” identities has become an increasing matter of public discussion and debate in U.S. society, as seen in the now cliché United Colors of Benetton advertisements, the stock biracial character on each season of MTV’s Real World, and the 2004 *New York Times* article, “Generation ‘EA’: Ethnically Ambiguous.” Focusing on text, film, interviews, and the historically shifting boundaries of black/white “biracial” identities, I analyze the interplay of racial categories
and ethnically targeted advertising. I identify and challenge the ethos within many popular culture representations: it is “hip”—edgy, cool, trendy—to be ambiguous. Overly simplistic, it essentializes a particular aesthetic of racial difference, yet reveals broader social values in the U.S. that have historically undergird these messages, which at once both highlight and erase “blackness.” This notion of racial authenticity is partly supported by ideas about nationality and citizenship on which advertising has capitalized. I conclude that by broadening our understanding of race, we can attempt to move away from the creation of simply more census boxes and instead move towards questioning those existing boxes and the powerful histories that have sustained their existence.

“Nothin’ was Nothin’”: Disposability and New York’s Crack Economy

Anika Paris, History
Sponsor: Dr. Adam Green, History, and Social and Cultural Analysis (American Studies)

In this study I initially sought to trace the changes in social and economic life precipitated by the crack epidemic in the New York City of the mid 1980s. There is no shortage of information on the deleterious effects of the crack epidemic; studies and stories on its connection to homelessness, AIDS, and prostitution, to name a few, abound in the literature on the subject. Yet crack cocaine hit at a time when the affected communities were facing new extremes of poverty; and inasmuch as it destroyed lives, I was also cognizant that it must have kept many lives afloat as well. To document this more complex picture of the crack epidemic, I began an oral history project interviewing people who were living in New York before, during, and after the crack epidemic, as well as conducting traditional research. The picture that emerged was often surprising. First and foremost, there was nothing about crack itself that contained the seeds of destruction for so many communities. Its impact was due more to a “perfect storm” of public and private disinvestment, unemployment, and shifting demographics that allowed the sale and consumption of crack to operate in a social vacuum.


Corie Patterson, Metropolitan Studies
Sponsor: Mosette Broderick, Fine Arts

Housing theorists and architecture scholars debate the various theories of “social architecture,” the notion that the architecture and design of their buildings affect the social behavior and social conditions of buildings’ inhabitants. In this study, I evaluated the validity of social architecture theory through a series of field studies of public housing developments in London and New York. In the post-World War II period, British housing planners typically devised creative designs for public housing. The New York City Housing Authority, on the other hand, often constructed simple, red-brick high-rises that became associated with poverty and social ills.

I assessed the success of a development through an analysis of crime levels, community facilities, and the physical condition of the building materials and facilities. My results suggest that when it is of a contextual scale and integrated spatially within the neighborhood, a building has positive social consequences overall. I conclude that while it does not directly influence behavior, good public housing design does ease the isolation and stigmatization of the development, and thus makes residents more connected to the neighborhood in which the development is located. Design and architecture also shape the public opinion of public housing in general.

“Hotel Argentina”: German-Jewish Refugees from Nazism

Jessica Perlman, History and Journalism
Sponsor: Dr. David Engel, Hebrew and Judaic Studies, and History

My study investigated the validity of Hannah Arendt’s essay, “We Refugees,” by comparing her assessment to that of other exiles from Germany. To begin my research, I collected memoirs, letters, and identification documents, as well as other materials from the Leo Baeck Institute at the Center for Jewish His-
Adaptation to Body Asymmetry in Children and Adults

Megan M. Powell, Psychology
Sponsor: Dr. Karen E. Adolph, Psychology

People's bodies are laterally symmetrical and so are their locomotor movements. In ongoing research, I examine the real-time process of adaptation to body asymmetry in children and adults. I induce body asymmetry by fitting participants with a platform shoe on one foot to elongate one leg and examine how they adapt marching movements under unconstrained conditions and spatial and temporal task constraints.

Children (five- to seven-year-olds) and adults march in place in two symmetry conditions (two platform shoes versus one platform shoe), crossed with two task constraints (marching to a given height and pace) and interspersed with unconstrained marching. I assessed adaptation based on the trajectory of difference scores between actual and goal performance (e.g., knee height and target height). A three-dimensional motion recording system tracked participants' leg movements.

Adults were able to meet both temporal and spatial task constraints; they showed greater levels of spatial variability, however, during the temporal task, and vice versa (e.g., knees reached different heights during timing task, and timing was neglected during height task). The children followed the same general pattern; they showed a greater level of overall variability, however, in all tasks. Children were also less likely to maintain constraint requirements throughout the one-minute task duration.

Rancho Mastatal as a Model for Improving Ecotourism

Carey Pulverman, Metropolitan Studies
Sponsor: Dr. Harvey Molotch, Social and Cultural Analysis, and Sociology

Ecotourism is an alternative to conventional tourism that focuses both on minimizing environmental impact and on supporting the local economy and people in a culturally respectful way. The objective of this research was to determine if ecotourism businesses are actually achieving these ideals in practice. Through an in-depth case study of Rancho Mastatal, a small ecotourism lodge in rural Costa Rica, I found that this lodge is doing a model job achieving all of these goals.

The three main goals of ecotourism concern environmental, economic, and sociocultural issues. Rancho Mastatal is succeeding in each area. It works extremely hard to minimize its resource use and trash production and tries to obtain all necessary inputs locally. The Rancho also aids the local community by providing jobs and helping financially and physically with community development projects. The Rancho values the surrounding farming community and does not want to disrupt the way of life of the local people. It therefore intends to keep its tourism operation small and personal. The locals like Rancho Mastatal for the jobs and opportunities it provides for some of the community members and enjoy interacting with the tourists because they get to learn to interact with another culture and share theirs with the tourists. When executed with the integrity and a genuine desire to create a nature-friendly plant ecotourism, lodges such as the Rancho are a viable solution to improving many of the negative effects of tourism in developing countries.

The Effects of Frontal Lobe Damage on Inhibitory Processing in Working Memory

Molain Saintilus, Psychology
Sponsor: Dr. Elizabeth Phelps, Psychology

Inhibitory processing is essential since it allows for the resolution of conflict between stimuli in working memory. Previous research suggests that the left ventrolateral prefrontal cortex may be the neural correlate of inhibition (Jonides et al. 1998; D’Esposito et al. 1999; Thomson-Schills et al. 2000). More recent research has revealed that regions of the orbitofrontal cortex (OFC)
may be linked to the facilitation of inhibition for emotional stimuli (Levens et al. 2005). My research investigates the OFC to determine if it is critical for the facilitation of inhibition for emotional stimuli. Utilizing a modification of the Sternberg Proactive Interference Paradigm, I compared reaction times to conflict trials versus nonconflict trials between normal age-matched controls and two patients with damage to the left OFC region. Reaction time comparisons between patients and controls show normal interference levels for the neutral and negative emotional conditions. No interference, however, is present in conflict trials in the positive emotional condition. These results indicate that the orbitofrontal cortex may be critical for the facilitation of inhibition for emotional information in general. Furthermore, the left OFC may be particularly critical for the facilitation of inhibition for positive emotional stimuli.

GED Classroom Dynamics and Their Effect on Students’ Success
Elina M. Santana, Sociology and Spanish
Sponsor: Dr. Ruth Horowitz, Sociology

Although research on GED (general equivalency diploma) classroom dynamics and their effect on student success are almost nonexistent, many studies on the regular classroom setting focus on the idea that something in the classroom itself can cause lower achievement rates and even increase dropout rates. While factors such as environment (overcrowding, lack of lighting, temperature discomfort, etc.) and family backgrounds may have significant effects, many have also argued that the teachers, the social organization of classrooms, and the schools are still overwhelming factors in the equation for personal academic success. For this study, I hypothesized that GED classrooms would reflect a dynamic that differed from regular high school classes due to perceived voluntary participation. I conducted an observational study involving two federally structured GED classes in an effort to find what caused students to succeed/fail in these classes after returning to the educational system. I controlled course location and content in an effort to focus on peer-peer interaction, instructor-student relationships, and organizational methods. Results indicate that the classes replicated the structure and dynamics of regular high school classes due to a lack of voluntary enrollment caused by parents, court decisions, and employment restrictions. Students’ lack of personal investment yielded patterns of disinterest, encouraged “cycling” through the course repeatedly, and discouraged the formation of significant friendship networks.

Beyond Dolls and Trucks: The Relationship between Gender Identity and the Nature of Infants’ Sex-Typed Play
Amy Schaller, Psychology
Sponsor: Dr. Diane Ruble, Psychology

According to cognitive constructivist theories of gender development, children’s gender category awareness is a crucial factor in guiding sex-typed behaviors. My study investigated children’s spontaneous production of gender labels as an early indicator of gender identity. I observed the types of play children engaged in with sex-typed toys in order to address two research goals: to explore the nature of infants’ sex-typed play beyond the doll/truck distinction and to determine whether gender labeling would predict increases in sex-typed play when specific behaviors were analyzed. Seventy-seven infants and their mothers participated in a longitudinal study of play and language development. Ten-minute segments of the infants playing alone with a standard toy set were coded for the time spent engaged in particular behaviors with the doll and truck. Diaries of the infants’ language development from nine to twenty-one months were coded for gender labeling. The study supported previous results investigating children’s sex-typed toy preferences. Consistent with the cognitive constructivist perspective, gender labeling predicted increases in sex-typed play behaviors with the doll and truck from seventeen to twenty-one months, most notably, a nurturing behavior for girls and mechanical play for boys.

Exploring the Unique Health-Care Outlooks of Integrative Practitioners
David Seader, Sociology
Sponsor: Dr. Ruth Horowitz, Sociology

At the end of the twentieth century, a new form of health care emerged, called integrative medicine, a practice which fuses the best elements of biomedicine and
complementary and alternative medicine (CAM). With this new conception in health care, a question arises: how do integrative health-care professionals negotiate distinct and disparate medical paradigms? When analyzed comparatively, the biomedical and CAM paradigms are fundamentally rooted in contradictory frameworks. Despite these apparent contradictions, research has shown that integrative medicine has rapidly grown and achieved much success. This indicates that it is possible to combine these two paradigms.

Through in-depth interviews with eleven integrative physicians and six alternative practitioners, I studied how integrative practitioners develop their health-care outlook and, more specifically, the strategies they use to combine the disparate biomedical and CAM paradigms. Most of the integrative practitioners interviewed have developed a meta-paradigm which combines elements of biomedical and CAM philosophies and has emergent properties not present in either philosophy alone. In essence, a new model of health-care has been developed that has great versatility. This meta-paradigm averts contradictions by giving integrative practitioners the flexibility to choose the appropriate medical philosophy to employ, depending on the individual patient and the condition being treated.

Overworking in the United States
Yevgeniya Shandina, Economics
Sponsor: Dr. Giovanni Violante, Economics

My study examines whether or not there is evidence that employees in white-collar occupations are working an excessive and inefficient amount of hours to signal overall abilities to their employers. In particular, my focus is on women and blacks because they are often thought to be discriminated against in promotion decisions and therefore have to work harder in order to prove themselves. Using 2000 Census data, I created a model for all full-time white-collar workers to measure the average differences in hours worked between men and women, blacks and other races. This model is the benchmark relationship of sex, race, and hours worked. Then I re-created this model for several industries and occupations and compared it to the benchmark. In several industries and occupations, the results show evidence for overwork among women, but not among blacks.
they were playing with another player. Participants in this task were given a goal of being competitive or cooperative, either consciously or nonconsciously. I found that participants in both the conscious and nonconscious conditions behaved similarly, indicating that nonconscious goals indeed function just as conscious goals do. I also found that those individuals pursuing a nonconscious goal of competing experienced less negative affect if their previous conscious goal was applicable to their behavior than if it was not.

**Perceiving Possibilities for Action: Infants Walking through Apertures**

*Michael T. Smith, Sociology and Psychology*  
*Sponsor: Dr. Karen Adolph, Psychology*

Everyday locomotion involves navigating through apertures. Passing through narrow doorways, squeezing between seats in a lecture hall, and other actions that involve navigating the body through tight spaces require that walkers perceive the fit between their own body size and the layout of the environment—that is, walkers must perceive possibilities for action.

In the current study, I observed twelve- to sixteen-month-old infants’ motor decisions as they walked through apertures on a raised platform. Sliding a wall across the platform created apertures of varying size (0–74 cm wide). As the aperture narrowed, infants were pushed toward the edge of the platform, so that the penalty for errors was falling. I used a psychophysical method to estimate possibilities for safe passage for each infant (ratio of successful and failed attempts) and compared infants’ motor decisions (ratio of attempts to avoidance) at various probabilities of success. Preliminary results (n = 5) indicated that thresholds for safe passage ranged from 11.02 to 22.03 cm (M = 14.91 cm). As in previous research with adults, infants’ attempts to navigate the apertures decreased with smaller apertures relative to their thresholds. This suggests that infants scale their motor decisions to their body size. Furthermore, infants used multiple strategies (turning their body, crawling, etc.) to pass through narrower apertures.

Using a psychophysical method, I determined a motor threshold (aperture infants successfully walked through on 50 percent of trials) for each infant and I compared infants’ motor decisions (to actual possibilities for action. Infants’ affordance thresholds ranged from 11.02 to 22.03 cm (M = 14.91 cm). Preliminary results indicated that infants used multiple strategies such as turning their body to cross different aperture sizes. Furthermore, infants’ attempts to cross the aperture decreased in line with decreasing aperture size.

**Effect of the Mentoring Relationship on the Perception of Work Performance**

*Elina Spektor, Psychology*  
*Sponsor: Dr. Madeline E. Heilman, Psychology*

Attributional rationalization has been defined as the rationalization of women’s success when there is source ambiguity (Heilman and Haynes 2005). Thus, when the source of an excellent outcome (on a male sex-typed task) is unclear, such as when the outcome is the product of group work, women in mixed-sex groups are perceived as less competent and influential in producing the success than their male counterparts. I explored this phenomenon in the mentoring relationship where source ambiguity might also be present. My sample consisted of ninety-five undergraduate students from whom I included only forty-seven participants due to some responses in debriefing that indicated that participants had deduced the study’s hypothesis. Participants evaluated a male and female target in terms of competence and future success. They were told that these individuals had completed an internship and might be offered a position within the organization. They received background information and project evaluations for both targets. Based on condition assignment, the targets were paired with either a male or female mentor, or no mentor. Results indicated that women were perceived as less competent than men when paired with a male mentor. Men, however, were rated less likely to be successful at the future position than women when paired with a female mentor. The implication of these results indicates that attributional rationalization may apply in other mixed-sex contexts and warrants further research.

**Loss Aversion in Asymmetry between Demand Elasticities of Goods with Low Substitutability**

*Jenny Tang, Economics and International Relations*  
*Sponsor: Dr. Jörg Stoye, Economics*

This paper estimates gasoline demand elasticities to test the hypothesis that the degree of asymmetry between elasticities following price decreases and price
increases is low in goods with few substitutes. Past research shows that easily substitutable goods exhibit a significant degree of asymmetry between these two types of elasticities due to loss aversion, or the tendency of consumers to place greater importance on losses than gains. In terms of consumer demand, this means that while a price decrease is accompanied by a consumption increase of a certain amount, a price increase of an equal magnitude actually causes consumption to decrease by a greater amount due to a higher sensitivity to relative monetary losses. My hypothesis considers two additional observations which are present in cases of goods with low substitutability. The first is that loss aversion also exists for nonmonetary losses. Additionally, low substitutability means certain loss of nonmonetary utility from decreased consumption. It follows that aversion towards these two types of losses would have opposing effects on the symmetry of demand elasticities for this class of goods. The estimated gasoline demand elasticities support this notion. My study also points out implications of this result and possible topics for future research.

**Does Private Primary Schooling “Crowd Out” Public Primary Schooling in the Developing World?**
*Chris Tausanovitch, Politics*
*Sponsor: Dr. Thrainn Eggertsson, Politics*

Discussion of development strategies often focuses on whether development projects should “bypass” governments. It is frequently suggested that directly providing social services that are typically provided by governments undermines their role. In this paper, I examine whether or not this is true in the case of primary schools. Using data from the World Bank and UNESCO, I test whether there is a correlation between growth in private primary school enrollments and growth in public primary school enrollments in the twenty-nine developing nations for which data are available. I find that there is no significant correlation. This finding holds for differing regime types, levels of growth, regions, growth in the young population, initial enrollment percentages, growth in government expenditure, and per capita growth in foreign aid.

In the four cases in which growth in private enrollment was exceptionally large, public school growth also over-performed, despite lower-than-average economic growth. These conclusions should dismiss the idea that private involvement in primary education “crowds out” public involvement. Although it may not extend to the effects of private involvement in other services, this analysis provides a framework in which these issues can be considered and tested as better data becomes available.

**Fostering Youth and Their Education: The Philosophy and Implementation of Educational Support Policies for Foster Adolescents in New York City**
*Ashley Terletzky, Journalism and Metropolitan Studies*
*Sponsor: Dr. Daniel Walkowitz, History, and Social and Cultural Analysis (Metropolitan Studies)*

My research examines the ways in which education and social service policies enable adults to help foster adolescents achieve an education. In particular, I investigated the responsibilities that policies allot or failed to allot to caseworkers, foster parents, group home staff, and birth parents. The study also delved into how policies assist these adults in overcoming the challenges that are inherent in supporting foster adolescents and their schooling. I investigated these aspects through in-depth interviews with policymakers and front-line social service staff. I also carefully analyzed the text of laws to understand better the various interpretations that confuse foster staff, caretakers, and school officials. I found that policies fail to designate a single adult as responsible for supporting the education of foster youth. Confidentiality laws and misunderstandings between Children’s Services and the Department of Education further complicate the ability of caring adults to advocate for a foster adolescent’s education. I also concluded that these adults need better training regarding the policies of the education and social services systems. Policies must also implement a method of evaluating how well foster caretakers and caseworkers function in this role.

**Defying the Civic-West/Ethnic-East Dichotomy: An Empirical Study of Democracy’s Power to Shape Nationalism**
*Thais-Lyn Trayer, Politics*
*Sponsor: Dr. Anna Harvey, Politics*

Traditional conceptions of nationalism in areas of the East are understood to be incompatible with liberal ideals. One of the main fathers of nationalist theory, Hans Kohn, writes of a good, progressive, and liberal nationalism in the West (i.e., the United States), placed in opposition to a more socially backward, exclusive, and ethnic nationalism in the East (i.e., the former Yugoslavia). This conceptualization of the civic-West/ethnic-East di-
chotomy and the liberal or illiberal character it confers on certain peoples continues to frame current debates of nationalism. My thesis explores the viability of the theory that people can establish and maintain a common identity based on a voluntary commitment to liberal democratic principles in any area of the world.

Using survey response data indicating levels of civic and cultural nationalism as my dependent variable and the strength of institutionalized democracy as my independent variable, my empirical method disproves the fatalist dichotomy while uncovering a propensity to use “Eastern” as a proxy for low levels of social, economic, and political development. The results of my ordered probit model indicate a positive relationship between levels of civic nationalism and the strength of institutionalized democracy. Similarly, a calculation of discrete change in predicted probabilities shows that civic types of nationalism are mutable and able to increase as the strength of democracy increases, even as cultural types of nationalism remain difficult to change. The implications of my research are significant and disprove the path dependency created by the civic-West/ethnic-East dichotomy, drawing into question conventional understandings of how an individual forms her identification to a collective, and the power of democracy to shape and reshape national identity.

Parent-Child and Sibling Relationships during Adolescence
Vanessa Vitello, Psychology
Sponsor: Dr. Diane Hughes, Psychology

I sought to determine whether adolescents’ relationships with their mothers and siblings would be related to self-esteem and depression. I had 422 adolescents complete the Network of Relationships Inventory (NRI)—Friends and Siblings, the NRI-Family—the Child Depression Inventory (CDI), and the Rosenberg Self-Esteem Scale (SES). I used idiographic methods (cluster analysis) to characterize adolescents’ relationships with their mothers. Three clusters emerged. The first was characterized by high conflict, moderate disclosure, and companionship (termed high conflict). The second showed moderate conflict, high companionship, and disclosure (termed close), and the third indicated moderate conflict, low companionship, and disclosure (termed disengaged). I ran a two-way analysis of variance with sibling relationship quality, cluster membership, and gender. I found all to be related to self-esteem scores. Only the mother-child relationship quality, however, was related to depression. The quality of sibling relationship did not appear to moderate parent-child relationship quality and mental health outcomes.
Given finite resources, should we fund more research into the cause—and possibly, cure—of cancer, or build a space station? Can weather be predicted much more accurately than it is now? Is your water supply safe to drink? Is the human population changing the world climate? We all tend to take it for granted that science and technology increasingly play a role in our livelihood, our recreation, our economic and even our physical survival. As in the humanities, many problems in applied science are so complex that they require collaborative research by scientists with diverse backgrounds and training. The purpose of education in our “postmodern” world is to allow one to navigate with insight and comfort in an increasingly math- and science-driven environment, to distinguish what is sense from what is nonsense, and to form a basis for sound decision-making.

—Neville Kallenbach, Professor of Chemistry

**NATURAL SCIENCES**

**The Effects of GLP-1 on Pancreatic Beta-Cell Function, Growth, and Survival**  
*Tara Albano, Biochemistry*  
*Sponsor: Dr. George G. Holz, Physiology and Neuroscience, NYU School of Medicine*

Glucagon-Like Peptide-1 (GLP-1), a hormone in use for the treatment of diabetes, enhances the ability of blood glucose to stimulate the secretion of insulin from pancreatic beta-cells. GLP-1 binds to its G protein-coupled receptor located on the beta-cell plasma membrane, thereby activating adenyl cyclase and stimulating cAMP production. One molecule activated by cAMP is Epac. I am interested in Epac and address two specific aims: whether GLP-1 promotes beta-cell growth and survival via an Epac-Rap1-PI3K-PKB-dependent pathway; and whether GLP-1 enhances glucose-dependent insulin secretion by using Epac to inhibit the function of ATP-sensitive K⁺ channels (K-ATP channels). Using an insulin-secreting beta-cell line (INS-1), SDS-PAGE, and Western blot analysis, I found no conclusive evidence to support the first specific aim. For the second specific aim, I have co-transfected INS-1 cells with Epac and a portion of the K-ATP channel known as nucleotide-binding fold-1 (NBF-1). I did this to see if these two proteins interact directly. In the absence of stimulatory levels of cAMP, there is no observable interaction of Epac with NBF-1. This suggests cAMP might be necessary for the association of these two proteins. Should this prove to be the case, my studies might establish the molecular basis for a novel form of ion channel regulation in which GLP-1, acting through cAMP and Epac, controls the function of K-ATP channels in beta-cells.

**Finding Low-Luminosity Galaxies in Distant Groups**  
*Dimitri Apostol, Mechanical Engineering and Physics*  
*Sponsor: Dr. Michael Blanton, Physics*

This project investigated the question of how galaxies are affected by their environment by looking at fragile low-luminosity galaxies in distant “groups.” These groups consist of many galaxies clustered together; the low-luminosity galaxies were the most easily affected. Using the Las Campanas 2.5-meter telescope in Chile, I was able to observe these galaxies and obtain redshifts—velocities of stellar objects corresponding directly to their distance away from Earth—in order to determine which galaxies...
were in groups that were of interest to me. These redshifts were obtained over the series of months following an observation run in Chile using a special method of spectroscopy utilizing computer models. In the short interval between acquiring all the redshifts I needed and the present time, I so far have found that a galaxy’s proximity to large groups can cause gaseous “stripping” effects which can affect the galaxy’s ability to form stars.

A Search for Target Genes Activated in vivo by the Bicoid Morphogen

Sofia Bajwa, Biology; Gilda Boroumand, Biology; and Rana Mady, Neural Science
Sponsor: Dr. Stephen Small, Biology

Gradients of regulatory proteins are critical for patterning the major body axes of all animals. The Drosophila melanogaster (fruit fly) morphogen Bicoid (Bcd) is distributed in an embryonic gradient and determines the anterior-posterior (AP) patterning of the body plan by activating the transcription of multiple target genes in different positions along the AP axis. Previous research has identified twenty-one cis-regulatory modules (CRMs) that contain significant clusters of Bcd-binding sites of various “strengths” which respond directly to Bcd-mediated transcriptional activation. Recent genome scans have predicted twenty-six new CRMs for investigation.

Further computational analysis of the Bcd-binding site clusters allowed us to focus on twelve of the predicted CRMs. These candidate regulatory sequences were cloned into donor vectors to create transgenes for injection into Drosophila embryos. The expression of these constructs will be determined by in situ hybridization. We expect transgene expression in the anterior portion of the embryos, consistent with the hypothesis that Bcd interacts with these predicted CRMs. Our results will help identify target genes that are activated in vivo by the Bcd morphogen. A greater understanding of how Bcd functions to establish the AP body plan will not only help clarify the transcriptional interactions that comprise the complex Bcd network, but also provide further insight into the developmental processes in other multicellular organisms, including humans.

Hovering in a Periodic Air Flow: The Effect of Weight

Anna Basanskaya, Physics
Sponsor: Dr. Jun Zhang, Mathematics and Physics

This investigation is based on a previous experiment in which the mechanism of hovering flight was studied. Hovering flight mechanisms are applicable to insects as well as robotic flyers. In the original experiment, paper “bugs” with four symmetrical wings were placed into a vertical wind tunnel with periodic air flow. The optimal frequency was defined as the frequency at which the amplitude of the air flow needed for hovering was a minimum. This optimal frequency was measured for bugs of varying sizes.

The first goal of this investigation is to obtain a velocity profile of the cylindrical wind tunnel in order to create a potential well in which the “bugs” would be most stable at the central axis. Such a potential well is established by changing the distribution of air resistance for the oscillating flow at both the top and bottom of the wind tunnel, and is now being tested. The potential well is expected to prevent a “bug” placed in the center from crashing into the vertical side walls. The second goal is to see how the optimal frequency depends on weight. Previous results suggest that the optimal frequency should decrease as more weight is added to the “bugs.”

Generating GAL4 Lines in Specific Neuronal Subsets Underlying Color Vision in Drosophila melanogaster

Yelena Bronevetsky, Biology
Sponsor: Dr. Claude Desplan, Biology

In order for it to discriminate colors, an organism must compare outputs from at least two different photoreceptor types. Because the color sensitive R7 and R8 cells in the Drosophila compound eye project to the medulla layer of the brain, I hypothesize that medullar neurons are responsible for color vision processing. Accordingly, I have attempted to develop a system to use the GFP marker gene to label unique neuronal subsets in a method modified from Feng et al. By inserting a DNA construct which carries one of three different fragments of the pan-neuronal elav promoter randomly into the genome, I hoped to generate lines expressing a transgene in a restricted and heritable pattern. Since this initial pilot screen has been successful, I am now generating large numbers of lines that may be tested for restricted expression patterns in optic lobe neurons. These neurons can later be silenced and assayed behaviorally for their role in color processing. Results have revealed restricted expression patterns that vary between lines and are heritable.

Optimization: Using Genetic Algorithms to Improve the Nelder-Mead Method

Kristina Chodorow, Computer Science and Mathematics
Sponsor: Dr. Margaret Wright, Computer Science

Imagine a person standing on a hill in the dark. If he is trying to get to the lowest possible ground, which way should he go? This is the problem that the field of optimization attempts to solve. Not knowing where the lowest ground is, how does one get there in the fastest time?
I researched a classic method called the Nelder-Mead method for finding the lowest point. This method is very effective, essentially using three people on the hill who communicate with each other to find low points. I have developed the following improvement to the Nelder-Mead method using genetic algorithms. First, a contour map of the hill is made based on what has been found so far. Then, the three people “parent” a person on a new part of the hill. This new person’s position is determined partially by each of the parents’ positions. This new position is then compared to the contour map. If the new position is probably going to be at a higher elevation than the parents’, the new person’s position will probably mutate to a better one. The improved method works extraordinarily well on all types of optimization problems.

Graft-versus-Tumor Activity against Renal Cell Carcinoma in a Mouse Model of Allo-BMT
Andrew Chow, Biology
Sponsor: Dr. Carol Shoshkes Reiss, Biology

Patients undergoing allogeneic bone marrow transplantation (allo-BMT) have demonstrated responses against renal cell cancer (RCC). I demonstrate CD8+ T cell-mediated antitumor activity against the renal cell carcinoma line RENCA in a mouse model of bone marrow transplantation. RENCA has been transduced with the luciferase gene that allows for bioluminescence imaging of tumor burden. Allo-BMT followed by the addition of $0.3 \times 10^6$ donor CD8+ T cells significantly prolongs survival (median survival of thirty-four vs. seventy-two days) and delays tumor progression compared to the tumor control group. In my model, CD8+ T cells mediate this graft-versus-tumor (GVT) activity with minimal detrimental responses against the host tissue (graft-versus-host disease). Using donor T cells from knockout mice, I determined that GVT activity against RENCA is dependent on the cytokine IFNγ and cytolytic molecule Fas ligand (FasL). I show in vitro that IFNγ increases expression of MHC Class I and Fas receptor on RENCA to promote CD8+ T cell recognition and enhance FasL-mediated lysis, respectively. I also demonstrate GVT activity in a clinically-relevant minimal residual disease model. These results comprise one of the first experimental mouse models for allo-BMT against RCC that is similar to the clinical presentation of patients diagnosed with RCC.

A Ligand-Modeling Carbonic Anhydrase
Christopher Cooke, Chemistry
Sponsor: Dr. James Canary, Chemistry

Carbonic anhydrase is a naturally occurring metalloenzyme which is critical in many biological functions, mainly respiration. The goal of this project was to synthesize an organic molecule to mimic the active site binding of this enzyme. The ligand designed should be soluble in water and bind the Zn(II) ion in water. It uses three pyridine rings and a central amine to bind the zinc ion. Hydrophobic surface area is introduced in the form of acetylene groups which space phenyl rings from the binding site. Triethyleneglycol groups on the phenyl rings are used to solubilize the ligand. It is believed that by modifying the hydrophobic environment around the binding site, the acidity of a zinc-bound water molecule will be modulated.

Inhibition of Hendra Virus Fusion
Lynne Doctor, Chemistry
Sponsors: Dr. Janice Cutler, Chemistry, and Dr. Anne Moscona, Pediatrics, and Microbiology and Immunology, Weill Cornell Medical College

Hendra virus (HeV) is a recently identified paramyxovirus that is fatal in humans and could be used as an agent of bioterrorism. Two glycoproteins are found on the surface of the virion: the receptor binding protein (G) and the fusion protein (F), which mediates merger of the virus and host cell membranes. Paramyxoviruses F proteins contain two conserved heptad repeat regions (HRN and HRC). Peptides derived from these regions of HeV F have previously been shown to inhibit entry and fusion. I found, however, that peptides from human parainfluenza virus 3 (HPIV3) not only inhibit HeV, but are also more potent than those from HeV itself. I used two approaches to show this. The first employed a luciferase reporter gene system to quantitate the inhibitory activity of peptides on cell fusion. The second assay used recombinant vesicular stomatitis virus (VSV)—carrying the gene for red fluorescent protein—pseudotyped with HeV surface glycoproteins, which mimics the conditions present during viral infection. I measured inhibition of viral entry by the peptides using FACS analysis. This finding could lead to peptides as effective therapeutic agents, similar to the entry inhibitor used against HIV.

Equilibrium and Vibrationally Averaged Structures of Small (H$_2$)$_n$, (H$_2$)$_n$CO, (He)$_n$H$_2$O, and (H$_2$)$_n$ Water Clathrate Clusters
Yael Elmatad, Chemistry
Sponsor: Dr. Zlatko Bacic, Chemistry

I determined equilibrium structures of small clusters of molecular hydrogen and hydrogen clusters doped with carbon monoxide by exploring the potential energy landscapes using the method of simulated annealing. The potential energy surfaces (PESs) of the clusters were con-
structured in the pairwise-additive fashion, using very high quality 4D (rigid monomer) H₂-H₂ and CO-H₂ pair potentials. For the pure (H₂)ₙ clusters, I calculated the minimum-energy configurations up to n = 13. The global minimum for n = 13 corresponds to the regular icosahedron with a H₂ molecule in the center. In the case of the (H₂)ₙCO clusters, I determined the lowest-energy structures up to n = 18. The results show that the first solvation shell around the CO closes at n = 17, unlike the pure hydrogen clusters which have twelve molecules surrounding the central hydrogen. The reason for this is the different ratio between the equilibrium distances of the CO-H₂ potential and the H₂-H₂ potential and the large angular dependence of the CO-H₂ potential.

Beyond static structures, I investigated the vibrationally averaged structures of such small clusters using the method of Diffusion Monte Carlo, a method which allows for the calculation of the ground state energy of a system by exploiting the similarities between the Schrodinger equation in imaginary time and the diffusion equation. Monte Carlo methods can find the ground state or zero-point energy of the system that cannot be determined by simulated annealing alone. Static structures and vibrationally averaged structures can be compared to one another to determine if the features of the classical, simulated annealing simulation can still be seen in the information that can be extracted from the vibrationally averaged structure. The two types of investigations show a tangible link between classical and quantum mechanics. Current systems for which calculations have been carried out are (He)ₙH₂O clusters and H₂ doped water clathrate clusters. For (He)ₙH₂O the ground state was found for n = 1. Probability distribution functions (PDFs) have shown a strong connection between classical and quantum properties of the system.

I have also explored water clathrate structures for the smaller, dodecahedron (20 water) cage. I examined two potentials for H₂-H₂O and H₂-H₂ for this system, the SPC/E model and a 5D H₂-H₂O and 4D H₂-H₂ ab initio PES. The SPC/E model is a method that fits experimental data to certain Lennard-Jones and Coulomb parameters. The 5D H₂-H₂O and 4D H₂-H₂ ab initio PESs are analytic in nature. I determined that the SPC/E model is not effective for investigation of this system because of its relatively weak binding and strong repulsive walls. Instead, I am exploring the 5D ab initio PESs.

**Pdp1e as a Direct Regulator of Larval Photophobicity in Drosophila melanogaster**
Harman Singh Gill, Biology
Sponsor: Dr. Justin Blau, Biology

Circadian rhythms in locomotor activity, eclosion, and larval photophobicity are regulated in *Drosophila melanogaster* by the functioning of a molecular clock housed in the lateral neurons in the fly brain. *Pdp1e* is a key component of the second loop of the two transcriptional feedback loops that constitute the molecular clock. Photophobic behavior is a simple light avoidance response of larvae. In this study, I investigated the role of *Pdp1e* in the regulation of larval photophobicity. A simple larval photophobicity assay investigated the distribution of larvae when given the choice between light and dark regions on a Petri dish at set light intensities. The results showed that the blind phenotype of a *Pdp1e* null mutant identifies *Pdp1e* as a key regulator of the larval photophobic response. The blind phenotype of the double mutant that had null mutations in both *Pdp1e* and *cycle* (another clock gene) shows that the second loop is more important for larval photophobicity and that *Pdp1e* must be a direct regulator of this response. Using this data, I propose a model for the regulation of larval photophobic behavior, and I also identify *Pdp1e* as the most downstream regulator of this behavior.

**Structural Strength of Animal and Plant Shells**
Michael Gordon, Physics
Sponsor: Dr. Stephen Childress, Mathematics

The thin-shell dome provides lightweight armor for eggs, skulls, turtles, nuts, fruits, and other common structures from the animal and plant kingdoms. In this combined experimental and theoretical study, I compare across species the strength-to-weight ratio of domes found in nature. I measured the geometries of shells from skeletons provided by museum collections and observed from biological literature. The maximum force that a shell can support according to its material properties and geometry may be computed using stress field relations from elastic membrane theory. I determined that in order for it to support the weight of its contents, a shell must grow thicker as it increases in size. The pattern of growth differs among shells based on material properties and how they are utilized.
The Effect of Alkyl Chain Length and Chirality on HIV Protease Inhibitor Activity

Robert Harrits, Chemistry and History
Sponsor: David I. Schuster, Chemistry

It has been theorized since 1993 that C₆₀ molecules could potentially inhibit HIV Protease (HIVP). The HIVP active site is located within a hydrophobic open-ended cylinder that is capped off by two flexible flaps. Several researchers theorized that C₆₀ would readily fit within the protease’s cylinder and react with its active sites due its size and hydrophobic nature. Since the initial discovery, significant progress has been made by both Friedman’s group and the NYU Fullerene Group. The most effective fullerene derivative to date is Compound 1. Further computer modeling of the interactions between fullerene derivatives and HIVP has shown that the activity of the inhibitor is related to the amount of area within the cylinder that is desolvated. Modeling has also shown that the most effective binding occurs when the two aspartic acid residues are protonated. With these facts in mind, I synthesized several fullerene derivatives analogous to Compound 1 containing alcohols and alkyl chains of varying lengths to test as HIVP inhibitors. In addition, to test the regiospecificity of the active site a single enantiomer of Compound 1 is being synthesized.

Effects of Chronic Food Restriction on Tyrosine Hydroxylase Protein Levels and Phosphorylation in Mesolimbic and Nigrostriatal Dopamine Pathways

Zena Hassan, Biology
Sponsor: Dr. Kenneth D. Carr, Psychiatry, NYU School of Medicine

Chronic food restriction augments the rewarding effects of psychostimulant drugs and dopamine receptor agonists. Increased signaling downstream of the D-1 dopamine receptor has been observed in the nucleus accumbens of the brain in food-restricted subjects. It has therefore been suggested that chronic food restriction causes a decrease in post-synaptic dopamine levels, resulting in these compensatory neuroadaptations in cell signaling and gene expression.

In this study, I examined dopamine use in food-restricted rats by measuring the protein levels and phosphorylation of the rate-limiting enzyme in dopamine synthesis, tyrosine hydroxylase (TH). I observed that total TH levels are marginally higher in the ventral tegmental area and substantia nigra, and significantly higher in the nucleus accumbens and caudate putamen of food-restricted subjects. The apparent accumulation of TH supports the hypothesized conservation of dopamine during food restriction. TH is activated by phosphorylation. Amphetamine injection resulted in a decrease in phosphorylated TH in the nucleus accumbens of food-restricted rats. This suggests that food-restricted rats experience enhanced dopamine release and feedback inhibition of dopamine synthesis. These results support the hypothesized decrease in dopamine utilization under basal conditions in food-restricted rats and may precede adaptations that contribute to the augmented responses to psychostimulant drugs and dopamine receptor agonists. These adaptations may further explain the way in which drugs of abuse exploit basic mechanisms involved in survival, learning, and memory, and may help to explain the high comorbidity of eating disorders and drug abuse.

Characterization of the Arabidopsis thaliana NIN1-like Transcription Factor Family and Investigation of Its Role in Nitrogen-Regulated Developmental Gene Networks

David Hersh, Biology
Sponsor: Dr. Gloria Coruzzi, Biology

Plant root growth and architecture are controlled by dynamic networks that integrate environmental, nutrient, and hormonal signals. For example, nitrogen (N) is a key limiting nutrient for the synthesis of amino acids, nucleotides, and vitamins. Nitrogen metabolites are also implicated as signaling molecules. Little is known, however, regarding the master regulators which affect growth and developmental gene networks in response to nitrogen.

One approach towards uncovering key nitrogen-regulators of development in Arabidopsis involves investigating orthologs of legume nodulation genes. This study is inspired by microarray analysis carried out in the lab, showing that such orthologs are part of N-regulated gene clusters in Arabidopsis. For example, nine of fourteen members of the Lotus japonicus LjNODULATION INCEPTION1 (LjNIN1)-like gene family are N/CN-regu-

Compound 1
lated. To study the potential role of \NIN1-like\ genes in \Arabidopsis\, knockouts for each gene were identified and a root growth bioassay conducted. Where a phenotype was identified, a molecular approach was taken. After identifying potential transcriptional targets of the \NIN1-like\ genes via genomic analysis, the targets were confirmed using Q-PCR to test for their misregulation in mutants. Continued analysis of nodulation-like genes may provide insight into the little-known intersection of nitrogen-regulation of gene networks and developmental signaling pathways in \Arabidopsis\.

**Antimutator Role of DNA Glycosylase \mutY in Helicobacter pylori**

Shuyan Huang, Biology  
Sponsor: Dr. Martin J. Blaser, Medicine, Infectious Diseases and Immunology, NYU School of Medicine

*Helicobacter pylori* has a highly variable genome with ongoing diversification via inter- and intragenomic recombination and spontaneous mutation. DNA repair genes modulating mutation and recombination rates that influence diversification have not been well characterized in *H. pylori*. To examine the role of putative base excision repair \ung\ and \mutY\ glycosylase and \xthA\ apurinic/apyrimidinic endonuclease genes in *H. pylori*, mutants of each were constructed in strain JP26 by allelic exchange. Spontaneous mutation frequencies of JP26 \mutY\ mutants, assessed by rifampin resistance, were consistently higher (26-fold) than wild-type, whereas the \ung\ and \xthA\ mutants showed smaller increases. In trans complementation of the JP26 \mutY\ mutant restored spontaneous mutation frequencies to wild-type levels. In cross-species studies, *H. pylori* \mutY\ complemented an *E. coli* \mutY\ mutant, and vice versa. In contrast, the \ung\ and \mutY\ mutants did not show higher frequencies of intergenic recombination, or greater sensitivity to UV-induced DNA damage than wild-type. The *H. pylori* \mutY\ open reading frame contains an 8-adenine homonucleotide tract. I provide evidence that this is subject to slipped-strand mispairing, thus leading to frameshifts that eliminate gene function. My findings indicate that *H. pylori* possesses phase-variable base excision repair consistent with a tension between repair and mutation.

**Semi-Automated Plagiarism Detection in Prose and Code**

Asya Iserovich, Computer Science and Mathematics, and Christo N. Kirov, Computer Science and Linguistics  
Sponsor: Dr. Dan Melamed, Computer Science

Detecting plagiarism manually is an extremely time-intensive task, and cannot be performed reliably. We introduce a new semi-automatic plagiarism detection system (PLAD). It uses a modified version of the generalized suffix tree data structure, often used for matching of DNA sequences in computational biology, to compute exactly all instances of overlap across a set of documents. Most previous methods have been based solely on the percentage of overlap between documents. This scheme is sometimes inadequate, however, so we introduced prominence-scoring based on the \tf-idf\ relevance weights, originally developed for information retrieval by search engines, as an additional indication of the most suspicious passages. The system leverages special properties of the input data with respect to this task to achieve computational efficiency. This is important for real-time interactive operation over large corpora. Our algorithms are general enough to be used on both prose and software source code with minimal changes in configuration. The system is designed so that the user can easily evaluate plagiarism findings in an interactive fashion. PLAD has successfully detected plagiarism in a variety of real and simulated test cases.

**Cationic Oligomers for Advanced Biomedical Imaging Applications**

Charles Kaczorek, Chemistry  
Sponsor: Dr. Kent Kirshenbaum, Chemistry

The imaging of cartilage by Magnetic Resonance Imaging (MRI) is an important technique for the detection of diseases such as osteoarthritis. One of the characteristics of the early stages of this disease involves the loss of anionic macromolecules such as glycosaminoglycans that are found in the cartilage matrix. Detection of this degradation at the early stages of the disease would be useful before the onset of more extensive tissue damage. Current MRI contrast agents have a net negative charge which complicates the imaging of these nega-
tively charged matrices. Using sequence-specific peptidomimetic oligomers called peptoids, I am pursuing a strategy for incorporating multiple cationic moieties onto known imaging agents for better access to these matrices. This leads to better imaging. Peptoids, N-substituted glycine oligomers, are generated through facile solid-phase synthesis with high yields and purity in a relatively short period of time. The addition of imaging agents onto these species may provide the overall positive net charge needed for association with the negatively charged biomacromolecules, facilitating the detection of cartilage degradation.

**Dendrite Structural Organization in the Lateral Amygdala**

Ashwin Kamath, Management and Organizational Behavior, Stern School of Business  
**Sponsors:** Dr. Luke Johnson, Neural Science, and Dr. Joseph LeDoux, Neural Science

Neurons are the complex, highly specialized cells that make up our brain and nervous system. Neurons have a complex tree-like network of dendrites that branch from the cell body, usually regarded as the information-receiving equipment for the cell. This research focused on the patterns of dendrite branching in neurons of the lateral amygdala (LA) of the rat brain. The LA is a brain region known to be essential for the formation of emotional memories. It is made up of three subnuclei: dorsal (LaDL); ventromedial (LaVM); and ventrolateral (LaVL). Neurons from each subdivision are known to differ in anatomical structure. Despite these differences in neuron structure, I attempted to answer the question of whether or not the systems of dendrites from neurons of each subnucleus contain some kind of common regularity. I first examined the total number of dendrite segments that each neuron has for every branch order and compared the proximal-distal ratio. Although the total number of dendrite segments differs for neurons from each subdivision, the ratios between segment numbers remained constant. Generally, my results have shown that there may be underlying principles governing the branching of dendrites, that is, the branching patterns are not completely random.

**Dissection of a Neural Circuit Controlling a Simple Circadian Behavior**

Elizabeth Kane, Biology  
**Sponsor:** Dr. Justin Blau, Biology

Most animals have a biological clock that synchronizes their activity to Earth’s twenty-four-hour day. These circadian rhythms are maintained by a molecular clock operating within cells and can be sustained without environmental cues. This molecular clock regulates many behaviors, but little is known about the output factors that link the molecular clock to behavior. *Drosophila* larval photophobicity mirrors canonical adult locomotion in its oscillations, thus making it a simple system for studying circadian pacemaker function. My research shows that the blue-light photoreceptor *cryptochrome* (*cry*) is an output factor regulating light avoidance. Mutant larvae carrying the *cry* allele are hypersensitive to light, whereas over-
expression of CRY in all larval circadian neurons induces blindness. Additionally, the cry mutation is dominant to mutations in the central clock. This implies that CRY lies downstream of the molecular clock in a pathway regulating behavioral output. Neural mosaic expression of cry suggests that it normally functions in a specific dorsal neuron group to modulate this behavior. This is the first example of CRY affecting a behavior independent of its role in the molecular clock. Understanding how CRY interacts with other factors downstream of the molecular clock will lend great insight into the bridge between genes and behavior.

The Locomotion of *C. elegans* through Micro- Channels  
*Erica Kim, Computer Science and Mathematics  
Sponsor: Dr. Jun Zhang, Physics and Mathematics*

*Caenorhabditis elegans* (*C. elegans*) is a microscopic nematode whose genetics and biological development have been studied extensively as one of the most important model systems in biology. As a result of this “model organism” status, one of the biggest breakthroughs in modern science was the complete genome sequencing of the *C. elegans* in 1993. Much, however, has yet to be understood about the nematode’s physical behavior and, specifically, the effect of the external environment on the nematode. Consequently, by manipulating the surrounding fluid in which the nematode is constrained, I was able to study one aspect of the hydrodynamic interaction between the body of the nematode and its fluid environment. By using different fluids of various viscosities, I observed a change in both frequency and velocity of the nematode’s locomotion. I also studied the trajectories which are affected by external viscosity as well.

Evolution of Male Tail Morphogenesis in Nematode Species Related to *C. elegans*  
*Alena Kolychkina, Biology, and Rocio Siu Ng, Biology  
Sponsor: Dr. David Fitch, Biology*

*Caenorhabditis elegans* (*C. elegans*) and related nematode species in the Rhabditidae family are useful in tracing the evolution of development in animals. The male tail is an effective model in studying the evolution of morphology since associated mating structures (i.e., the sensory rays) differ significantly among species. We reconstructed stages of ray development in species that diverged early in the Rhabditidae lineage: *Rhabditoides inermiformis*, *Brevibucca*, and *Poikilocolaimus oxycerca*. Indirect immunofluorescence staining with the MH27 antibody was used to visualize cell boundaries within the developing male tail. Ray precursor cells which originate in similar positions in the larvae of the examined species undergo a series of cell divisions and migrations that vary from species to species. Using cell lineage information from *C. elegans*, cell homologies were assigned. We were able to isolate key stages of cellular divisions and observe deviations in migration patterns as outlined in a previous study. The phasmid, a tail-associated structure, was found to originate in different positions in the species, which is a key change in determining phylogenetic relationships. This data can be used in conjunction with a molecular phylogeny to trace the most parsimonious reconstruction of the evolutionary changes in these characters.

Creating Germline-Expressing Reporters in *C. elegans*  
*Jim Lai, Biology  
Sponsor: Dr. Jane Hubbard, Biology*

The worm *Caenorhabditis elegans* (*C. elegans*) has been studied extensively as a model organism in the fields of genetics and developmental biology. The entire genome of *C. elegans* has been sequenced and this worm is widely used as a model to study biological processes in multicellular organisms. The particular subject of interest to the Hubbard Lab is the development of the germ line in *C. elegans*. One of the current technical limits in studying the germ line, however, is that there are few good germline “reporter” systems, visible transgenic proteins that facilitate analysis of the germline.

From information found in the literature and public *C. elegans* databases, I have identified several candidate genes that strongly express in the germ line. Using molecular biology techniques, my project used the regulatory regions of these genes to develop transgenic germline markers. To do this, I cloned the promoter region of these genes and ligated them to a variety of reporter genes. These plasmids are currently bombarded into the worm’s DNA and assessed for germline expression.

Yeast ATPase-Encoding Gene *TID4*’s Overlapping Function with the DNA Repair Genes *RAD54* and *RDH54* and Functions Downstream of *SRS2*  
*Isabel Lam, Biology  
Sponsor: Dr. Hannah L. Klein, Biochemistry, NYU School of Medicine*

Unrepaired double strand breaks, in which both strands of the DNA double helix break apart, cause chromosomal instability that may result in cell death or a precancerous state. Several pathways, including homologous recombination, are known to repair double strand breaks
in eukaryotic cells. My research project investigated the DNA damage sensitivity and the genetic interaction in mutagen sensitivity between the Saccharomyces cerevisiae ATPase-encoding gene TID4/RIS1, whose precise role in homologous recombination is unclear, and the DNA repair genes SRS2/HPR5, RAD54, and RDH54 by analyzing the sensitivity of the double mutants to the mutagen methyl methanesulfonate (MMS). The rad54 tid4 and rdh54 tid4 double mutants exhibited poorer growth in MMS than either single mutants, but the srs2 tid4 sensitivity resembled that of srs2. In other words, the MMS sensitivities of rad54 and rdh54 are enhanced by tid4, whereas srs2 does not show any synergistic phenotype with tid4. These results suggest that Tid4 protein overlaps with Rad54 and Rdh54 function and acts in a pathway downstream of Srs2, indicating that Tid4 may have a role in MMS-induced DNA damage repair.

**Dynamics of a Flexible Loop in a High-Speed Flow**
Kathleen Mareck, Mathematics
Sponsor: Dr. Michael Shelley, Mathematics

Working in the Applied Mathematics Lab at the Courant Institute, I have studied the system of a deformable body interacting with a fast fluid flow. Very little is understood of how a passive yet deformable body interacts with a fluid flow, much less an active one like a fish. To model such a system experimentally, I used an elastic loop in a fast-flowing soap film. Affixed at a single point, the loop was distended by the flow and, above a certain velocity, oscillated while changing its shape continuously. I used loops of several different circumferences and performed numerous trials at different velocities. Utilizing software written in the Matlab language, I analyzed the data—images recorded using a high-speed video camera. I found that the motion of the centroid of the loop is in a figure-8 shape. The frequency of oscillation is linearly proportional to the velocity of the flow, which I explain by a simple theoretical model. I also studied the morphology of the loop and found that it maintains a constant area as it oscillates.

**Limbless Locomotion: The Propulsion of Snakes**
Kathleen Mareck; Jasmine Nirody, Physics; and Terri Scott, Physics
Sponsor: Dr. Michael Shelley, Mathematics

Our study concerned the propulsion of limbless creatures that rely on solid-solid friction rather than hydrodynamic forces for forward motion. Examples of such animals include snakes, worms, inch worms, and caterpillars, which are capable of propulsion over sand, mud, grass, and other terrains. Limbless creatures exhibit a variety of terrain-specific modes of locomotion, including lateral and vertical undulation, sidewinding, concertina, and rectilinear progression. In our twofold experimental and numerical study, we rationalized the observed modes of locomotion by snakes. A series of laboratory experiments was conducted to elucidate the transition between different modes of locomotion by varying the composition, and thereby the friction, of the underlying solid substrate. The direction and magnitude of the dynamic forces applied by a snake were visualized using a photoelastic gelatin track. In our corresponding numerical study, we modeled quantitatively the motion of a virtual snake over surfaces with continuously varying friction coefficients.

**Identifying the Early Activator of zen Expression in Drosophila melanogaster**
Kira Melamud, Biology
Sponsor: Dr. Christine Rushlow, Biology

zerknult (zen) is one of several master-regulator genes involved in dorsoventral patterning of the Drosophila embryo. zen is expressed in the dorsal half of the Drosophila embryo during the early stages of its development and is responsible for the proper formation of several dorsal tissues. While genes that repress zen in the ventral region have been identified, the factors responsible for zen’s activation are unknown but are believed to be maternal. Previous research on zen activation identified a cluster of four TAGteam sites in the distal region of the zen enhancer (Bosch et al. 2004, Doyle et al. 1986). The TAGteam sites (CAGGTAG, TAGGTAG, CAGGCAG) are conserved between at least two Drosophila species, D. melanogaster and D. virilis. One goal for this scientific inquiry is to show that TAGteam sequences direct early expression of zen, using TAG transformant embryos in an in situ hybridization experiment. Furthermore, a yeast-one-hybrid experiment conducted in the Rushlow lab identified the transcription factor that binds to the TAG sites in order to activate zen. The most promising candidate was the protein product of the gene CG12701. Using the cDNA clone of CG12701, this fragment was subcloned into a vector in order to make an RNA probe. Subsequently, an in situ hybridization experiment was performed with wild-type embryos to examine the early expression of this gene. Results showed that there was ubiquitous staining in one- to two-hour-old embryos, suggesting that this gene could indeed be the early activator of zen. Maternal expression of this gene was confirmed with an additional in situ hybridization experiment on wild-type fly ovaries. This experiment demonstrated that CG12701 is a strong candidate for the activator of zen. The in situ hybridization ex-
experiments conducted on homozygous TAGteam transformant flies showed that the TAG sites are essential for zen expression. Mutated TAG sites resulted in no expression pattern.

**Thermosensation in the Drosophila Pacemaker Neural Circuit**

*Kristen Muirhead, Biology  
Sponsor: Dr. Todd Holmes, Biology*

Circadian rhythms are biological phenomena that occur with periodicity of approximately twenty-four hours. They are controlled by pacemaker oscillators and influenced by daily light/dark and temperature cycles. The relationship between these stimuli and the underlying clock mechanism is not fully understood. In many cells, Trp (transient receptor potential) ion channels are responsible for thermosensation. The *Drosophila melanogaster* ortholog of the vertebrate TrpA channel (dTrpA) is located in the brain near the small and large ventral lateral pacemaker neurons (LNv). To test if these channels are responsible for thermoregulation of the circadian clock, dTrpA and PDF neurons were visualized using the GAL4–UAS system. UAS-synaptobrevin-GFP, which marks synapses, as well as anti-dTrpA and anti-PDF antibodies were co-localized using immunocytochemistry and confocal microscopy. My expectation that the two antibodies overlap due to shared location was not observed. Larval temperature sensitivity assays with the clock neurons ablated also confirmed this result. These larvae were able to detect a difference in temperature when placed between zones of high and low temperature. This ability would have been eliminated if the PDF neurons were essential for thermosensation. Further experiments are being conducted to determine if dTrpA interacts with other circadian neurons.

**Analysis of Oligonucleotides with Single, Mutagenic Base Lesions by Mass Spectrometry**

*Emily Nosova, Fine Arts, and Viraj Patel, Chemistry  
Sponsor: Dr. Nicholas Geacintov, Chemistry*

With improvements in Matrix-Assisted Laser Desorption/Ionization time of flight (MALDI-TOF) instrumentation, it is becoming possible to sequence short mutated DNA sequences and to determine the characteristics of chemically damaged DNA. Cellular DNA, the carrier of genetic information in cells, can be easily damaged by reactive oxygen and nitrogen species in vivo and also by certain metabolites of chemical carcinogens that react with DNA. In this study, we have explored the limits of sensitivity of the MALDI-TOF method for detecting DNA mutations and for ascertaining the site of DNA damage in an oligonucleotide. Using both the ammonium citrate and THAP matrix and 3-hydroxypropionic acid (3-HPA) solution, we obtained clear results with 56 fmol of an 11mer oligonucleotide with the ammonium citrate and THAP, and 2.8 pmol with the 3-HPA matrix. With a longer 43mer oligonucleotide, however, the sensitivity is significantly lower (5 pmol). The significance of these results is that prior to this experiment, such a small concentration of oligonucleotide has rarely yielded reliable results.
in Binding Protein (CBP) in maintaining circadian rhythms in *Drosophila* behaviors are sleep/wake cycles in the fruit fly, which are abolished. A simple model that could explain CBP’s involvement in the clock is one where CBP acts as a transcriptional co-activator with the classic circadian activators Clock and Cycle. My study shows for the first time that CBP, a calcium-regulated protein, is necessary for proper circadian rhythms in the fruit fly.

### Structural Determination of a Four-Armed Junction Consisting of DNA and a Synthetic Analog of DNA

**Elizabeth Phipps, Chemistry**

**Sponsor: Dr. Philip Lukeman, Chemistry**

My research investigates the behavior of a four-armed junction of DNA hybridized to PNA. PNA (peptide nucleic acid) is an achiral and uncharged mimic of DNA with a high resistance to enzymatic breakdown that also forms very stable hybrids with DNA. Hybrids of DNA mimics are used in biotechnology, as they utilize the same Watson-Crick base-pairing that underpins the genetic code. The study of DNA/PNA hybrid junctions is important for their use in nanotechnological applications since the four-armed junction is the central motif of this technology. I have formed a small four-armed junction of DNA that incorporates PNA, demonstrating correct assembly by comparing its electrophoretic behavior with a known four-armed junction of DNA. After successful synthesis of my miniature model, I have prepared a “long-armed” DNA/PNA four-armed junction. Pair-wise enzymatic restriction of these arms changes the product’s electrophoretic mobilities on a gel, thus allowing an estimation of the junction structure based on a pre-existing model of these systems. I have determined that PNA/DNA hybrid junctions demonstrate folding patterns that differ from those of DNA junctions in the presence of divalent cations. Such structural determinations are relevant and necessary, as junction structure is a critical variable in assembling matter on the nanometer scale using junction-based molecules. These results open new possibilities for PNA-based nanotechnology.
Characterization of a Gene Regulating Eye Development in Drosophila melanogaster
Jessica Rosenberg, Biology and Mathematics
Sponsor: Dr. Claude Desplan, Biology

The visual system of Drosophila melanogaster has been successfully used as a paradigm to study developmental pathways. The fruit fly has a compound eye made up of approximately 800 ommatidia, each with eight photoreceptor cells (PRs), including six outer PRs specialized for motion detection and two inner PRs specialized for color vision. Most of the ommatidia fall into one of two subclasses: pale or yellow. These subclasses differ in the type of light-absorbing molecule, Rhodopsin, expressed in the inner PRs, causing them to detect different colors of light. The subclasses occur in a stochastic distribution throughout most of the eye in a conserved ratio of 30:70, the establishment of which is poorly understood and is the focus of this project. I am examining a line of flies with an unknown point mutation that causes a pale-to-yellow ratio of approximately 45:55. Using a combination of molecular and genetic techniques, including deficiency mapping, complementation testing, and mutant analysis, I have identified CG32030 as the gene affected by this mutation. This research implicates CG32030, which was previously only characterized computationally, as a key regulator in eye development and differentiation.

Characterization of Epithelial-Mesenchymal Transition in Ovarian Carcinoma Cells
Mansi Shah, Biochemistry, and Phil Smith, Biochemistry
Sponsor: Dr. Orlando Gil, Cell Biology and OBGYN, NYU School of Medicine

Ovarian cancer is the gynecological cancer with the highest mortality rate primarily because of the difficulty of detecting it at an early stage. Epithelial-mesenchymal transition (EMT) is thought to play an important role in the spread of epithelial-derived cancers. To learn more about ovarian oncogenesis, we examined growth factor-induced EMT in the ovarian carcinoma cell line OVCAR429. Characterization of EMT in OVCAR429 consisted of treating the cells with the growth factors lysophosphatidic acid (LPA), epidermal growth factor (EGF), and transforming growth factor (TGFβ). We then analyzed for morphological and molecular marker changes. After three-day treatments, we observed differential morphological changes with a fibroblastic phenotype induced by TGFβ, and an intermediate effect with EGF, but not with LPA. We examined EMT markers snail and slug mRNA induction at two hours and twenty-four hours using real-time PCR, and found a graded response, with TGFβ having the highest effect, followed by EGF and LPA. These results correlated not only with the morphological observations but also with the effects of these growth factors on the activation of proteolytic pro-invasive enzymes MMP-9 and MMP-2 using zymography. Taken together, these results suggest that different growth factors function in a graded-like manner to exert different functions during ovarian carcinogenesis.

Investigating the Immunological Functions and Potential Tumor Suppressive Role of the Chemokine CXCL14
Kevin Shenderov, Biochemistry
Sponsor: Dr. Dan Littman, Pathology and Microbiology, NYU School of Medicine

Small signaling molecules known as chemokines, or chemotactic cytokines, are essential to the immune system because of their roles in diverse processes such as white blood cell migration and blood vessel formation. Interestingly, chemokines have been implicated in tumor growth and metastasis, but their involvement is not well understood. A novel chemokine, CXCL14, is a particularly exciting candidate for further study. This chemokine is a potential tumor suppressor gene (it is down-regulated in many cancers), and it is highly conserved throughout vertebrate evolution, suggesting that it has an important biological function. In this study, I examined the molecular functions and tumor suppressive role of CXCL14. A mouse is currently being generated that has the CXCL14 gene knocked out, and a reporter gene (LacZ) inserted in its place. In this mouse, every cell that would normally express CXCL14 will instead express this easily detectable reporter. Besides studying the cell types in which this CXCL14 is expressed, the knock-out mouse will also be used to determine the effect of a complete deficiency of this chemokine. It is hypothesized that the immunological functions of CXCL14 provide it with important tumor suppressive properties and that CXCL14-deficiency will therefore be associated with increased susceptibility to cancer.

Inhibiting HIV Membrane Fusion through a gp41 Inhibitor
Anjali Sheth, Chemistry
Sponsor: Dr. Paramjit Arora, Chemistry

Formation of helices in nature must overcome the high energy demand for the formation of hydrogen bonds between the carbonyl of i-th amino acid residue and the amino group of the i+4-th amino acid residue through a process known as nucleation. Overcoming this nucleation energy allows for the propagation of the alpha-helix by
stabilizing the structure through successive hydrogen bonds between the carbonyl and amino groups. As previously shown by the Arora lab, stable artificial alpha-helices can be synthesized by replacing the C=O--H-N hydrogen bond with a covalent linkage of C=X--Y-N, where X and Y are two carbon atoms. I have synthesized a mimic of the gp41 helix found in HIV to develop inhibitors for the transmission of the virus to host cells.

**Gauging the Thermosensitivity of a ncRNA Implicated in Heat Shock Activation in Eukaryotes**

*Michael Shick, Chemistry*

**Sponsor:** Dr. Evgeny Nudler, Biochemistry, NYU School of Medicine.

On the basis of a novel ncRNA, HSR, that was shown to be critical to Heat Shock activation in eukaryotes, my project employed cloning methods to create a convenient in vitro transcription system for over-expressing the target molecule, HSR. Temperature-dependent UV spectroscopic analysis indicates that HSR has a highly variable region between 35°C and 45°C. When heated above 65°C, HSR loses the ability to renature into its native state. Attempts to isolate large amounts of the in vivo analog from BHK and HeLa cells using hybridization-mediated affinity chromatography were confirmed to be successful using northern analysis. Northern hybridization also revealed that ribosomal 18S rRNA is effectively co-precipitated with HSR. Given that transcriptional inactivation during heat shock is not well understood, I suspect that HSR may interact with ribosomal complexes (along with EF1-α) to mediate the process. EMSA analysis to elucidate details concerning stoichiometry is pending the results from NHS-sepharose-mediated affinity chromatography using BHK and HeLa total cell lysates.

**Behavioral Measure of Temporal Contrast Sensitivity Development in Macaque Monkeys**

*Kara Stavros, Neural Science*

**Sponsor:** Dr. Lynne Kiorpes, Neural Science

Temporal vision, the detection of changes of light over time, is essential for motion perception. Yet studies of how temporal vision develops in human infants are few, and those for monkey infants, which are an excellent model of the human visual system, are virtually nonexistent. To learn more about temporal visual development, I measured temporal contrast sensitivity (TCS) in seven monkeys ranging in age from five weeks to four years; two of these animals were tested longitudinally. I tested their ability to detect an unpatterned field of light whose luminance was sinusoidally modulated over time at various temporal frequencies. Results from the youngest infants showed reduced sensitivity for all frequencies tested and a reduced range of detectable frequencies. Sensitivity to high and low frequencies appeared to develop at similar rates, though mid- to high frequencies approached adult values somewhat earlier than low. Adult TCS was reached by six months postnatal, which is slightly earlier than spatial vision. This suggests that the mechanisms that limit spatial and temporal contrast sensitivity mature at different rates. Overall, the results render a more complete picture of TCS development in monkeys and may be useful for future comparisons of spatial and temporal visual development.

**Variation in the Frequency Intensity Curve within Mutually Coupled Neural Networks**

*Marco Stillo, Mathematics and Neural Science*

**Sponsor:** Dr. Charles Peskin, Mathematics

The purpose of this investigation is to examine coincidence detection and postsynaptic inhibitory rebound so as to determine how they affect neural activity within a network of cells. I investigate these properties using several computer models, each of which makes use of standard Hodgkin-Huxley equations/parameter to model intracellular inputs, coupled with several additional terms to allow for intercellular input. The procedure consists of creating three somewhat similar models, one control and two experimental. The control model consists of a self-coupled excitatory neuron set at a resting potential above threshold, to which is fed random inhibitory current inputs. The first experimental setup consists of two mutually-coupled excitatory neurons, with one cell’s resting potential above threshold, to which I proceed to add inhibitory input. The second experimental model consists of three mutually-coupled neurons, two producing excitatory synaptic input, while the third produces inhibitory input. The resting potential of the excitatory cell receiving input from the inhibitory cell is set above threshold, while random excitatory input is fed into the inhibitory neuron. Projected results consist of variations among the models, including oscillatory behavior and attenuation of the spike frequency of the spike trains.

**Structural Studies of DNA Replication Proteins: Human Replication Protein A**

*Maria Varvara, Biochemistry*

**Sponsor:** Dr. Xiang-Peng Kong, Biochemistry, NYU School of Medicine

Recombinant human Replication Protein A complex (hRPA) is the human single-strand DNA binding protein responsible for keeping the two strands of DNA separated during replication. It is a heterotrimeric protein com-
plex consisting of 70 kDa, 32 kDa, and 14 kDa subunits. Through its interactions with DNA and other proteins, hRPA plays an essential role in replication, repair, and recombination, as well as in promoting catalytic activity. Thus, in order to gain a better understanding of how these interactions occur, the ultimate aim of this project is to determine the three-dimensional structure of hRPA. Purification of hRPA is the first step in this process, involving forms of affinity and size-exclusion column chromatography. Once an ample amount of purified protein complex is obtained, one can induce protein crystallization and, from these protein crystals, use x-ray crystallography to determine the three-dimensional structure of the complex. Thus far, hRPA is still being purified in an effort to obtain a sufficient amount of the protein to perform crystallization.

Studies of Novel C_{60} Fullerene Derivatives in HIV-1 Protease Inhibition

Alexander Volodarskiy, Chemistry
Sponsor: Dr. David I. Schuster, Chemistry

It is estimated that the AIDS pandemic affects forty million people worldwide. Yet despite the billions of dollars spent on finding the cure, there is still no effective antiviral agent or vaccine, because the HIV virus, which causes the disease, mutates very rapidly. The solution might lie in attacking the virus on the molecular level, by inhibiting the HIV protease, the enzyme responsible for the assembly of viral products. Prior studies have shown that the topology of C_{60} fullerene derivatives allows them to inhibit competitively the HIV protease by filling the internal hydrophobic cavity of this C_{2}-symmetrical enzyme. In particular, a C_{60} fullerene derivative 1 has shown promising results with an inhibition constant of 10^3 nM (for the racemic material). It is not clear, however, what role, if any, the substituents of this C_{60} fullerene derivative have in making it a more successful inhibitor.

In order to elucidate the inhibition mechanism, new fullerene derivatives that vary from 1 in their constituents were synthesized. One of the phenyl groups of 1 was replaced with naphthalene, as in 2 and 3, to gain insight into the role of the π-π stacking in the enzyme inhibition. Additionally, an amino acid derivative was attached to the fullerene sphere as in 4, in order to learn what role the amino acids play in the inhibition mechanism. These compounds, and analogs, were synthesized by modifying the route used to synthesize 1. In vitro assays of several of these novel C_{60} fullerene derivatives are currently underway. These results should help elucidate the inhibition mechanism.

Triazole-Linked Non-Peptidic Foldamers: From Synthesis to Structure

Adam Waxman, Biochemistry
Sponsor: Dr. Paramjit S. Arora, Chemistry

Proteins are capable of performing precise biochemical functions in living cells because they possess an ordered, three-dimensional arrangement of atoms that consist primarily of three or four different folds. New classes of molecules consisting of different polymer units that project protein-like side chains would be extremely valuable as tools in molecular biology and as leads in drug discovery. Foldamers are oligomers that display a strong tendency to adopt well defined shapes, such as α-peptides in proteins folding into α-helices and β-sheets. I am developing new types of foldamers by replacing the amide bonds of peptides with triazole linkages that stabilize structures by different non-covalent interactions. Structures include 1,3 α-triazole linkages and 1,3 β-triazole linkages. The foldamers are synthesized from monomer units derived from α-amino acids by multi-step organic synthesis. The folding properties have been ascertained by both molecular modeling and two-dimensional NMR spectroscopy. Definite folding patterns have been observed. I will explore the potential to use these foldamers to solve biological problems in the future.

Preparation of Cystine N, N’ Tetraacetic Acid as a New Gadolinium Chelater for MRI Contrast

Florence Williams, Chemistry
Sponsor: Dr. Marc Walters, Chemistry

Magnetic Resonance Imaging (MRI) is one of the major tools of medicine today. Because of its importance, much research has been devoted to the development of new and better contrast agents. Contrast agents are utilized in the body to increase the quality of MRI images by augmenting the contrast of the magnetic resonance of the tissue being imaged against surrounding tissue. For the most part, two metals have been used to provide this
contrast: gadolinium and manganese. Their toxicity is reduced by ligation. My project has focused on the preparation of a new ligand to bind these metals, which I have named Cystine N, N’ Tetraacetic acid (CNTA). This ligand is based on the amino acid L-Cystine and is a perfect foundation for chelation, having already two amino and two carboxylic groups for chelation, as well as a disulfide which can be easily cleaved and derivatized. I have substituted two extra acetyl groups at each amino end, making the molecule effectively an eight coordinate chelater. It binds gadolinium and has significant potential for use as a contrast agent. My further research will focus on cleaving the disulfide and subsequent attachment of other substituents to form methionine-like alkyl sulfides.

Generating a Null Mutation of the Gene CG1270I of Drosophila melanogaster
Yuhong Yan, Biology
Sponsor: Dr. Christine Rushlow, Biology

Developmental genetics is and continues to be a major field of research in biology. My model organism of choice is Drosophila melanogaster, the fruit fly. The Drosophila fly has been extensively studied and its DNA genome sequenced, but many of the genes that control Drosophila development from early embryo to adult are still under investigation. My research into the developmental controls in Drosophila may well give better insight into homologous controls in human development. My research consists of investigating the controls for a master regulator gene, zen, that is essential for dorsal-ventral patterning of the early fly embryo. I have discovered a gene called CG1270I that may be essential for the expression of zen. Genetic analyses on zen expression suggest there is a maternally loaded factor (mother puts proteins into the egg) that activates zen everywhere in the early embryo; and another factor that represses zen in the ventral regions of the embryo, thereby restricting zen to only the dorsal region. The repressor is known, but the activator remains elusive. I believe the CG1270I gene is a good candidate for the activator of zen. It is a maternally expressed gene located on the X-chromosome that may controls D-V patterning through its relationship with zen. It is also expressed in the nervous system of the late embryo. Two mutants of CG1270I exist, both of which cause head/brain defects which kill the embryo.

Molecular analysis of these mutations reveals that they are regulatory mutations, caused by the loss of an enhancer element. These types of mutations affect the spatial or temporal regulation of the gene without causing universal loss of the gene product. In the case of the CG1270I mutants, maternal expression is not affected, but nervous system expression is absent, leading to the lethal phenotype. My goal has been to create a null mutation of CG1270I and study the subsequent effect(s) on zen expression. I have produced putative mutants for CG1270I by an imprecise excision event of a p-element insertion upstream of the gene of interest. Further analysis is needed in order to confirm the nature of the mutation and its effects on zen.
with no cure, only prevention. In sub-Saharan Africa, the area hardest hit by the pandemic, young women now account for the majority of those infected. Implementing microbicides, a vaginally inserted cream, gel, or film that immobilizes the virus, is a step toward better prevention of HIV. In South Africa, strict social barriers impede distributing microbicides. Women are not afforded the opportunity to assert and protect themselves in sexual relationships. The stigma surrounding HIV/AIDS prevents women from seeking the guidance necessary to help reduce the disease’s spread. Building medical clinics within community centers allows for less discriminating access to microbicides and HIV/AIDS education. Both men and women need to be educated in group settings to try to reduce the negative assumptions surrounding the disease. Until South Africa’s perceptions about the disease change, however, it remains important to empower women with a way to protect themselves.

The FDA Approval Process: Prophylactic or Inefficient?
*Team Members: Alap Butala, Gregory Purpura, George Rakkar, and Joshua Wallach*

The FDA’s function is to approve effective medicines within an appropriate risk-benefit ratio; it is not to guarantee 100 percent efficacy and safety of pharmaceutical drugs. Using a multi-step approval process, potential medications are scrutinized by various FDA committees to prevent the release of unsafe drugs and expedite the approval of beneficial ones. Delays, however, plague the process, resulting in Type II errors when effective medications are withheld. Several factors contribute to this dilemma, including insufficient inquiry and inefficient data sharing. The general public first became aware of Type II errors during the 1980s when useful HIV medications were left unapproved and therefore inaccessible. The FDA’s current approval schematic cannot accommodate for the large influx of new drug applications (NDAs). In response to this overwhelming surge, experts are occasionally assigned to critique NDAs that are outside their field of expertise, and unwittingly cause sound proposals to be rejected. It is necessary to reallocate funds to hire properly qualified personnel for reviewing clinical trials. Furthermore, funds should be used to implement a more efficient system of data storage. Also, promoting research as a worthwhile investment rather than an expense will help to create a more suitable approval process. These solutions will provide a broader basis for FDA approval and will minimize Type II errors.

U.S. Pandemic Program: A Review and Critique
*Team Members: Alexander Barton, Kaitlin Francis, Ian Kramer, and Jennifer Savini*

In recent years, avian influenza epidemics in birds have devastated Asia, Europe, and Africa. These viruses have the potential to become transmissible among humans. Such sudden outbreaks mandate strategic planning to contain the epidemic, prevent human infection, and treat the ill. The United States Department of Health and Human Services has a Pandemic Influenza Plan that focuses on obtaining stockpiles of antivirals and vaccines as they become available. Currently, no contingency for the inability to produce vaccine exists. To combat a lack of vaccine or reduced vaccine efficacy, enhanced quarantine and containment efforts utilizing antivirals are necessary. The present plan calls for individual states to control antiviral distribution, vaccinations, and treatment. This plan underscores several problems: the current uneven distribution of health care providers among states and differing socioeconomic levels; the discrepancies among state health-care budgets; and the absence of protocol for the transportation and site designation of doctors based on pandemic-related needs. A solution to these inadequacies is to incorporate the Department of Defense fully into the plan, allowing it to receive antivirals and move into areas needing treatment to provide both transportation of doctors and the distribution of medical services.

Prescribing Happiness: The Cosmetic Use of Antidepressants
*Team Members: Susan Bloomberg, Ryan MacFarland, and Jennifer Sharpe*

Antidepressants are designed to treat clinical depression. Many people who are not clinically depressed, however, take antidepressants to ease the stress they associate with social interactions. This practice is known as cosmetic pharmacology. Our culture now perceives personality traits such as shyness as a chemical imbalance to be fixed. If someone is not clinically depressed, what are the costs of taking antidepressants? Through examining the effects on an individual’s health, the prescription trends in the United States, and international views on the use of antidepressants, our research shows that the cosmetic pharmacology trend in the United States is creating a dependence on medicine to solve typical life problems. We advocate that the prescription of antidepressants should be more strictly regulated and the side effects of these drugs be better advertised to deter people from unnecessarily harming their health.