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INTRODUCTION:

Research as Educational Paradigm

Research is disciplined inquiry. It is at the heart of human endeavor, for humans crave knowledge with every move we make. It is, of course, also at the heart of this University and the education we offer. The journal you are reading was made possible by donors who believe in what we do. It also emerges from the brilliance and dedication of the students whose work you will read and the faculty who mentored them during the academic year 2014–2015 in the College of Arts and Science at New York University. It is a celebration of the achievements of our most curious, driven students.

Research takes many shapes, as this publication attests. Students featured here spent time working in a lab with a team of scientists in order to understand brain development; they measured the dimensions of ancient human remains to understand cultural practices surrounding beauty; they picked through boxes in an archive, finding textual evidence to support a literary analysis; or interviewed living eyewitnesses to a major historical event in a foreign country. The benefits are many. Students work closely with a mentor, sharpen their problem-solving skills and learn about “the big ideas” of their chosen field. Students explore possible future careers, learn how to work independently and hone marketable skills such as effective written and oral communication. However, in personal terms, there is no greater achievement than meeting the challenges of a long-term project, following a passion to a wonderful conclusion and having a completed work to show for it. It is a thrill and satisfaction like no other. The internal standard of excellence that our students discover within themselves is perhaps the most salient personal outcome of undergraduate research, and a reward that keeps on giving no matter what one pursues after college.

This publication represents only a fraction of the research undertaken by College students, as individuals and in groups, under the close mentorship of faculty; for the most part, the projects featured here were supported by the Dean’s Undergraduate Research Fund, created through the generosity of alumni, parents and friends, which provides material support necessary to carry out their inquiries. (A list of the research scholarships that have been endowed in the Fund appears on page 2 of this journal.) These abstracts were also presented at the annual Undergraduate Research Conference, which was established over thirty years ago and encompasses the sciences, humanities and social sciences as well as creative writing.

At the start of this issue is the “Faculty Perspective,” in which we publish the remarks delivered by an NYU faculty member at the closing award ceremony of the previous Undergraduate Research Conference. The content of this issue underscores the crucial importance of independent inquiry as a paradigm for a liberal arts education for the twenty-first century. We are very grateful to the students, their faculty mentors and the generous funders who have made this sort of educational experience, and this journal, possible.

G. Gabrielle Starr
Seryl Kushner Dean, College of Arts and Science
Professor of English
FACULTY PERSPECTIVE

Bridging Gaps and Discovering Questions:
Research across the Disciplines

Professor Patrick Deer

Thank you to Professor Marisa Carrasco-Queijeiro for that kind introduction, and my sincere thanks to Dean Gabi Starr, Dean Richard Kalb, and to the generous donors to the Undergraduate Research Conference. There are many different ways to do research, as you have all demonstrated so superbly here today. As my title suggests, I’ve always been drawn to gaps and silences, by the desire to discover my research questions that might bridge those gaps and break those silences. I began my own life in research by following my passions: at first I didn’t consider studying literature because reading was something I saved for pleasure. In England you have to choose your undergraduate major even before you’ve finished high school, and I was going to study history. Then I realized that I could combine historical research with the close analysis of the ways writers used language to move their audiences, to express the inexpressible and push the limits of representation. As an undergraduate at Oxford, I studied English literature from start to finish, as well as critical theory, and arrived at Columbia as a medievalist ready to write a dissertation on the work of Geoffrey Chaucer. Or so I thought. But I also came to work with Edward Said, author of Orientalism and later Culture and Imperialism, who became my Professor. I had this crazy idea that I could seek out an expert in the field and learn from him or directly. And it worked out. Why? Because experts and academics mostly love to communicate their ideas, and they very often sit peacefully in their offices or office hours because people think they must be too busy to talk to them. Don’t stalk them—that would be creepy. But seek them out. Find the confidence to figure out who knows what you need to know and go and ask them politely.

My best teachers taught me another lesson, and here I think as much of my high school teachers in England as my Oxford University tutors and Columbia professors. At NYU I’ve also learned by listening to my students’ and colleagues’ questions. You couldn’t just stay within the boundaries of established knowledge. You had a responsibility to your knowledge, to take that knowledge and apply it to the world. And the beauty of research is that it can allow you to reinvent yourself.

In graduate school studying medieval literature I discovered a century long gap in literary history, the 15th Century, between Chaucer and the Renaissance and Shakespeare. Here was the germ of a PhD topic, I thought. Then I asked my Professor, a Dante specialist, who else had worked in the field. He named the author of a very good book I’d found in the Library stacks—sitting on the shelf. Where was she now, I asked? Oh, she’s working in finance on Wall Street, he said. My instincts told me, like the subway at Union Square: mind the gap! You have to listen to your instincts.

Instead I discovered another unknown period in literary history, right under my nose: the 1940s and WWII literature during which most critics assumed nothing very good was written because there was a war on. But, joining a new generation of like-minded critics, I discovered otherwise in writings of Churchill, Virginia Woolf, George Orwell, Henry Green, Graham Greene, Elizabeth Bowen, and Alexander Baron. Why had all these voices been forgotten, left out of the canon of modern literature? My project was also inspired by the legends and the silences of my family history. Here, I will share a short war story.

Lieutenant Gerard Borg of the 144th Royal Armoured Corps of the British Army had a very brief war. Trained as a tank commander, my grandfather was part of the vast force that invaded Normandy in June 1944. His unit crossed Gold Beach a week after D Day, moved inland through the Bocage countryside of lanes, open fields and thick, almost fortified hedges, towards the bitterly contested city of Caen. He was killed in action on the morning of July 16th near a sunken lane in the hamlet of Queudeville, on the first day of an attack poetically code-named Operation Pomegranate. But the facts of battle, I discovered, were prosaic. The tank and infantry assault lasted for two inconclusive days, a diversionary attack for the British 2nd Army’s huge armoured assault on July 18th, Operation Goodwood, which successfully pinned down German forces south of Caen and allowed the Americans to break out of the Normandy beach head.

I discovered all this reading the War Diaries for my grandfather’s unit in the National Archive while I was doing research for my dissertation. Holding these yellowing documents, typed up in the heat of battle, I was breathless. Now I would learn what actually happened to my grandfather. What I discovered, of course, is that the closer people are to intense action or events, in this case infantry combat in Northern France after D Day, the less time they have to write about it, and the more fragmented the archival records are. At this point, someone else typically steps in to tell people’s story for them: the novelist, the historian, the geographer, the scientist, even the lowly graduate student, all have a responsibility to reconstruct the big picture. But I’ve learned that we must also remain faithful to the silences, gaps in knowledge, to what we don’t and perhaps will never know.

I did learn a few new things, though. According to a report compiled by his Commanding Officer from the unit’s War Diaries, after crossing the Start Line at 05.30 hours Lt. Borg’s 3 Troop tanks hit a British minefield and “lost direction” in the early morning mist and thick dust stirred up by tank and infantry battle. The War Diary entry for another unit involved in the Battle, ends for that day, “The plan must be good and the rest is hope.” But the plan went awry. The infantry was supposed to mark paths for the tanks that night through the British minefield. But they didn’t. My grandfather’s tanks hit the
mine running, lost radio contact and made directly for the heat of the action, overrun slits trenches manned by the 277th Volks Grenadier Infantry Division of the S.S. Second Army. Lieutenant Borg was shot in the head while firing with his sub-machine gun on the soldiers who had overrun his tank. Family legend had it that he was too vain to wear his helmet, but I realized he may not have had time to put it on as he hung out of the turret firing at the enemy. A colleague of mine, a Marine Corps Vietnam veteran with whom I shared my research, agreed observing tersely: “I never did any of that John Wayne shit.” My grandfather’s tank crew kept firing “for a considerable period” until they were able to recover his body and drive it back to safety burying him temporarily underneath an apple tree in an orchard near Fontenay Le-Pesnel. His two brothers were both serving nearby in Normandy at the time of his death, but they no idea of each others’ whereabouts.

My grandfather left behind some letters, photographs, and mementoes, a wife and one year old daughter, my mother. Over the years I had heard many stories about Gerard Borg, about his charm and erratic timekeeping, adventures in the Birmingham blitz and blackout, his popularity with his fellow officers, and his death in Normandy. The countless British war films, documentaries, military histories, war poems and novels I’d consumed growing up, had filled in the blanks left by the silences of family history. Or so I thought.

I thought my research would interest my grandmother so we arranged to meet for tea. But when I arrived at the appointed time in Stratford on Avon, England, the house was empty. On the dining room table was a note saying that she had needed to go for a walk, so she’d driven with my aunt to a country garden in the Cotswolds, ten miles away. A slim stack of my grandfather’s letters, along with his campaign medals and some newspaper cuttings sat next to a plate of biscuits and an apple. There was also a yellowed clipping I had not seen before, a copy of his brief death notice from the Birmingham Post, one item in a long column, which ended, “No Letters Please.” Sitting there in the empty house, I recalled that my grandmother had gone away to stay in the country after Gerard was killed, leaving my mother, then only a year old, with her grandparents in Birmingham. Even now, fifty odd years later, it was too much, too traumatic to sit and talk about the details of his death in wartime. Sitting in her empty house, I realized how that short sentence, “No Letters Please,” continued to resonate down the years.

I learned another lesson there, I think, that you have to include the personal and the human dimension in your research. And that silences are always actively produced. How was it, after growing up in a British culture saturated by the official and popular versions of World War II, which told us what it was like, that there could be such deep silences about the human and personal costs of war? Why was it that when men and women came back from WWII, they confronted a culture of silence, a home front that assumed it had heard about it already and didn’t need to listen to these individual voices? What was it about the work of the war writers I was studying that people didn’t want to hear? The experience of modern warfare, I discovered, was about too little and too much. The traumatic nature of total warfare was often too much for civilians, soldiers or veterans to articulate: they were often reduced to silence. Meanwhile an official war culture emerged during WWII that said to its citizens, in the US, “This is a Good War,” or in Britain, “This is a People’s War.” Those war cultures declared: “It’s too big, too vast, too complex, too extreme for you to comprehend. Don’t worry, we will represent it for you. Just go on. Don’t stop to grieve or process what you’ve seen. We’ll take care of that. Keep going.” But, as we all know, there can be a cost—psychological, ethical, social and economic—to keeping going when bad things are happening in the world. The question is: who’s going to bear that cost? Do we—so far away and insulated from America’s recent wars and conflicts that we have grown up with—live in a similar culture of war?

These days when I am talking to veterans of Iraq or Afghanistan wars, or more rarely to Iraqi or Afghan civilians because they are so far away, I try to be responsible in the ways that I ask my questions or use their stories. Veterans encounter a constant, “Thank you for your service” in the street or airports, or drunken questions at campus parties. “So...did you kill anyone...what was it like?” They want to be part of an actual conversation that overcomes the “civilian military divide.” But we have to listen carefully and allow them to help us set the terms of the exchange of ideas, information and experience. This takes time, and we are addicted to fast results. Our war culture also encourages us to think we already know how to ask these questions or that we should stop asking and remain silent. But it is our responsibility to slow things down, listen carefully, act ethically and seek out our own questions.

To conclude: Too often, I think, we relate to research as a noun, something a bit abstract and end oriented that sits across from us like an ideal or a product. The truth is that we very often discover, formulate and reformulate our research questions as we go along. Better to think of research as a verb, an activity that we do. The excitement is in pursuing these questions in conversation. More helpful to think of research directions, rather than finished topics. A good friend and colleague, Mary Louise Pratt, now Professor Emerita in SCA, is fond of saying, “People think only scientists discover things. But people in the humanities discover things all the time.” True, and we can turn that around and extend it: people in the sciences and social sciences are interpreting, imagining, telling stories and working with narratives all the time. In the 1950s, a fairly crusty British intellectual called CP Snow famously warned the British that they were divided into “two cultures,” scientific and humanistic, and that they would continue to decline if they didn’t remedy this gap. He was exaggerating, of course, the way intellectuals do, but we still recognize the problem. But I would like to suggest that all of us, in our different disciplines, belong to a culture of research that cuts across these great social divides, because it is our intellectual responsibility to talk to each other and bridge these gaps together.
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

Dios y los Diez: Diego Maradona, Lionel Messi and the Making of Icons in Contemporary Argentina

Catherine Addington, Latin American Studies
Sponsor: Professor Mariano López Seoane, NYU Buenos Aires

Argentine soccer players Diego Maradona and Lionel Messi have been subject to similar cultural phenomena, from national identity politics to Catholic imagery, despite wildly contrasting personal contexts. Their subjection to the tropes in question is not an overwhelming natural outpouring of the sport, the country or the players themselves, but a function of rational cultural expression anchored in Argentine social values. This thesis undertakes a comparative study of the two players as secular icons in order to discern those values. Foremost among these values is the ever more tightly grasped moral economy that informs Argentines’ relationships with soccer. The priority placed on local, collective prosperity over individual success has manifested itself as a communal resistance to soccer as one of many cultural products seen as under siege by neoliberalism and globalization. Yet another value is the definition of citizenship as participation in institutions that provide mechanisms for social change or resistance, which has only included soccer when left with no other options in civil society. Finally, ritual accessibility in Christian and secular contexts alike is an increasingly prioritized value that expresses itself in reaction to established forms of religiosity across class lines.

A Historiography of the Relationship between the Third Reich and Zionists

Mia Appelbaum, Economics
Sponsor: Professor David Engel, Hebrew and Judaic Studies

Although the Second World War is one of the best-documented subjects in history, there is only a small body of literature dedicated to the relationship between the Third Reich and the Zionist movement. In the 1970s, however, a proliferation of studies emerged on the Haavara (transfer) Agreement, in which the Zionist Organization negotiated the emigration of German Jews to Palestine in exchange for Jewish assets. Within this area of study, there are sharp disagreements among scholars about what this relationship represented. There are those who argue that Zionist collaboration with the Nazis was morally reprehensible and politically perverse because it undercut the global economic boycott movement against Germany and promoted its own interests in establishing a national home in Palestine. These writers maintain that the boycott had a reasonable chance of defeating the Nazi regime in its infancy, thereby obviating the eventual Holocaust. Conversely, other historians gather evidence to prove that economic boycott would not have been strong enough to frustrate Nazi Jewish policy and that the number of German Jews immigrating to Palestine through Haavara was not enough to determine Palestine’s political future. This research explicates why 70 years later, details of the Haavara agreement continue to inflame passions and strike a raw nerve among historians and the general public. This historiographical study traces the academic actors in the debate and illuminates their personal ideologies, the selected archives available and their divergent conclusions.
An Exploration of Bike-Oriented Development Patterns in Scandinavia
Erik Battista, Urban Design and Architecture
Sponsor: Professor Jonathan Ritter, Urban Design and Architecture

This project explores how biking informs street and building design in cities with significant rates of bike ridership and considerable overlap with American land use patterns. Copenhagen, Denmark, is one such city that meets these criteria as well as a major exporter of urban design principles across the world. Danish planning practices can be seen informing the new street design manuals of places like New York, Chicago, San Francisco, Portland and Washington DC; but, it can be hard to judge just how much evolution (or dilution) of Copenhagen’s example has taken place without experiencing both sides of the picture. By documenting the progress of Copenhagen roughly thirty years into its cycling renaissance, this project shows how the Danish capital and its surroundings illustrate best practices among architects, urban planners and real estate developers to accommodate bikes not only in the streets but also in the building stock. By laying out a clear vision of what a bikeable city looks like, American cycling advocates can better understand the fundamental elements that go into creating effective multimodal communities.

"El Niño del Nuevo Estado:” How the Franco Regime Used Textbooks to Influence Spanish Youth
Melissa Bazydlo, Spanish
Sponsor: Professor Jordana Mendelson, Spanish and Portuguese

This project explores how Francisco Franco’s nationalist, Catholic idea of the child during the Autarky and “hunger years” of the 1940s and 1950s in Spain influenced children’s literature released during this time. Within the 36-year dictatorship (1939–1975), this paper focuses on the early years, which arguably were the hardest for the citizens of Spain. Franco’s regime used various forms of media aimed at children in order to effectively impose his political agenda on an entire generation of children. He shaped the idea of what an “ideal child” and the “ideal family” meant for the Spanish people. This project seeks to understand the relationship between the politics of the regime and how this shaped the citizens of the nation. Franco used textbooks to effectively alter history for his own devices. By examining these textbooks, and Así quiero ser in particular, a strong case can be made for the fact that children were taught from an early age what it meant to be a good and devout Spanish citizen. This is significant because not only is there a focus today on the recuperation of historical memory in relation to the Spanish Civil War but also because it is interesting to look at why Franco’s regime chose to censor children’s stories.

“No One Cares About Us:” Syrian Refugees and the Greek-EU Immigration System
Kristina Bogos, Hellenic Studies, Journalism
Sponsor: Professor Liana Theodoratou, Hellenic Studies

The 2011 Syrian crisis has left behind nearly 3 million refugees, the majority of whom seek refuge in the neighboring countries of Lebanon and Turkey. Yet not much attention has been paid to Greece, which has become a gateway for refugees seeking asylum in the European Union due to its proximity to the Middle East and its porous borders along the Mediterranean Sea. In 2014 alone, approximately 26,000 Syrian refugees entered Greece. As the country undergoes a vast economic and political transformation following the 2008 sovereign debt crisis, it faces challenges to humanely handle refugees and asylum-seekers in accordance with its international obligation. This research, conducted in Athens in January 2015, examines the Syrian refugee experience in Greece and the subsequent struggles refugees incur as they access a feeble asylum system. Interviews conducted with Syrian refugees and Greek NGOs in Athens reveal a lack of interpretation services upon entry, a wanting provision of welfare services, instances of police brutality and stringent and delayed asylum policies and procedures. While bringing to light the deficiencies of Greece’s asylum system, this research also reveals the shortcomings inherent in the larger EU immigration system in the wake of one of the largest humanitarian crises of the twenty-first century.

“Let Them Say, ‘He Is A Better Man Than His Father!’” An Examination of Paradigmatic Behavior in Portrayals of Heroic Fathers and Sons in Ancient Greek Art and Literature
Monica Bulger, Art History, Classics
Sponsor: Professor Joan Breton Connelly, Classics

This thesis investigates the ways in which heroic fathers and sons from Greek myth provided exemplary models for historical Greek fathers and sons, thereby offering solutions for problems they might encounter in their lives. Systematic evaluation of portrayals of mythic fathers and sons in ancient Greek art and literature show that these fictional heroes regularly supplied paradigms of behavior. Present fathers who play an active role in the upbringing of their sons enjoy successful relationships with them, in which a sense of mutual affection and respect promotes warm attachments. The sons of absent fathers, boys who mature without male guidance, regularly lack a clear understanding of morality and grow up to breach societal norms, often disgracing their lineage. The legal rights of aging fathers, although respected, could honorably be appropriated by their adult sons to preserve family estates. Overall, myth reinforces the seminal importance
of the role of the father in a son’s life. These conclusions exhibit the ways in which Greek myth, in its performed, pictorial and poetic guises, encouraged certain types of behavior. These ideal behaviors ensured the preservation of the norms and morals of the community and, thereby, the continuation of ancient Athenian society.

“Freedom:” The Abrams Struggle
Selena Chen, History
Sponsor: Professor Jonathan Soffer, Technology, Culture and Society, NYU Polytechnic School of Engineering

This thesis aims to explain the complex intellectual relationship between three prominent legal figures of the twentieth century and their contribution to the advancement of free speech rights during a period, World War II, when speech against the government was heavily restricted. Through examining their involvement in the Supreme Court case Abrams et al. vs. United States, this study explains how Supreme Court Justice Oliver Wendell Holmes Jr., Judge Learned Hand and Harvard judicial philosopher Zechariah Chafee advanced the necessity of the protection of free speech by seizing upon this particular case of violation of the free speech rights of six Russian immigrants by the United States government. It was through the exchange of ideas between Holmes, Hand and Chafee that ultimately allowed Justice Holmes to develop the argument of his famous Abrams dissent, which was championed by later liberals as the greatest enunciation for the necessity of free speech. This thesis describes instances where the collaboration between multiple academic and legal luminaries ignited the flame to showcase greater freedom of speech. Holmes, Hand and Chafee had little power beyond their reputation and influence. Yet, they managed to sensitize the American public to speech-related issues. Through their collaboration, they gave America a coherent argument for the social necessity of free speech. The production of radical archives depart from traditional archives in curatorial intention, form and function to reveal narratives previously unexplored. Through the analysis of the archival artwork of an Argentine artist and North American artist, this project explores the radical archive as a mechanism of repurposing knowledge and memory transmission in two specific regions that bear unique histories of oppression. These artists provide alternatives to the often problematic nature of traditional archives. Archival art is best understood by analyzing its construction, performative aspects and engagement with public feelings. The production of radical archives through archival art has therapeutic effects that enable healing processes in response to histories of trauma and mis-representation not only to the individual artist but to the community. This work is a contribution to the developing study of radical archives in terms of memory and historical representation.

Inventing the Petite Patrie: The Flibrige as a Nationalist Project
Philip Dalgarno, European and Mediterranean Studies
Sponsor: Professor Madigan Fichter, European and Mediterranean Studies

In 1854, a group of seven young Provençal poets gathered to found the Flibrige, a literary society that aimed to revitalize their regional language— the langue d’oc or Occitan—faced with the increasing dominance of the national language, French. While the Flibrige is best remembered for the literary achievements of its leader and Nobel laureate Frédéric Mistral, the movement to preserve Occitan was also inherently political. The Flibrige grew out of the broader réveil des nations, a national awakening across Europe that revalorized popular literature and local
languages through a Herderian conception of nationalism. Traditionally viewed as a regionalist organization with an only peripheral role in French history, the Félibrige was in fact a uniquely French response to this contemporary trend towards national construction in Europe. Though the Félibrige did not succeed in its proximate goal of stopping the advancement of French over Occitan, the group redefined the relationship between the Grande Patrie, France, and the petite patrie of Provence. In doing so, it played a central role in the history of nationalism’s evolution in France.

**Something in the Forest: A Scientific and Social History of Ebola Virus Disease, 1976–2015**  
*Anthony Donadia, Global Public Health/History  
Sponsor: Professor David Oshinsky, History*

Prior to the most recent import of Ebola into the U.S. from West Africa, little attention was paid to a disease that usually struck isolated, rural communities in Central Africa: one day it would arrive, and after burning its way through entire villages, taking hundreds of lives in the process, the virus would simply disappear back into the forest—back into whatever organism contained the natural reservoir. There have been major outbreaks of Ebola in 1976, 1995, 2001 and 2014–15. Each of these epidemics has produced an increasing number of deaths and a potentially worrying increase in outbreak frequency. This thesis examined three of these outbreaks: 1976 in Yambuku, Zaire; 1995 in Kikwit, Zaire; and 2014 in Western Africa, in order to determine which biological and social factors most influenced the course of any given outbreak. The results of this inquiry suggest social considerations, principally cultural concerns regarding funeral rites and diet practices; negative attitudes toward Western medicine; and other widespread deficiencies in the healthcare infrastructure are most responsible for a majority of the largest documented outbreaks of Ebola. In a field in which quantitative analysis predominates, a historically-based interpretation of these epidemiological events offers a unique addition to a discussion that, due to a recent upswing in interest, may very well be just beginning.

**Arts, Spirituality and Judson’s Avant-Garde**  
*Luka Douridas, Music  
Sponsor: Professor Stanley Boorman, Music*

In 1890, Judson Memorial Church was founded in 1890 by Edward Judson, a Baptist minister who came to New York with dreams of creating a new kind of church. Proclaimed an “institutional church” from the start, Judson’s mission was to provide resources for the local community without any agenda for conversion. While many of these efforts initially took the form of classes or recreational activities, the postwar environment in the Village bred a community of radical thinkers who eventually morphed Judson’s community involvement and turned the church into a space that became better known as a platform for the avant-garde than as a place of worship. Yet, while much of the literature around Judson has focused on the artists, few have examined the ministry of the church itself for clues as to what allowed for such an artistic renaissance to take place. Through interviews with surviving staff members, readings of hundreds of nearly untouched documents and the introduction of several key new sources, an enlightening and, at times, shocking new picture is painted of what triggered Judson’s reign as one of NYC’s greatest underground cultural forces and draws particular attention to some of the unsung heroes of their ministry that helped forge an unlikely yet fitting bond between spirituality and the avant-garde.

**Edward Burtynsky: Photographing the New Landscape**  
*Laura Edelman, Art History  
Sponsor: Professor Shelley Rice, Photography and Imaging, Tisch School of the Arts*

Due to growing global desire for an advanced lifestyle, the modern landscape has changed. Beautiful, pristine places have largely been overtaken by massive industry’s incursions on the earth, a process that comprises one aspect of the mounting environmental crisis. Canadian photographer Edward Burtynsky (1955–) has become a darling of the art world with his images of “manufactured landscapes,” which combine carefully chosen examples of industry’s influence on nature with grand formal elements including large scale, removed perspectives, rich colors and painterly compositions. Their intended effect is awe and contemplation, as the scenes are often ambiguous depictions of terrible beauty. Frequently, the simple title of the photograph is the sole indicator of its subject, thus elevating the implications of the transformed landscape. Of his ten series, Burtynsky’s projects covering shipbreaking in Bangladesh (2000–2001), urbanization in China (2004–2006) and water usage worldwide (2009–2013) have had a distinct impact beyond the gallery. This influence is evidenced by tangible progress toward sustainability awareness and action ranging from the qualitative creation of blogs to quantitative improvement of working conditions in Bangladesh. This thesis will examine why these lauded fine art photographs are potent activist tools, showing how art can be a catalyst for significant social change.
Figuring Post-War Trauma: The Return to Representation in German Neo-Expressionism

Catalina Escalona, German, Global Liberal Studies  
Sponsor: Professor Matthew Longabucco, Global Liberal Studies

This paper explores the international art historical movement Neo-Expressionism within the context of post-war Germany. It argues that Neo-Expressionism functions not only as an indicator of Postmodernism and as a critique of representation in the contemporary world but, more importantly, as an approach to deal with the greater traumas of World War II. In the late 1970s and early 1980s, Neo-Expressionism gained significant acclaim on the art market yet simultaneously provoked heated debates among art critics. In its return to previously existing visual languages, or what critic Benjamin H.D. Buchloh calls the “perceptual conventions of mimetic representation,” Neo-Expressionism was condemned as “backwards” and “neobourgeois.” Extending the arguments of Donald Kuspit and Andreas Huyssen, this paper looks beyond the field of art history and uses trauma studies to frame Neo-Expressionism as a radical movement of art that deals with trauma and its images. In considering it the first active engagement of post-war trauma management in painting, this study asserts that Neo-Expressionist art can allow us, as Cathy Caruth says, to recognize “realities that most of us have not yet begun to face.”

Some Versions of Shakespeare in the Eighteenth Century

Christopher Feldsine, English  
Sponsor: Professor John Guillory, English

Shakespeare’s plays have been edited since their initial publication in the late sixteenth century, but scholarly consensus identifies the publication of Nicholas Rowe’s The Works of Mr. William Shakespeare as the birth of the modern editorial tradition. Contemporary editors, nevertheless, are careful to distinguish their task from the labors undertaken by Rowe and his successors. Rather than produce a readable version of the most authoritative edition of a given play, Shakespeare’s eighteenth-century editors are supposed to have attempted to reconstruct the lost manuscripts behind the earliest editions of his plays, Shakespeare’s plays as he completed them and intended them to stand forever. While not disputing the interest of these editors in the authenticity of the text, this thesis investigates the processes that determined the form and content of their editions. Whereas current scholars tend to assimilate these editions to sociopolitical phenomena, this study is concerned with the relationship between editors’ personal investment in their editing of the texts of Shakespeare’s plays. Although their work may be inflected by personal convictions and social concerns, Shakespeare’s eighteenth-century editors did not attempt to present a version of his plays that promotes a particular ideology; rather, they strove to restore his original texts by relying on their personal understandings of his style and personality. This project is a study in reception. It examines several editions of Shakespeare’s plays produced during the eighteenth century and attempts to demonstrate that they present the plays as they are read by the editor. Invoking the work of reception theorists such as Roman Ingarden and Wolfgang Iser, it adumbrates the complex intellectual processes involved in the act of editing and the intimate relationship between reading and editing. It asks: What is the relationship between the earliest extant editions of Shakespeare’s plays and their eighteenth-century counterparts? What do the differences between these editions reveal about the editing of the plays? Should these editions be regarded as “authoritative?” How do the editors of these editions determine “authority?” Is an “authoritative” text of Shakespeare’s plays an objective category, or is it defined by the editor alone? In pursuing these questions, it elucidates the extent to which eighteenth-century editions present personalized versions of Shakespeare’s plays, the possibility of producing an authoritative text of the plays and the extent to which reading Shakespeare determines readers’ understanding of Shakespeare.

The Gaze of Narcissus: Ovidian Echoes in the Orlando Furioso

Alice Fischetti, Comparative Literature  
Sponsor: Professor Jane Tylus, Italian Studies

“The men of old . . . are so eaten to the heart with . . . envy that . . . they must take it upon themselves to disclose any blemishes in women.” Ludovico Ariosto’s Orlando furioso (1532) is remarkable in having largely shaped the Cinquecento debate on the existence of the romance genre. Engaging with such a work sets critics on a journey through history, a quest illustrating the development of literary self-consciousness, the innovation of genre and the questioning of social customs. A deeply ambiguous and multifaceted text, the poem’s engagement with classical sources is crucial to uncovering the “meaning” of its contents. This study thus critically examines the classical influence on the Furioso. Using the theories of both Sigmund Freud and Jacques Lacan, the influence of Ovid’s Metamorphoses is unmistakable in the narcissism of both the Furioso’s poet and its protagonist Orlando. By examining Orlando’s identity and the male gaze throughout the poem, questions of female subversion arise, namely, questions that link Ariosto’s use of narcissism to his possible critique of the suppression of the female literary voice. This project contributes to a reading of Ariosto’s work that grapples
with larger questions of literary influence, the dialectic of
fiction and reality and the Cinquecento’s apparent engage-
ment with questions of gender and identity.

**Philanthropy: A Staple Piece of British Culture in the
Nineteenth Century**
*Isabelle Foss, History*
**Sponsor: Professor Guy Ortolano, History**

Philanthropy is much lauded for its connection to
high morality and benevolent spirit as are those involved
within it. However, a deep analysis of its development
during the reign of Queen Victoria (1837–1901) sheds
light on the institutionalization of this enterprise and on
wider reaching changes in the rapidly evolving society
of nineteenth-century Britain. The Industrial Revolution,
which dominated this period, brought not only modernization
but also a whole host of social problems: vast
impoveryment, overcrowding, disease and poor working
conditions, especially in the heavily concentrated industrial
urban centers. Mass welfare provision arose in response to
this situation in the form of philanthropy in a pre-Welfare
State Britain. The cases of four major philanthropists, Lord
Shaftesbury, George Peabody, Angela Burdett-Coutts and
Louisa Twining, each represent key figures that developed
popular philanthropy into an institution and a staple piece
of British culture. This study’s significance arises from its
ability to illuminate broader trends in British society as
well as on welfare aid, which in this period interestingly
was overall inefficient and inadequate when faced with
the depth of the crisis.

**Garudas and Nagas: An Eastern Approach to the
Monstrous**
*Ashley Frenkel, Art History*
**Sponsor: Professor Kathryn Ann Smith, Art History**

Monsters are cathartic: they allow people to project
their unsavory desires onto an acceptable outlet. They
lie on the periphery of the conventional and are some of
the most enduring examples of the power of the human
imagination. This project focuses on western theories of
the monstrous in relation to two Southeast Asian creatures,
garudas and nagas, man-eagle hybrids and serpent spirits
respectively. Garudas and nagas derive from the beliefs
of indigenous religions in southern Asia, but Hinduism
and Buddhism appropriated these figures as a way for
people to reconcile contrasting belief systems. The author
analyzes iconographic evolutions from India, the birthplace
of Buddhism, to other eastern countries such as Tibet and
Thailand. Gandhara in Pakistan, a cultural crossroads of
eastern and western ideas, offers art influenced by both
traditions. It is argued that despite garudas’ and nagas’
similarities to western monsters, neither can be classified
as “monstrous.” The lingering negative connotations of
this western-born concept are neither evident in nor appli-
cable to the artworks and myths related to these creatures.
This research is significant because it takes a western idea
within a western dominated field and examines the idea
through a lens that shows the intersectionality of seemingly
disparate cultures.

**Manuscript Collecting as Statecraft in the Courts of
King Charles V of France and Jean, Duke of Berry, 1364–1416**
*Nora Gorman, Art History*
**Sponsor: Professor Carol Krinsky, Art History**

Jean, Duke of Berry (1340–1416) is recognized as a
patron whose novel tastes changed the course of art history,
but he was also a shrewd political manipulator. He brokered
key settlements with England during the Hundred Years’
War and, along with his brothers, acted as regent on behalf
of his incapacitated nephew, King Charles VI of France.
This paper argues that Jean’s collecting—especially of
illuminated manuscripts—was part of an established
tradition, one in which the acquisition of objects was a
sophisticated and purposeful expression of royal authority.
Jean’s late brother, Charles V, had used library-building—
a practice appropriated from royal women—to reify the
Valois dynasty’s legitimacy. Moreover, Jean employed
the tradition of collecting in unprecedented ways in order
to expand his power and articulate his individual identity.
Comparative analysis of royal inventories and the icon-
ography of Jean’s most significant manuscripts reveals
parallels between his collecting and political campaigns
as well as stylistic similarities between his acquisitions
and commissions. This paper takes an interdisciplinary
approach to the study of illuminated manuscripts, engages
with the growing body of knowledge on the history of
collecting and investigates gaps between Anglophone and
French scholarship.

**Opening Hearts and Aligning Minds: Counterinsur-
gency in Algeria and Iraq**
*Marian (Nate) Grau, History*
**Sponsor: Professor Valerie Deacon, History**

This paper compares the methods with which the
United States and France attempted to defeat the insurgen-
cies against which they were pitted in Iraq and Algeria
respectively. French military thought in the late-colonial
period revolved around successfully winning “small wars”
against indigenous uprisings attempting to overthrow
France’s imperial authority after the Second World War,
and many French analyses were instrumental in shaping
how American military thinkers understood their own
situation in Iraq. Yet, for all the attention that was paid
to France’s campaign to retain Algeria, the architects of American counterinsurgency strategy in Iraq looked only to the doctrinally unstable initial years of the Algerian war, which spanned from 1954–1958, to the detriment of the final four years. This study focuses on those pivotal and final years of the Algerian insurgency when France pursued a joint strategy of indigenous empowerment and sweeping raids to devastating effect. In order to successfully employ the lessons of Algeria against modern insurgencies, it is necessary to investigate the entirety of the conflict and to understand that the United States cannot defeat insurgents by buying their loyalty but must instead use every resource, military and economic, at its disposal.

**One Big Soul: The Unity of Bill Viola's Going Forth by Day**
Alex Greenberger, Art History
Sponsor: Professor Shelley Rice, Photography and Imagining, Tisch School of the Arts

American artist Bill Viola (1951–) is known for his videos that ponder life’s biggest questions: e.g., the mysteries of birth and death, humanity’s connection to nature and the role of spirituality today. It is clear that what Viola does differs from the work of many socio-politically concerned contemporary artists. Scholars are therefore sometimes unsure how to study his work. In *Going Forth by Day* (2002), Viola’s most ambitious work to date, he brings together five videos that seem unconnected: a woman and rescue workers search for her son in the aftermath of a flood, an old man dies as his belongings are shipped off, people walk through a forest, an apartment building explodes with water and a birth is abstractly shown. Although these videos’ narratives have little in common, Viola brings them together so that these disparate parts are unified as a whole installation, a process that is then mirrored by the viewer’s own spiritual journey through the work. By relying on non-Western spirituality, art from both the West and outside it, the history of the sublime and video theory, it can be suggested that with *Going Forth by Day*, Viola attempts to reconnect humanity with its world.

**Glocalizing Expressway Conversions: From Brooklyn-Queens Expressway to Public Urban Tech-Park “Midline”**
Jesslyn Guntur, Urban Design and Architecture Studies
Sponsor: Professor Mosette Broderick, Art History

Since the 1970s, more than two dozen American cities have participated in the “Expressway Teardown Movement” and permanently dismantled outdated expressways or replaced them with a community-building, economically viable and environmentally sustainable alternative. However, still more cities have been too sidetracked by misplaced priorities, conflicting interests and financial hesitancy to realize the wide-ranging benefits of expressway conversions. This has been most evident in the case of the Brooklyn Queens Expressway (BQE) in Brooklyn Heights, New York. This project aims to convince Brooklyn Heights constituents to glocalize the “Expressway Conversion Movement” with the BQE by supplanting one of its three-tiered cantilevered lanes with the Midline, a sustainable, urban technology-based public park. The author uses literature reviews, newspaper periodicals, technical manuals and global case studies to clarify the necessity, desirability and feasibility of the conversion. Ultimately, this project shows the estimated community benefits of the Midline to offset the cost of implementation. Research on the implications of the Midline offer a significant contribution to the field of urban design by challenging the forum to consider revitalization of active yet outdated infrastructures—as opposed to passive conversions of abandoned or deactivated spaces—for improving community life.

**A Call to Arms: John Oliver’s Democratic Engagement with His Audience**
Alexandra Heffern, Global Liberal Studies
Sponsor: Professor Matt Longabucco, Liberal Studies

Contemporary news media suffers many maladies: covert bias, obsession with entertainment and information overload to name a few. In response, political satire exposes and remediates these flaws. The impact of satire on politics was explored by Amber Day in her article *Satire Might Not Sway Votes, but That Isn’t the Point*. Day explains that when examining satirical impact, short term observations use a flawed understanding of healthy democratic activity. Instead of short term markers, like voter turnout, to judge success, Day proposes that, “the very idea of a democratic system is premised on the existence of an informed and engaged citizenry.” American politician Thomas Jefferson, Wendy Brown, professor at the University of California in Berkeley and Michael Schudson, professor at Columbia University’s Graduate School of Journalism, all have theories that elaborate on a healthy citizenry. A combination of their ideas creates a new model for contemporary citizen engagement. With this reconstructed definition of an informed and engaged citizenry, it is possible to move forward and analyze the efficacy of satirists in enacting change over traditional news journalists. Ultimately, John Oliver of *Last Week Tonight* is offered as a model for future development within the field of satire.
Shaping Citizens’ Values in Augustus’ Rome and Post-9/11 America: Scenes from Virgil’s Aeneid and Zack Snyder’s Man of Steel
Emma Hickey, Global Liberal Studies
Sponsor: Professor Christopher Packard, Global Liberal Studies

This study explores the ways in which Virgil’s Aeneid shaped and unified national identity in Augustus’ Rome and the ways in which post-9/11 American superhero movies do the same. The analysis is done through the lens of instrumentalism, as outlined by Daniele Conversi in Nationalism and Ethnosymbolism: History, Culture and Ethnicity in the Formation of Nations, and is complemented by the ethnosymbolic nationalist approach of Anthony D. Smith in Ethno-Symbolism and Nationalism: A Cultural Approach. This study looks specifically at the use of cultural symbols, myths and icons in each text by focusing on similarities in the ways Dido and Superman are used in their respective works to canonize certain values embodied by the characters. Specifically, it discusses how the myths and characters of Dido and Superman were altered in the Aeneid and Man of Steel and the ways in which these changes reflect Augustus’ Rome and post-9/11 America. Understanding these changes is significant because they influence how ancient Roman and American citizens perceive themselves and the values of their nations.

Beirut’s Reconstruction: Colonialism, Architecture and Identity
Valerie Itteilag, Art History
Sponsor: Professor Jon Ritter, Urban Design and Architecture Studies

Architecture forms the backbone of a nation’s identity and the identities of its citizens. What does it mean, then, that an independent nation recovering from a post-colonial civil war chose to rebuild “the heart of the nation” in a colonial style? The Lebanese Civil War (1975–1990) destroyed significant sections of Beirut, heavily damaging the city center, its Ottoman structures and colonial buildings of the French Mandate (1918–1943). This paper argues that while reconstructed architectural features like unified façades in the colonial style contribute to the revival of a colonial image, urban design decisions like selective demolition and higher street walls reflect a strong Haussmannian, or Parisian, design influence on reconstruction efforts and, subsequently, post-reconstruction Lebanese identity. Analysis of Haussmannian design principles reveals that the reconstruction, led by private joint-stock company Solidère, physically revived the “Paris of the Middle East,” which in turn created demographic changes in the city center and ruptured the relationship of Lebanese social classes to the center of their city. The French inspired reconstruction of Beirut forever changed how Beirutis see, utilize and shape their city. The private funders of post-civil war Beirut created a colonial enclave of wealth and exclusivity rather than a place of inclusion and diversity.

From the Canvas to Congress and Beyond: Significance of American Landscape Painting on the Development of an American Identity in the Nineteenth Century
Caroline Johnson, History
Sponsor: Professor Linda Gordon, History

This paper explores the relationship of American landscape paintings to the development of a unique American identity in the period of 1870–1900, a time when artistic expression transcended the sphere of art alone and came to influence political, cultural, mythological and philosophical attitudes in the United States. The paintings of this period were pivotal in influencing the first American conservation efforts as well as in shaping attitudes exhibited in popular geopolitical ideologies like Manifest Destiny and Frederick Jackson Turner’s Frontier Thesis. Changing styles and aesthetics of landscape painting resulted in a continuous development of the myth of the West as a characterization of a shifting American identity. This paper explores the tradition of the European-born concept of art of the sublime as it made its way from Europe to the East Coast of America and into the West as well as how the American frontier proved to be fertile ground for ideas of the sublime in art to translate into politics and popular culture. This research is significant in the field of history because it explores the ways in which American landscape paintings brought about political change and the development of a popular mythology that was built on images of places Americans in the East would never see in their lifetime. Thus the research shows how qualities of the sublime evolved from a European legacy, largely limited to the world of art, into tangible political and social change when exposed to the physical vastness of the American West.

The Neustadt and the Grande-Île: The Urban Transformation of Strasbourg at the Crossroads of France and Germany
Ava Kiai, French
Sponsor: Professor Jean-Louis Cohen, NYU Institute of Fine Arts

In 1871, France’s northeastern territory was annexed to newly unified Germany, and Strasbourg was made the capital city of the new region, Reichsland Elsaß-Lothringen. Strasbourg became Imperial Germany’s vitrine to the west as an ambitious urban extension project was swiftly taken up that would double the city’s total area and prepare it for its new responsibilities as part of the German state. Strasbourg was outfitted with entirely new neighborhoods to the north and
Defending Architectural Poiesis: Designing the Dynamism of Life
Sharel Liu, Urban Design and Architecture Studies
Sponsor: Professor Jon Ritter, Urban Design and Architecture Studies

Architecture is a record of social values that is physically omnipresent yet subliminally sensate. Stemming from a long tradition of atavism, architecture swung abruptly to the dehumanizing functionalism of modernism. Yet, as we enter postmodernity, how do we recapture the experience of our age? This epoch is at once dubbed the Digital Age, the Anthropocene and the age of globalization. Yet, from these various masks emerges the binding agent of poststructuralism, a contemporary movement implying that architecture approaches life as a process. How then do we design architecture that evolves as a function of life? This study makes use of design as research, site inspections in New York and interpretive phenomenological analysis (“IPA”) to investigate an architectural idiom that enhances the relationships among architecture, its inhabitants and its surroundings. By augmenting life’s dynamic interconnectedness, this architecture model suggests a less anthropocentric and more truthful understanding of ourselves in how we relate to the world around us.

Eternalizing the Ephemeral: Photographic Stills of the José Limón Technique
Charalambia Louka, Neural Science
Sponsor: Professor María de Lourdes Dávila, Spanish and Portuguese

Photographic stills of dance present an ontological paradox that vacillates between two key philosophies in the fields of photography and dance: photography is an art that harnesses the power of existing as an extension of the real, while dance is an act that ceases to exist the moment a choreographic moment is complete. It is this contradiction that has challenged the aim of dance photography in eternalizing the ephemeral. This study focuses on the ontological underpinnings of dance photography through an exploration of dance stills of Mexican choreographer and dancer José Limón. The José Limón technique is unique in certain choreographic aspects involving the gravity and respiration
of a dancer’s body that produce movements marked by fall, rebound, recovery and suspension. How the movement of José Limón translates from real-time to two-dimensional stillness is determined by the particular choreographic characteristics of the Limón technique and by the photographic techniques of each dance photographer—including Imogen Cunningham, Barbara Morgan, and many others—who has documented José Limón both in performance and as a posed subject. This analysis offers an understanding of how the collision of two art forms can bridge the gap between the eternal and the ephemeral.

At the End, Hope: The Future of the Story as Argued by the Comics of Grant Morrison
Chengqi Alexander Lu, English and American Literature
Sponsor: Professor Teresa Feroli, Technology, Culture and Society, NYU Polytechnic School of Engineering

The comics of Scottish writer Grant Morrison liberally draw from the American Superhero canon. This thesis explores the way Morrison uses metafictional devices to elucidate the existence of a symbiotic relationship between readers and storytellers. In The Filth, Morrison argues fiction is a form of wish fulfillment where writers express ideas in their stories that they wish to see reflected in the future. Then, in Flex Mentallo, Morrison connects this theory to comics history. He argues comics, which once influenced positive change in the real world, have negatively impacted societal development since the dawn of the Dark Age of Comics heralded by Watchmen and The Dark Knight Returns. Finally, in Final Crisis, he casts the DC Comics hero Superman as a universal symbol for hope that saves the multiverse from “the end of all stories.” This thesis situates Morrison as an advocate for the past, present and future of comics, which help engage the general public in the rapidly widening world of comic studies.

Inner Struggles, Outer Terrains: The Militarization of the U.S./Mexico Border, 1910–1930
Elizabeth Maguire, History
Sponsor: Professor Andrew Needham, History

Events in the period from 1910–1930 including the Mexican Revolution, World War I, the threat of a typhus epidemic and growing demands of agribusiness and mining companies had a profound and lasting impact on the United States’ border with Mexico. Over the course of two decades, the border was transformed from a region of fluid exchange and crossing to a hardened and militarized boundary. This thesis highlights how people in the transborder communities of El Paso, Texas, and Juárez, Chihuahua viewed this transformation and how changes to the border affected their everyday lives. The work builds upon both secondary sources and original research done in the archives at the University of Texas El Paso to address the events that led to the militarization of the border and its impact on local communities. The study thereby addresses a gap in current historiography by linking national events with local trends. In order to understand the complexities of the border in the present day, it is essential to examine the historical context that led to its initial militarization at the turn of the century.

The French Corsican: Napoleon Bonaparte’s Transition from Corsican Nationalist to French Revolutionary (1766–1799)
Emily Maloney, History
Sponsor: Professor John Shovlin, History

In worldwide historical and cultural memory, Napoleon Bonaparte is remembered as the embodiment of the French Revolution who overhauled France’s political system and built it into an empire. This view is complicated by the fact that Napoleon was actually Corsican rather than French and was known to be a devoted Corsican nationalist well into his young adulthood before changing his allegiance and siding with the French Revolutionaries. This paper examines Napoleon’s initial fervor for Corsican sovereignty and his transition into what others perceived as a loyal French patriot dedicated to the Revolution’s ideals. Based on an examination of Napoleon’s published letters, speeches and other documents that demonstrate his primary rhetorical technique of constantly emphasizing and drawing upon his French identity, it is argued that this transformation created Napoleon’s French identity, which he used as grounds to justify and gain support for his initial seizure of power in 1799. The question of Napoleon’s national identity is one often overlooked in Napoleonic historiography. Through the investigation of this topic, however, the author hopes to offer a justification of why it is so crucial to understanding Napoleon as a historical actor and thus should be given more consideration.

Science and Non-Fiction in Science Fiction: The Vietnam War and Star Wars
Tucker Chet Markus, Global Liberal Studies
Sponsor: Professor Matthew Longabucco, Liberal Studies

This thesis is an individual and comparative analysis of science fiction in film and how it critiques contemporary sociopolitical events. This study discusses George Lucas’ 1977 film Star Wars and how its narrative use of technology presents a clear commentary on the Vietnam War. By showcasing individual scenes, characters and narrative choices made in the film, lines of correlation to contemporary historical events of the time will be drawn: specifically, how the United States government framed and fought the spread of communism in Southeast Asia. The terminology used by American leaders in the decades before and during
the Vietnam War spoke of the monolithic terror of communism—an imposing threat that was not mirrored by the actual military force of the Vietcong. What George Lucas chose to do with Star Wars was to place the viewer in the eye of a rebellion against a military power. Made by a man quintessential to the youth movement of the 1960s and 1970s, this film forced a questioning of the perspectives of the United States’ role in the Vietnam War. This study also considers several theoreticians’ views on the role of technology in society, how that informs the choices made in the film and what those choices intentionally or unintentionally illustrate symbolically. “Object moments”—scenes in the film that encapsulate broader statements—are used to define the major themes in the film by analyzing the technology used in the narrative. As well as a discussion of the narrative use of technology in Star Wars, this paper briefly looks at the real-world film technology and companies that George Lucas’ successors introduced. The story of Star Wars is one of the unassuming becoming the all-powerful; the story of George Lucas has grown to be much the same. This meta-analysis of the now ubiquitous technology that this technological film spawned provides an interesting and perhaps even ironic plot that has developed in the 38 years since the film’s release.

Colonial (Mis)Education in Francophone Caribbean Literature
Kathleen McClure, Economics, Romance Languages
Sponsor: Professor J. Michael Dash, French

French Assimilation policy, a colonial doctrine that attempted to transform colonized peoples living within the French Empire into culturally “French” citizens, represents one of the most contested and complex aspects of nineteenth century French colonial policy. The French colonial education system functioned as the primary instrument of this policy throughout the French Empire but especially in the Caribbean colonies. Using Bourdieu’s notion of symbolic capital, this study analyzes the role of the French school in French Caribbean society from the perspective of three twentieth century Antillean novelists: Joseph Zobel, Patrick Chamoiseau and Maryse Condé. By using literature, specifically coming-of-age novels, to analyze French colonial policy, it is possible to circumvent traditional approaches in colonial studies by emphasizing the point of view of the “colonized” rather than the “colonizer.” Each of the novelists portrays the school as an institution that reinforces stratification within local social spheres based on race, class and cultural capital; however, the differences in their representations also underline generational shifts in attitudes towards French education and trace the formation of an emergent “Creole” identity. By writing in French, these novelists reclaim agency and assert non-French identity with the same tools given to them by Assimilation policy, embodying the complexities and ambiguities that characterized the relationship between Creole and French culture throughout the twentieth century.

“The Institution of a New Art:” Dramaturgy and the Ideal Shavian Spectator
Clio McConnell, Dramatic Literature
Sponsor: Professor Bill Blake, Dramatic Literature

George Bernard Shaw is a giant of literary history renowned for his work as a playwright, critic and essayist. His intellect is matched with sharp political sense and biting humor, meaning his work is both entertaining and informative. Shaw, often studied across disciplines, presented radical political and social theories along with an intensely pessimistic attitude toward the theater of his time. This paper intends to show that Shaw’s theory of drama is uniquely valuable, particularly his opinions about the audience and the maintenance of an original script. These concerns are shared in the world of modern day production dramaturgy, a slowly growing field within the theater industry. Production dramaturges are most visible through materials like program notes and pre- or post-show talks, all of which work to inform spectators about the performance in question. Dramaturges also participate in the rehearsal process, where they are responsible for observing and explaining any and all contextual clues in the script. The ultimate goal of production dramaturgy is to make sure that the audience gets a sense of the play’s original context, thus allowing them to engage more critically with the current performance. This focus on audience enrichment ties in directly with Shaw’s worry that theatregoers could not fully appreciate the genius behind his body of work. He wrote censoriously of his peers, and this paper uses selections from his essays and criticism to suggest that his disillusionment can be very productive for theatre professionals in the twenty-first century. Having worked as a dramaturge on a production of Shaw’s Pygmalion in 2014, the author describes their experience in using the playwright’s extensive commentary as a way to postulate a Shavian dramatic theory.

The Politics of Brotherhoods
Jordan McFadden, History
Sponsor: Professor Leslie Peirce, History

The Muslim Brotherhoods in Senegal have been an influential political force during the period of French rule, the brief transition period towards independence and the post-independence period. The four main Muslim Brotherhoods are geographically based Sufi Muslim movements that serve as vital societal organizers in Senegal. As citizens were faced with the necessity of navigating changing regimes and shifting power structures, the Brotherhoods served as a constant on which they could rely. This study examines the
Brotherhoods’ engagement—both as distinct Brotherhoods seeking political gain and recognition as a Muslim collective—with the formal political structures of Senegal during these three periods. As the Senegalese political structure and power changed and evolved, the Brotherhoods remained a constant social and political player through direct and indirect interaction with Senegalese politics. When beneficial, they engaged directly in politics and functioned as a de facto party. Alternatively, they might engage more indirectly as a voting bloc that mobilized for particular candidates. Through an examination of the change in power—both perceived and imagined—for the Senegalese government and the Brotherhoods during these transitions, the various methods that the Brotherhoods have used to navigate their place in Senegalese politics demonstrate the complexity and difficulty of having religious groups be major players in a secular government system.

**Dorian in the Paratext: A Material History of The Picture of Dorian Gray from 1890–1940**
Grace McLaughlin, English and American Literature
Sponsor: Professor Elaine Freedgood, English

This thesis is based on the premise that not only do people unavoidably judge books by their covers but also that the same text can take on vastly different meanings through variations in its covers and other external, or paratextual, features including illustrations, advertisements, paper materials and prefaces. Specifically, this paper considers a range of editions of *The Picture of Dorian Gray* published from 1890–1939 in order to understand how readers in this period experienced Wilde’s story and what messages publishers hoped to capitalize on, to manage or to obscure. Ultimately, it is argued that in the years before Dorian Gray became an established classic and focus of scholarly attention, the paratexts served as primary sites through which publishers and readers navigated and indirectly contested questions about the novel’s narrative focus, cultural status and relation to Wilde’s life or authorial intent. Though a few studies on the publication history of a single text or on Wilde’s involvement in the publication of his work have come out in recent years, no one has yet examined Dorian Gray’s publication history and early “cultural afterlife.”

**Vino e il Cambiamento: The Effect of Supranational and National Legislation on Sicilian Wine Production**
Elena Mercado, Romance Languages
Sponsor: Professor Rebecca Falkoff, Italian Studies

Sicily leads Italy in the production of organic wines, shooting up to a million hectoliters of production by the beginning of the twenty-first century. While many reasons have been given for the expansion of this sector of Italian and Sicilian wine production, this project investigates the legislative and societal reasons behind this increase (i.e., what role has recent European and Italian legislation had in shaping Sicilian wine production?). The case of Sicily becomes necessarily more complicated when we examine the implications of organized crime in the region and more compelling still when we examine agriculture and viticulture as a tool for overcoming crime and underdevelopment. Ultimately, this thesis explores the possibility that supranational and national legislation have bolstered Sicilian organic wine production. Sicily, a historically agrarian and comparatively underdeveloped Italian region, is a hallmark for other such regions in the world. More than serving as a model for the effects of multiple layers of legislation on a single agricultural product, the contemporary evolution of the Sicilian wine industry serves as an important lens through which the scope of Sicilian culture and society have been altered both internally and externally.

**On the Border: Examining the 2014 Influx of Illegal Immigrant Children in South Texas**
Elena Mercado, Romance Languages
Sponsor: Professor Laura Torres-Rodriguez, Spanish and Portuguese

Through an exploration of historical evidence, cinema and testimonies, this thesis examines in depth the 2014 influx of unaccompanied refugee children to the U.S.-Mexico border from Latin America. The U.S.-Mexico border boasts the highest volume of crossings of any international border in the world. Although unaccompanied minors have crossed the U.S.-Mexico border in past years, the projection for 2014 was 60,000 children—a number that was surpassed by May of that year. The violence and poverty that now consume countries like Mexico, Guatemala and Honduras compel these children to risk their lives, unaccompanied, in the hopes of traversing the U.S. border. As these children overwhelm resources provided by the U.S. Government and the U.S. Border Patrol, respite shelters operated entirely by volunteers and charities have opened in South Texas cities. This is the contemporary backdrop against which historical, testimonial (interviews conducted on and off the border) and cinematic materials (including the films *Purgatorio, Sin Nombre* and *La jaula de oro*) are analyzed in an effort to establish the extent of U.S. contribution to the reasons Latin American immigrant children have for immigrating.

**Reconsidering the Roles of Aplu in Etruscan Society**
Elizabeth Meschel, Art History, Urban Design and Architecture Studies
Sponsor: Professor Charles Ewell, NYU Florence

The Etruscan god Aplu is widely considered equivalent to Apollo the Greek god who prompted his creation. Etruscan scholars believe that Aplu, like Apollo, was the god of the sun, prophecy, music, youth, medicine, purification and
The exhibition of multidisciplinary art and in forging strong developing local art scenes, in providing vibrant spaces for demonstrates the instrumental role that art sites can play in process of Alice Yard as a laboratory for artistic experimentation Yard has been galvanizing the Trinidadian art scene. The suc-

Sponsor: Professor Edward Sullivan, Art History

No Art Scene is an Island: Sites of Artistic Production in Trinidadian Art
Layo Olayiwola, Art History
Sponsor: Professor Edward Sullivan, Art History

Since its launch in 2008, the experimental art site Alice Yard has been galvanizing the Trinidadian art scene. The success of Alice Yard as a laboratory for artistic experimentation demonstrates the instrumental role that art sites can play in developing local art scenes, in providing vibrant spaces for the exhibition of multidisciplinary art and in forging strong connections with global audiences. Alice Yard effectively negotiates local issues and global concerns, remaining a vital source of cultural renewal for Trinidadians whilst contributing to the heterogeneous character of contemporary Caribbean art and art institutions. Using an analysis of sources such as newspapers, exhibition catalogues and scholarly works as well as interviews and photographic documentation, this project seeks to contextualize Alice Yard within the history of Trinidadian art. As Alice Yard is a dynamic, non-traditional site, it presents an important lens through which to view expanded and emerging definitions of Trinidadian culture. Through this project the author hopes to widen the scholarship on and critical assessment of sites in which contemporary Caribbean art is being produced and exhibited.

Highway Snapshots of the American Landscape: The Search for the Frontier Fantasy in the Fiction of Steinbeck and Kerouac
Dilyn Myers, English
Sponsor: Professor Phillip Brian Harper, Social and Cultural Analysis

This project traces the history of female body hair removal in the United States. Although most women today regularly remove some if not all of their body hair from the neck down, most women did not regularly engage in hair removal practices until after the 1920s. This paper explores the origins of hair removal as well as the methods used, some of which were dangerous, and analyzes the forces that contributed to normalizing a hairless female body. An exploration of various medical journal texts from the late nineteenth and early twentieth century and of advertisements from fashion magazines from the 1910s to the 1930s reveals that both scientific inquiry and commercial interest helped persuade women to remove their body hair. As more women entered public spaces and as fashions revealed more of the female body, body hair increasingly became a site of contestation. This paper reveals the dangers that women willingly subjected themselves to throughout history to maintain this ideal of beauty and helps contextualize the present-day obsession with female hair removal.

No Art Scene is an Island: Sites of Artistic Production in Trinidadian Art
Layo Olayiwola, Art History
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Since its launch in 2008, the experimental art site Alice Yard has been galvanizing the Trinidadian art scene. The success of Alice Yard as a laboratory for artistic experimentation demonstrates the instrumental role that art sites can play in developing local art scenes, in providing vibrant spaces for the exhibition of multidisciplinary art and in forging strong connections with global audiences. Alice Yard effectively negotiates local issues and global concerns, remaining a vital source of cultural renewal for Trinidadians whilst contributing to the heterogeneous character of contemporary Caribbean art and art institutions. Using an analysis of sources such as newspapers, exhibition catalogues and scholarly works as well as interviews and photographic documentation, this project seeks to contextualize Alice Yard within the history of Trinidadian art. As Alice Yard is a dynamic, non-traditional site, it presents an important lens through which to view expanded and emerging definitions of Trinidadian culture. Through this project the author hopes to widen the scholarship on and critical assessment of sites in which contemporary Caribbean art is being produced and exhibited.

The Medicalization and Commercialization of Female Body Hair Removal in the History of the United States: 1870–1940
Paige Picard, History
Sponsor: Professor Linda Gordon, History

This project traces the history of female body hair removal in the United States. Although most women today regularly remove some if not all of their body hair from the neck down, most women did not regularly engage in hair removal practices until after the 1920s. This paper explores the origins of hair removal as well as the methods used, some of which were dangerous, and analyzes the forces that contributed to normalizing a hairless female body. An exploration of various medical journal texts from the late nineteenth and early twentieth century and of advertisements from fashion magazines from the 1910s to the 1930s reveals that both scientific inquiry and commercial interest helped persuade women to remove their body hair. As more women entered public spaces and as fashions revealed more of the female body, body hair increasingly became a site of contestation. This paper reveals the dangers that women willingly subjected themselves to throughout history to maintain this ideal of beauty and helps contextualize the present-day obsession with female hair removal.

Hacking the Circuit: The Artist’s Approach to Collective Healing in Post-Colonial Latin America
Caroline Pocock, Global Liberal Studies
Sponsor: Professor Christopher Packard, Liberal Studies

The standard Western model of memorialization of collective trauma—museums, memorial structures, designated spaces for contemplation—does not reflect the way Mexico’s history of oppression has cultivated unique artistic responses to the ongoing collective trauma associated with drug-related violence. Artist Teresa Margolles employs the institution to express subversive opinions through the official
channels designed to censor them. This project examines how one Mexican artist exercises a freedom of expression that evades stringent government restrictions and serves as an international testimony of collective trauma. In response to institutional constraints, Margolles has demonstrated innovative engineering of artistic expression to aid the process of collective healing. The emerging field of trauma studies has focused largely on the psychological restraints of representing trauma, but this project argues for a historically and politically informed analysis of traumatic aesthetics that aims beyond government censorship without violating its restrictions.

**We Shall Not Abandon the Ruins: Seventy Years of Remembering the Warsaw Uprising**

*Emily Julia Roche, Russian and Slavic Studies*

**Sponsor: Professor Lawrence Wolff, History**

The lasting impact of the Warsaw Uprising of 1944, which resulted in the total depopulation and destruction of the capital city of Warsaw, can still be seen in the political, cultural and social dynamics of Central and Eastern Europe. The importance of the Warsaw Uprising cannot be underestimated. This research concerns the ways in which we remember the Uprising and how this remembrance has informed the development of Polish society in the second half of the twentieth century. To address this question, memoirs, films, newspapers and archival sources were examined to understand how the Uprising is remembered in Poland and elsewhere. The author also traveled to Warsaw to see how the city, having risen from total ruin, continues to propagate an atmosphere of mourning and celebration in honor of the heroic acts of 1944. This research shows that different groups remember the Uprising in different ways. Former insurgents who fought in the Uprising remember it not only as a moment of a very traumatic war but also as something exciting and mythical, which they remember fondly. Many Poles today remember the Uprising as a moment of national honor that helped form the foundations for later activist movements (including Solidarity). The Uprising remains a somewhat contentious point between Poland and its neighbors, Germany and Russia. This project addresses a seldom-studied legacy that continues to play a remarkable role in European society. The Warsaw Uprising resulted in fundamental changes in Central European politics and dramatically shaped the trajectory of Polish social development.

**Out of Sight, Out of Mind: An Historical Reappraisal of Fascist Internment of Ex-Yugoslavian Civilians during World War II**

*Claudia Sbuttoni, Italian Studies, Sociology*

**Sponsor: Professor Ruth Ben-Ghiat, Italian Studies**

Using archival evidence from the Italian Central State Archives and Italian Army Archives in Rome, this project examines *per scopi repressivi* (*for repressive purposes*) Fascist internment camps for ex-Yugoslavian civilians during World War II. While the history of Fascism in Italy is the subject of ample academic inquiry, the role of Fascism in occupied territories and the Fascist treatment of others within Italy’s own boundaries remains understudied. Because the internment of non-Jewish peoples by Fascist Italy is not part of public discourse or contemporary Italy’s national narrative, it is important to study these camps in order to better understand Italy’s role in World War II and bring to light the repression and suffering of an unacknowledged group of people. Over 100,000 ex-Yugoslav civilians were interned in Italy and in Italian-occupied territories from 1941–1943 by the Fascist regime without repercussion after the war. There has been no sustained attention on this network of camps or their relationship to the ethnic cleansing of thousands of Slavs. The goal of this project, through a reconstruction of the Fascist camp system, is a historical reappraisal of Fascist internment during World War II in order to bring these events to the foreground of national consciousness and address post-war Italy as a false “new order” and born of an anti-Fascist movement that did not properly confront its Fascist past as it heralded a new country.

**Locating the Middle Class in Mumbai**

*Raka Sen, Sociology, Urban Design and Architecture Studies*

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

Mumbai’s middle class is an enigma: it is not easily visible within this city of harsh dichotomies. But India’s middle class is among the fastest growing in the world. Many argue that Mumbai lacks a middle class entirely. However, there is little evidence to support this claim. Instead of lacking a middle class, Mumbai in fact lacks a middle class infrastructure. The effect of this is that Mumbai’s middle class dwells and blends with Mumbai’s lower class. The scope of this study is to research and interview Mumbai residents of various classes to situate and locate the middle class and its infrastructure through an on-the-ground study of class lines. These interviews included affluent people, residents of Mumbai’s largest slum, servants and the residents of Khar Danda Fishing Village. This study paints a clearer distinction of the class lines and the overlap of these class lines with infrastructure. Understanding where and how pockets of wealth develop in lower class Mumbai is vital.
information for those who want to shape or even simply thrive in these societies. This study contributes to both the larger sociological discourse of class generally and also in studying the intersection of sociology and urban design. This intersection is often overlooked but is very crucial because of the close connection between the way societies function and their actual physical forms.

A Tapestry of Narratives: Rethinking Feminism through South African Visual Culture
Alice Ishbel Sholto-Douglas, Global Liberal Studies
Sponsor: Professor Theresa Senft, Liberal Studies

This project details contemporary feminist art and other feminist creative products in South Africa and analyses the importance of the use of art as a platform for positive socio-political dialogue on two levels, within the country itself and on a global scale. The author recognizes the parallels between South Africa’s feminist movement and the Global feminist movement, particularly the dominance of a Western ideal concerning popular feminism. This study examines the power of art in and of itself in serving as a collaborative entity that engages otherwise disconnected South Africans in a feminist discussion. Finally, the author studies the use of new media to enhance that connectedness and bypass the art, film or television industries as they commodify and consequently fail to encourage necessary controversy within the country and in international exhibitions. Relying on the sentiments and experiences expressed by the young, feminist creators interviewed for this project in Cape Town, it is concluded that the use of new media is essential in forming collaborative communities of feminist creators so that South Africa can become more unified through shared feminist narratives.

Organizational Adaptations to the Decline of Yiddish in America
Shulamit Smith, Hebrew and Judaic Studies
Sponsor: Professor Hasia Diner, Hebrew and Judaic Studies

The decline of the Yiddish language rapidly increased in mid-twentieth century America. As Jewish immigrant groups gave birth to an English-speaking, assimilated generation, organizations that had been previously built on the foundation of Yiddish language and culture faced a daunting challenge: How could they adapt to the decline in Yiddish in order to sustain relevance in the American Jewish community? This project focuses on the Workmen’s Circle, an organization founded to protect the needs of immigrant, Yiddish-speaking laborers, as well as the organization’s summer camp for children, Camp Kinder Ring. The use of archival materials and secondary research illuminates both the subtle as well as the radical alterations made by Yiddish oriented organizations from the mid-twentieth century onwards. Understanding the changes the Workmen’s Circle has made helps clarify when and how these changes happened and ultimately sheds light on larger cultural shifts in American Jewish history.

Richard Wagner and the Oxford Fantasists
Woodrow Steinken, Music
Sponsor: Professor Rena Charnin Mueller, Music

Richard Wagner’s Tannhäuser and Die Meistersinger premiered twenty-two years apart, in periods of Wagner’s life marked by armed conflict and the growing tension of German nationalism. The operas portray two sides of a practice descended from medieval music-making, the song contest. Tannhäuser premiered after Wagner returned home to Dresden following three unsuccessful apprentice years in Paris. He followed this premiere by writing the first sketch of Die Meistersinger play that would follow the drama of Tannhäuser, according to his readings in Greek drama. Both of these works were also revisited in the 1860s, when Wagner again returned to Germany after exile and a performance debacle in Paris. Years later in Oxford, C.S. Lewis and J.R.R. Tolkien faced the same problem Wagner had addressed: how to imagine medieval fictions that were critical but also instructive in their modern environments. All three artists experienced armed conflicts that clearly influenced their works and, further, inspired them to craft stories and artworks that are both medieval and modern, associating their scholarly work with concepts of national unification and superior artistry. Wagner and the Oxford Fantasists both shaped the Middle Ages for mass audience consumption with the goal of societal preservation in mind.

Moral Issues in Euthanasia
Calvin Sung, Philosophy
Sponsor: Professor Regina Rini, Center for Bioethics

The American Medical Association and many contemporary codes of medical ethics claim active and passive euthanasia are importantly different. The idea is that while it is never permissible for a physician to actively kill a patient, it is permissible, at least in some cases, for a physician to passively let a patient die. This study challenges this view by arguing the moral force of the distinction between killing and letting die is weak when it comes to different forms of euthanasia. Not only is death a desired outcome, thereby diminishing the weight of the distinction between killing and letting die, but other factors such as practicality and patient dignity may also pull in the opposite direction favoring active over passive forms. All things considered, there are good reasons to prefer a swift death to one that is drawn out over the course of an illness. The conclusion of this analysis implies that the position of the American Medical Association, that while passive euthanasia is permissible in some cases active euthanasia is always forbidden, is in need of reform.
Joshua Tan, History
Sponsor: Professor Rebecca Karl, East Asian Studies

This project analyzes how the newly installed government of the People’s Republic of China (PRC) responded to the return immigration of ethnic Chinese from Southeast Asia from 1949–1955. It argues that the Chinese government set in place mechanisms to assimilate and integrate these new immigrants into Chinese society. Responding to existing scholarship which views the PRC’s policies towards these returning immigrants as principally exclusionary, this analysis surveys “Overseas Chinese State Farms”—institutions established by the government to absorb returning ethnic Chinese predominantly from Southeast Asia—and identifies aspects of state policy enacted through these farms which attempted to create a citizenry from this returning diaspora through linguistic, ideological and cultural assimilation. Finally, this study presents the PRC’s policy of receiving these returning overseas Chinese as a model for how new nation states in the postcolonial period sought to absorb a returning diaspora and the challenges they faced in the process.

Liga Continental: The Importance of Soccer in a Pan-Latino Enclave
Eliot Thompson, Latin American Studies
Sponsor: Professor James Fernández, Spanish and Portuguese

The Latino population in New York City has increased rapidly over the past thirty years. Indeed, a group once dominated by two countries, Puerto Rico and the Dominican Republic, now represents over a million people of South and Central American descent. This demographic change is reflected in vibrant pan-Latino neighborhoods throughout Brooklyn, Queens and the Bronx. Yet, the idea of a united Latino identity emerging from these neighborhoods is predicated on the assumption that forming racialized groups is the only way to adequately assimilate and influence American culture. Indeed, the Latino identity is an American invention, created by American society through racialized real estate markets, media and political necessity. Yet, in New York City, Latinos are organizing in ways that defy conventional assumptions about the way the Latino identity is produced. This research demonstrates that soccer, the most popular sport in Latin America, is also the largest and most important social organizer of Latinos in New York City. In dozens of leagues that celebrate nationality and facilitate social interactions under the guise of friendly competition, soccer brings more Latinos together from disparate ethnicities than any other institution. This paper focuses on the role of amateur soccer in local Latino periodicals, its influence in New York politics and an in depth profile of one such league: Liga Continental de Queens.

The Fight for Independence: The Executive Directory and the United Irishmen
Sophie Tunney, English and American Literature, History
Sponsor: Professor John Shovlin, History

On 14 February 1796, Theobald Wolfe Tone founding member of the United Irishmen arrived in Paris in order to secure the help of the French government for the establishment of an Irish republic. Tone argued that helping Ireland reach independence would end England’s monopoly of power which, for the Directory, had destabilized Europe. Because France was involved in fighting Austria, England, Italy, Spain and the German States while also trying to fight royalist movements in the west of France, a supplemental military strategy in Ireland seemed impossible. And yet, under the leadership of General Hoche, 14,000 French soldiers sailed to Ireland in 1796. While most historians of the Directory have focused on France’s wars on the continent, many have looked past the Irish Expedition. The expedition was France’s secret attempt at not only moving the war from the continent onto England’s shores but was also designed to end England’s political and economic hold on Ireland. Ultimately, the question of Ireland is central in understanding France’s diplomatic relations and its military strategy across Europe.

Giving a Voice to Sex Workers in Contemporary European Debates
Brittany Valente, European and Mediterranean Studies
Sponsor: Professor Madigan Fichter, European and Mediterranean Studies

As a result of the 1999 Swedish law that criminalized the purchase but not the sale of sex, public debates about sex work have gained prominence in France and the United Kingdom. The main interlocutors of the debates are sex workers, anti-prostitution feminists, news outlets and politicians. Participants in the debates are mostly divided among three groups: those who support abolition, those who support prohibition and those who contest both. The main topic in contestation in the debates is the belief that all sex workers are victims of male sexual violence, specifically of human trafficking. This idea is derived from a widely accepted sex work stigma that situates sex work as a discussion of morality and human rights. As a result of public anxieties about human trafficking, abolition and prohibition policies have gained the most support because both legislative models reflect a desire to save sex workers from exploitation. Using the media as an outlet to voice their opinions, some sex workers have contested abolition and prohibition policies through critiques of stigma and instead advocate
for policies that situate sex workers as laborers not victims. However, there are also sex workers who argue in favor of restrictive prohibition policies. The goal of this project is to gain an understanding as to how the public opinions voiced by sex workers have influenced the overarching sex work discourses in France and the United Kingdom. Through analyses of scholarly literature, legal documents, media sources and popular culture works, it is also shown that the more recent participation of sex workers in the public debates in France and the United Kingdom is a result of the public’s renewed interest in sex work policy and the treatment of sex workers as an outcome of the 1999 Swedish law.

In moving forward with prostitution legislation, it is hoped that this thesis will persuade interlocutors of the sex work debates to consider policies other than those of abolition or prohibition. This thesis also attempts to persuade readers to see past the stigma that still characterizes the sex work debates in order to encourage future discussions about sex work to focus on the well-being of sex workers and their concerns rather than on unconsciously perpetuating stigma.

The NYU Virtual Arboretum Project
Laura Jane Valenza, Comparative Literature
Sponsor: Professor Nancy Leszczynski, NYU Florence

The purpose of the NYU Virtual Arboretum Project is to document the NYU green spaces in New York and abroad. This project focused on NYU-Florence and Villa La Pietra, which is famous for its garden. Because the Virtual Arboretum Project is currently in development, the goal was to build a foundation for future research and a site that could serve as an example for other students. The NYU-Florence Arboretum seeks to communicate the vivacious spirit of the gardens and foster the same passion for educational discourse and the arts such Renaissance Revival gardens sought to inspire in their visitors. The visitor is thus ushered into the unique context of the Tuscan garden with a history of the Villa La Pietra garden. A plant guide, elements of sustainable design and an interview with the head gardener serve to create a full picture of the garden. The Project involved library and archival research, copywriting, photography and design. Eventually, student research will be collected on a NYU Virtual Arboretum Project website, but until then I have created a blog (www.virtualarboretumproject.blogspot.com). While a Villa La Pietra website and books do exist, this is the first site to provide comprehensive information on the garden, its plants and notable features. Whether in a major city or a rural area, students flock to parks, gardens and natural rest spots to study and relax. Green spaces bring people together, and in a university as large and worldwide as NYU, the Virtual Arboretum Project unites us. No matter where you are, you can connect Washington Square Park with the garden of Villa La Pietra and many more locations.

The Issue of Monarchical Authority under Queen Elizabeth I
Jennie Woo, History, Politics
Sponsor: Professor Gay Ortolano, History

This research looks at the history of the Tudor family as reigning monarchs of England during one of the most religious conflicted times of European history. The focus is not only the politics of the era, but also how the family dynamics among the Tudor monarchs led to the beginning and continuation of the Reformation, and how that affected the legitimacy of authority for future monarchs, specifically Queen Elizabeth I. It draws upon mostly secondary sources from scholars who analyzed the political situation of the monarchy at the time and the influences of the Reformation on England. This research project is significant in the field of Elizabethan history due to the different perspective it attempts to provide on not only the English Reformation, but also the interpersonal relationships within the English monarchy.

The Education of a King: The Scottish Court and the Coursework of James VI & I
Jonathan Xu, History
Sponsor: Professor John Shovlin, History

On July 19th, 1567, the Scottish Privy Council crowned the 13-month-old James VI King of Scotland. Earlier, his father had been found naked and strangled in the church orchard, and his mother, Mary the Queen of Scots, had married the man accused of murdering her husband. In a coup d’état, outraged Protestant lords imprisoned Mary, crowned James and then descended into an internal power struggle for jurisdiction of the fledgling king and for the powers of regency that came with him. This project looks at James’ formal education in the next 16 years, to emerge the most educated man in his kingdom. It is concerned with the subjects he studied and the pedagogy he studied them under. Scholars argue that Tudor princes were taught to perform for the court in the classroom to uphold the regal education of their reigning parents. This project, however, considers the relationship between the Scottish nobility and a bastard king and argues that James’ education was a product of the aristocratic interests that reared him. Using a manuscript discovered in the British Museum containing the classical texts of James’ curriculum, this project explores the character of a king’s formal preparation for the throne in a historical period where one man reigned over a kingdom by law and by custom. Were monarchs truly absolute in the balance of power? Was James’ education as Machiavellian as the politics behind his ascension to the throne? Was his pedagogy responsible for producing the prodigy known as “The Wisest Fool in Christendom?”
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 Adam Walsh Child Protection and Safety Act: Anti-Child Sexual Abuse Movements, Pathologization of Childhood Sexuality and the Undue Harm to Minors
Allison Adams, Gender and Sexuality Studies
Sponsor: Professor Lisa Duggan, Social and Cultural Analysis

The United States has a strong tradition of enacting legislation intended to protect children from sexual assault and abuse. Generally, these laws seek to establish harsh punishments for a wide range of crimes against children, create prevention programs to prevent future crimes and monitor released sex offenders through registration and community notification measures. This project focuses on the Adam Walsh Child Protection and Safety Act of 2006, which was enacted after several high-profile murders raised alarm over the effectiveness of the existing sex offender legislation. As an attempt to create a national standard for sex offender registration and notification procedures, the Adam Walsh Act diverged from previous statutes in several significant ways: increasing mandatory minimum sentences, expanding the definition of “sex crime,” establishing a three-tier system of offender classification, creating the new felony crime of “failure to register” and mandating that certain juvenile offenders be subject to the same registration requirements as adults. This project investigates how the inclusion of juveniles under the Adam Walsh Act conflicts with both the goals of the juvenile justice system and the stated purpose of the Act. In elucidating the contradictions and conflicts within the Adam Walsh Act, we can work towards legislation that more appropriately handles juvenile sex offenders and better addresses the trauma caused by child sexual abuse.

Laughing and Waiting
Meera Aiyagari, French, Journalism
Sponsor: Professor Jason Samuels, Journalism

This documentary follows three stand-up comedians as they face hope, fear, and intense competition to make people laugh for a living. This documentary shows the lives behind the laughs and the three different journeys taken by aspiring comedians. Their daily lives, performances and outlook on the future of their careers are the focus of this story as they all decide how long they will chase their dreams. Ashley Brooke Roberts is hoping to break into television, Langston Kerman is finding his rhythm as a new New Yorker and Brad Austin is trying to break into the competitive and famous comedy clubs of the city. As they pursue these paths to hopeful success their commitment to comedy and to believing in themselves will be tried and challenged.
Relationship between Academic Performance and Anxiety among Undocumented Community College Students: Preliminary Results
Ahmed Alif, Applied Psychology
Bryan S. Nelson, Mathematics, Psychology
Sponsor: Professor Sumie Okazaki, Applied Psychology, Steinhardt School of Culture, Education, and Human Development

The present study compares levels of psychological distress and academic performance among New York City college students with various immigration statuses. For each of the 94 participants (39.5% at-risk of deportation), several factors were measured: participants’ grades, depression (CESD), anxiety (GAD-7), self-esteem (Rosenberg), alienation (Jessor and Jessor), study habits (SHI), somatization (PHQ) and fear of family deportation. Those with at-risk of deportation status (undocumented or refugee/ asylee application rejected) had statistically significantly higher anxiety, depression, alienation and fear of family deportation than both stable status participants and temporary status participants. Further, there were no statistically significant differences in typical grades across immigration statuses. From the results it can be inferred that at-risk of deportation participants exhibit higher psychological distress, yet also demonstrate the same level of scholastic achievement as both stable status and temporary status participants, which may highlight this population’s resiliency.

Using Survey Methods to Analyze Behaviors and Thoughts of Undocumented Immigrants and Their Financial Activities: A Preliminary Report
Ahmed Alif, Applied Psychology
Bryan S. Nelson, Mathematics, Psychology
Sponsor: Professor Hirokazu Yoshikawa, Applied Psychology, Steinhardt School of Culture, Education, and Human Development

The majority of the 11 million undocumented immigrants in the U.S. pay taxes from which they do not benefit. By examining the psychological factors that influence their participation in the economy, the present study seeks to better understand how undocumented immigrants are viewed within the context of the American economy and how they participate in it. The semi-structured interview measures levels of psychological distress and immigration related stressors, such as depression, anxiety, somatization, self-esteem, quality of life and alienation. Economic questions were adapted from the Free Application for Federal Student Aid (FAFSA). Open-ended questions measuring how undocumented immigrants utilize public health services and schools were also included. This study will accurately determine how immigration status relates to the psychological well-being of immigrants and how this in turn relates to their tax participatory behavior. The cost of education and healthcare by undocumented immigrants and how it compares to the state and federal level budget estimates will also be explored, providing valuable insight into the true financial impact of this population.

Evaluating the Effects of Wealth on Corruption in Brazilian Municipalities: An IV Design
Matheus Amaral, Economics, Politics
Sponsor: Professor Anna Harvey, Politics

Does increasing wealth also increase opportunities for corruption in developing countries? The goal of this research project is to answer this question. This study hypothesizes that increased levels of wealth will lead to increased opportunities for government officials to extract rents, thereby increasing corruption. It further predicts this effect will outweigh the possible effect wealth may have on strengthening democratic institutions, and thereby on reducing corruption. Existing studies of the effect of wealth on corruption have returned mixed results. Some studies have found negative associations between measures of wealth and measures of corruption, but others have found positive associations. However, these studies have mostly failed to address the problem of causal inference. While wealth may have an effect on corruption, the inverse may also be true. This project address this issue of identification using wealth shocks induced by coffee prices as an instrument to predict the effect of wealth on corruption in Brazilian municipalities. The study finds that once the causal inference problem is addressed, an effect of wealth on corruption can no longer be observed. These results matter because it implies that increases in wealth do not necessarily cause decreases in corruption once the negative effect of corruption on wealth is subtracted.

Molecular Analyses of East African Galagos (Order Primates)
Julia Apoznanski, Anthropology
Sponsor: Professor Todd Disotell, Anthropology

Galagos, or bushbabies, are a group of small nocturnal African primates. The various species of galagos have a great deal of overlapping morphology, so their taxonomic classification has largely been based on acoustic data (vocal calls) because morphology is often an ambiguous indicator. While both types of data have been useful for identifying members of different species and for estimating phylogenetic relationships, genetic analysis can also be used to help understand species’ boundaries and phylogeny. There is little genetic data for galagos compared to other primate groups, so additional coverage of the genome through this project contributes valuable evidence for a better understanding of galago evolution. After amplification via
Polymerase Chain Reaction (PCR) followed by Sanger sequencing, Bayesian and maximum likelihood (ML) analyses of nuclear DNA sequences were performed. The data were subject to gene tree-species tree analyses and a STRUCTURE analysis to infer population differentiation. These molecular approaches showed support for the distinction between *Galagoides zanzibaricus* and *Galagoides cocos* despite their nearly identical morphology. Molecular analyses are an important way to shed light on relationships between extant species. Proper classification of populations into species and subspecies also has major implications for conservation efforts.

**Through Rain or Shine: The Effect of Natural Disasters on Incumbent Vote Share**
*Thomas Arce, International Relations*
*Sponsor: Professor Leonid Peisakhin, Politics*

One of the most prominent theories on elections and voting states that elections serve as a mechanism for holding incumbent politicians accountable for their past actions and policies. Some political scientists, however, argue that not only do voters not have enough information to judge incumbents’ past policies, but voters often punish incumbents for events that are completely outside their control. This research tests these competing theories by studying the relationship between natural disasters and voting behavior in Canadian federal and provincial elections. Specifically, it examines the effects of natural disaster damage and government relief spending on incumbent vote share. While both natural disaster damage and government relief spending have an effect on incumbent vote share, relief spending has a greater and more statistically significant effect than disaster damage in both federal and provincial elections. These results suggest that although voters punish incumbents for the occurrence of a natural disaster, they still hold incumbents accountable for how they responded to the disaster. As such, the results of this research seem to support the validity of the electoral accountability theory.

**Explaining the Variation in Government Digital Surveillance in OECD Countries: Evidence from Online Giants**
*Deniz Duru Aydin, European and Mediterranean Studies, Politics*
*Sponsor: Professor Leonid Peisakhin, Politics*

Edward Snowden’s 2013 revelations of blanket surveillance programs carried out by democratic states around the world with little or no oversight have sparked a debate on the existence of and the right to privacy online. It is certain that online communications data is being used for intelligence gathering and law enforcement purposes around the world in the face of terrorism risks and the increasing usage...
of social media by terrorist groups as well as new forms of cybercrime. However, due to the inherently covert nature of surveillance and the lack of uniformity in intelligence oversight and transparency, two related questions remain unanswered: To what extent do democratic states differ in their commitment to digital surveillance efforts? Are there any factors that can explain such differences? This paper tries to answer these questions by using publicly available data on account information requests for 2013 and the first half of 2014 extracted from tech company transparency reports as a proxy for the differences in digital surveillance efforts carried out by democratic states. The findings show that impact of terrorism and participation in intelligence alliances increase surveillance on the internet.

**Irish Gaelic: Politics and Perpetuation**  
*Josh Azar, English, Journalism*  
*Sponsor: Professor Brooke Kroeger, Journalism*

Nationalist politicians in Northern Ireland have proposed legislation that would give official status to the Irish language. The legislation is being opposed by unionist politicians, who believe Northern Ireland benefits from its connection to the United Kingdom and wish to maintain that connection. The Irish language has existed for over a thousand years. It is the oldest extant written vernacular north of the Alps. And yet, in the last few centuries it has become extremely politicized and conflated with national identity. In the diaspora, however, the language has thrived and grown, divorced from Ireland’s political context. Based on independent research and many interviews with experts, native speakers and government employees, this project presents a brief history of the politicization of the Irish language, its current status and informed speculation on its possible future. While there are academic writings on the topic, there are not many long-form journalism articles, and so the issues Irish Gaelic faces are mostly inaccessible to people who do not speak or study the language. Many people, including some in Northern Ireland, do not even know the language exists.

**Perception of Others Who Admit Susceptibility to Prejudice**  
*Emily Badin, Psychology*  
*Sponsor: Professor Tessa West, Psychology*

Even people who are motivated to be fair and unprejudiced behave in prejudiced ways. Because seeming prejudiced is socially undesirable, people attempt to appear unprejudiced. Although previous research has documented the effects of a target admitting prejudice, the question of how the target evaluates another who admits susceptibility to prejudice remains unexplored. The present research explored how a racial in-group member’s willingness to admit susceptibility to prejudice influences anticipatory in-group interactions. Specifically, same race affiliation (e.g., positivity behaviors) was examined in two domains: interest in contact and trust. Seventy nonBlack students were recruited and told they would be interacting with a partner about either a race related topic or a race neutral topic. The participant responded to a variety of scenarios that measured admission to susceptibility to prejudice and then received their potential partner’s answers for review. The participant evaluated their partner on interest in contact and trust. As was predicted, participants rated their interaction partner more negatively when their partner admitted high susceptibility to prejudice. Biases and prejudices will continue to proliferate if those who hold these biases do not feel comfortable admitting them. Research in this domain can provide an important empirical base to foster positive interpersonal interactions.

**Through the Haze: Emotion as a Tool to Process Uncertainty**  
*Augustus Baker, Psychology*  
*Sponsor: Professor Elizabeth Phelps, Psychology*

Emotion plays a key role in many of the decisions people make, but its role in decision making under uncertainty is still unclear. Uncertainty can be parsed into two parameters: risk (which refers to outcome probabilities that are known) and ambiguity (which refers to outcome probabilities that are unknown or partially known). Prior research has shown that while most people are somewhat averse to both risk and ambiguity, they tend to exhibit higher aversion to ambiguity than to risk (Levy, Belmaker et al., 2012). This study examines whether emotional arousal accounts for the differences in how people process and respond to risk versus ambiguity. As a proxy for arousal participants’ Skin Conductance Responses (SCRs) while they made decisions about whether to play lotteries with varying degrees of risk and ambiguity were collected. It was found that higher SCRs predict aversion to ambiguous lotteries but not risky ones. These findings support the original hypothesis and indicate that emotional arousal plays a key role in guiding decision making under uncertainty. This knowledge can help elucidate the mechanisms behind maladaptive behaviors such as gambling addiction and possibly give insight into new ways of changing these behaviors.

**The Role of Trait Learning in Predicting Social Choices across Time**  
*Stacy Beach, Psychology*  
*Sponsor: Professor Yaacov Trope, Psychology*

In social situations, one learns many things about the individuals with whom one interacts. Information learned about people can range from their personality traits to the
How to Get High Heels in the Oval: The Effect of Psychological Distance on Voting Intentions
Abigail Bisi, Psychology
Sponsor: Professor Emily Balcetis, Psychology

Women comprise 50.8% of the American population but are largely underrepresented in leadership. For example, out of 44 presidents, none have been female. One explanation for this gender imbalance is the pervasiveness of negative stereotypes held about women in leadership positions (Heilman and Parks-Stamm, 2007). However, not all Americans hold such stereotypes (Alexander and Anderson, 2013). If only some Americans adopt negative stereotypes about female leaders, why then are women grossly underrepresented at the top? This research uses Construal Level Theory to predict that at a distance, people use higher-level values endorsed at the system level, including negative stereotypes regarding female leaders. However, up close, people use personal beliefs to inform voting decisions. To manipulate distance, participants were asked to consider an election either 3 or 3,000 miles away (Study 1) or an election 2 days or 2 years away (Study 2). Results show that when considering voting for a woman located farther away, people rely on national beliefs, as assessed through self-report and experimental manipulations. However, when considering a female candidate located nearby, participants rely on personal beliefs, as assessed through conscious and unconscious measures of personal attitudes. This study discusses implications for female underrepresentation in politics, business and other male-dominated industries.

Does Not Paying Subjects a Show-Up Fee Affect Results in Lab Experiments
Vittorio Bisin, Economics, Mathematics
Sponsor: Professor David Pearce, Economics

At New York University there are fundamentally two types of experimental pools: one consists of unpaid undergraduates completing experiments for class credit, the other of volunteers who are paid a show-up fee. By re-running in the latter pool an experiment conducted in the former one, this project examined whether the pool has an effect on the results of the experiment. The authors demonstrate two statistically significant effects compared to the original study and discuss how these results seem to decrease framing bias compared to the original study. It is hypothesized that this decrease in framing bias is a result of greater incentivization due to the show-up fee.

Collaborating on a “Wicked Problem:” The Contested Language of Climate Change Adaptation
Sheila Blair, Anthropology
Sponsor: Professor Sonia Das, Anthropology

Climate change is a complex and controversial issue involving political, cultural, sociological and economic dimensions. Addressing these issues in tandem brings together stakeholders from a diverse array of professions, classes and cultures. Communication within these diverse groups of stakeholders is crucial to achieving mutual understanding, yet there are far too few anthropological linguistic studies of climate change debates. Drawing on a discourse analysis of discussions among scientists, scholars and other professionals, this study advances understanding of how the goals of climate change action are negotiated. The data analyzed are audio recordings of two case studies: the first was a panel of “unlikely allies” open to the public, the second an academic workshop open by invitation only. Analysis reveals a) explicit statements regarding actors’ self-awareness about the contested nature of institutional talk, b) conversational framings that contest key terms and goals and c) explicit references to institutional norms as barriers to cross-scale and/or interdisciplinary collaboration. Thus, this study argues that although current climate change debates are strengthened by an acknowledgement of the need for diverse voices and increased reflexivity about the issue’s complexity, there remain significant obstacles to bridging institutional divisions that hinder consensus understanding.

Love at First Sight or Character Flawed? The Role of Physical Attractiveness and Character in Dating
Chase Brennick, Psychology
Sponsor: Professor Emily Balcetis, Psychology

What inspires a person to pursue a potential romantic partner? Prior research indicates that physical attractiveness and positive character predict further interactions with a prospective partner (Walster et al., 1966; Li et al., 2002). However, not all potential dates possess both good looks and character. In these cases, which factor takes precedence and which can be overlooked? This research investigated the extent to which physical attractiveness and
character traits motivate a person to continue interactions after an initial impression. Single, college-aged participants learned information about a prospective partner (who they believed was another participant). Participants saw the partner’s photograph, in which physical attractiveness was manipulated by morphing an original photograph with an extremely attractive and unattractive exemplar. Participants also learned that the partner scored either very highly or poorly in positive character traits, including kindness, reliability and trustworthiness. Participants indicated their interest in further communication with the partner. Communicative intentions depended on the prospective date’s characteristics: physical attractiveness predicted participants’ interest more than character traits. This suggests that appearance is of primary importance when singles evaluate prospective dates and that preferences for positive character traits in hypothetical partners (Li et al., 2002) may be attributed to impression management effects.

Satmar Williamsburg’s Smartphone Revolution: Ultra-Orthodoxy in the Twenty-First Century
Daniel Bronstein, Individualized Major
Sponsor: Professor Brooke Kroeger, Journalism

Satmar, an extremely insular sect of ultra-orthodox Hasidic Jews, for whom Yiddish is the primary vernacular, have been living in Williamsburg since arriving from Holocaust ravaged Hungary 70 years ago. The hipster invasion of Williamsburg has slowly enveloped even the areas surrounding overwhelmingly Latino projects but has still been unable to make its way across Broadway and into the Hasidic enclave. Satmar’s stronghold in South Williamsburg, while exploding in numbers for years now, is experiencing evolutionary challenges to its otherwise untouched insular apparatus. While the physical boundaries of the community keep expanding due to rocketing birth rates, the virtual boundaries for exploring the internet are unclear and impossible to enforce. Realities of twenty-first-century technology, paired with growing discontent with elementary secular education and expanding wealth gaps throughout the community complicate insularity in challenging ways. Smartphones make keeping people within those same imagined ghetto walls their grandparents still been unable to make its way across Broadway and into the Hasidic enclave. Satmar’s stronghold in South Williamsburg, while exploding in numbers for years now, is experiencing evolutionary challenges to its otherwise untouched insular apparatus. While the physical boundaries of the community keep expanding due to rocketing birth rates, the virtual boundaries for exploring the internet are unclear and impossible to enforce. Realities of twenty-first-century technology, paired with growing discontent with elementary secular education and expanding wealth gaps throughout the community complicate insularity in challenging ways. Smartphones make keeping people within those same imagined ghetto walls their grandparents settled within upon arrival from Europe that much harder. Whether this triggers changes in relationship commitment or not is unclear and impossible to enforce. Realities of twenty-first-century technology, paired with growing discontent with elementary secular education and expanding wealth gaps throughout the community complicate insularity in challenging ways. Smartphones make keeping people within those same imagined ghetto walls their grandparents settled within upon arrival from Europe that much harder.

Movin’ on Up: How Elevations Influence Infant Exploration
Anastasia Bui, Psychology
Sponsor: Professor Karen Adolph, Psychology

Infants encounter various surfaces during locomotor exploration. Elevated surfaces pose unique challenges for locomotion compared with flat ground. To successfully navigate elevations, walking infants can walk independently, crawl forward or backward and crawl or walk with support from parents or furniture (poles, rails, walls). The authors observed spontaneous exploration in novice and experienced 13- to 19-month-old walking infants in a playroom with elevated and flat surfaces. Younger infants were novice walkers and older infants were experienced. Infants’ walking experience was unrelated to frequency of visits or time on elevations, indicating that both novice and experienced walkers explore elevated surfaces. However, experienced walkers spent more time on elevations walking independently. Walking experience was negatively correlated with crawling steps on elevations: less experienced walkers took more crawling steps. Likewise, a greater proportion of novice walkers’ steps—both crawling and walking—were supported. Findings show that novice walkers explore elevations. However, because of limited skills, they do so by crawling or receiving support from parents or furniture. Regardless of experience, infants may be motivated to explore elevations to practice motor skills, obtain a different perspective or satisfy curiosity, a finding which suggests that elevations are a powerful motivator to facilitate movement in infants with disabilities.

What’s Holding You Back? Internal versus External Obstacles in Promoting Relationship Commitment Using Mental Contrasting with Implementation Intentions (MCII)
Julia Cachia, Psychology
Sponsor: Professor Gabriele Oettingen, Psychology

Communication plays an important role in resolving conflicts in relationships. The present study tested whether a self-regulatory technique, mental contrasting with implementation intentions (MCII), helps partners talk about a topic they felt uneasy addressing in the past and whether this triggers changes in relationship commitment. MCII consists of mental contrasting a desired future with present obstacles and forming implementation intentions (if–then plans) specifying when and where to surmount those obstacles. In Study 1, MCII yielded no effect on communication behavior but led to a significant decrease in relationship commitment compared to the control group. However, this effect was moderated by the type of obstacle generated: for both MCII and control conditions, participants who named internal obstacles reported an increase in relationship commitment while those who named external obstacles reported a decrease in relationship commitment. In Study 2, when participants exclusively named internal obstacles, MCII significantly increased the initiation of communication behavior compared to the control condition. While previous research has widely demonstrated MCII’s effectiveness in the intrapersonal domain, this
Increasing Empathic Accuracy through Internal Conflict
Sarah Casper, Psychology
Sponsor: Professor Yaacov Trope, Psychology

Accurately perceiving how others feel is highly important in many social interactions. However this skill, known as empathic accuracy, is not easily implemented. Given the important role empathic accuracy plays in social life, much research has been dedicated to explore ways in which it can be improved. Most of this research suggests that to improve empathic accuracy one needs to direct attention at the other person, for example, identifying with the other person. This project takes a different approach and suggests that focusing on the self may also improve empathic accuracy. Specifically, this project suggests that considering one’s alternative, conflicting goals broadens one’s horizons. This broadened scope may in turn be beneficial in perceiving others. The authors examined students’ ratings of others’ emotions either after writing about an internal conflict or after writing about an experience in which they experienced no internal conflict. It was expected that those primed with an internal conflict would be more accurate at perceiving the emotions of others. The novelty and significance of this project lies in the idea that focusing on the self can be beneficial for promoting meaningful and successful interactions with others.

Undercurrents: The Past, Present and Future of the Gowanus Canal
Alexandra Cass, History, Journalism
Sponsor: Professor Jason Samuels, Journalism

Undercurrents is a multimedia reflection of the past, present and future of the Gowanus Canal in south Brooklyn. Constructed in the mid-nineteenth century, the Gowanus Canal quickly became a backbone of the rapid industrial and economic development of New York City at the expense of its ecological quality. Over the last century, the canal has become one of the most toxic waterways in the country. However, in 2010, the Gowanus Canal was designated an EPA Superfund Site, meaning it will receive a federally mandated cleanup, using funds acquired by those responsible for its destruction. Since then, political tensions and contrasting visions for the future of the Gowanus have infiltrated the community and left the future of this neighborhood fairly uncertain. Undercurrents looks at these issues through a multimedia platform highlights several different viewpoints from community members and historians to urban development and urban ecology experts as well as the efforts on behalf of the community and city leaders. The varying insights reflect the challenge faced by diverse urban communities to mediate multiple approaches in pursuit of positive community development.

Attachment Style and Exploration of Unfamiliar Brands
Kate Chia, Psychology
Sponsor: Professor Patrick Shrout, Psychology

Every day, people are bombarded with advertisements of new brands: What makes someone more likely to buy a new brand? The answer to this question holds great value for marketers and businesses. The present study examines this question and hypothesizes that people with a secure attachment style, as opposed to an insecure one, would be more willing to try new brands. The authors conducted an online survey with 173 participants. In the survey, participants were randomly assigned to receive a secure, anxious or avoidant attachment style prime. Participants were then asked to rate their willingness to try unfamiliar and familiar brands and to select whether they would purchase the familiar or unfamiliar brand in a forced choice. No significant differences were found between conditions in willingness to try unfamiliar brands or in the proportion of unfamiliar brands chosen. This could be because the priming methods were not strong enough or because the sample size was too small to detect a small effect size. Although the results were not significant, this study is still valuable as it is one of the few to study whether attachment style is related to exploratory consumer behavior, paving the way for future research in this important domain.

Construal Level and Conflict Resolution in Romantic Relationships
Chih-Yun (Eileen) Chiu, Politics, Psychology
Sponsor: Professor Patrick Shrout, Psychology

This research investigates the association between construal level and conflict in romantic relationships. It was hypothesized that thinking abstractly (i.e., with a high level construal) about relationship issues should help couples focus on the importance of addressing and resolving disagreements and, in turn, encourage conflict resolution. In contrast, thinking concretely (i.e., with a low level construal) about relationship issues should lead individuals to emphasize the potential stress and negative affect associated with conflict and thus is not expected to promote resolution. Study 1 explored whether manipulating relationship construal level affects individuals’ intentions to address important relationship disagreements. As hypothesized, participants induced to think about their relationship with a high level construal reported stronger intentions to address the most important topic of disagreement in their
relationship compared to the low construal level condition. Study 2 investigated whether manipulating couples to have a high versus low level construal when discussing a topic of disagreement would lead couples to use more constructive conflict strategies and make greater progress toward conflict resolution in a conversation setting. This line of work stands to inform the development of clinical interventions to enable couples to better regulate conflict to maintain and improve their relationships.

The Importance of Neighborhoods’ Physical Characteristics in Shaping Childhood BMI
Doris Chiu, Sociology
Sponsor: Professor Ruth Horowitz, Sociology

To better address the growing problem of obesity, researchers need to further explore how the built environment affects weight status. This project examines the contours of neighborhoods and the type of effect these characteristics have on childhood obesity. This research uses the 2011 National Survey of Children’s Health, a nationally representative survey. The two primary characteristics of interest are physical amenities and physical disorder of the neighborhood. Physical amenities are measured by the presence or absence of sidewalks, parks and/or community centers, while physical disorder is measured by the presence or absence of litter, vandalism and/or dilapidated housing. While not all components of the two characteristics prove significant in protecting against obesity, understanding how neighborhoods interact with the health of residents is integral to building and developing future, healthy neighborhoods.

Economic Voting and Cross-Strait Relations
Antony Chu, Economics, Politics
Sponsor: Professor Oeindrila Dube, Politics

Since the end of the Chinese Civil War in 1949, Taiwan and China have been at a standstill. The Three Links was a 1979 proposal from China to open up postal, transportation and trade links across the Taiwan Strait with the goal of facilitating unification or at least forestalling Taiwan’s drift toward formal independence. As Cross-Strait relations have begun liberalizing in recent years, however, have these policy changes been received by the Taiwanese populace? Although it has been shown that several aspects of safety may be determining factors in the likelihood of a survivor of domestic violence returning to their abuser, the concept of safety has never been thoroughly studied within domestic violence survivors. The long-term goal for this project is to create a scale that accurately measures the construct of safety. This phase of the project sought to determine how level of safety correlates with aspects of

The Concept of Safety among Domestic Violence Survivors
Veronica Cruz, Psychology
Sponsor: Professor Alisha Ali, Applied Psychology, Steinhardt School of Culture, Education, and Human Development

Although it has been shown that several aspects of safety may be determining factors in the likelihood of a survivor of domestic violence returning to their abuser, the concept of safety has never been thoroughly studied within domestic violence survivors. The long-term goal for this project is to create a scale that accurately measures the construct of safety. This phase of the project sought to determine how level of safety correlates with aspects of
the self, such as self-efficacy, psychological well-being, perceived stress and depression. Fifty individuals who had experienced domestic violence and were currently staying at a large domestic violence shelter filled out four standard self-report measures for self-efficacy, psychological well-being, perceived stress and depression as well as the newly developed safety scale. Results are expected to show that there is a positive correlation between safety and self-efficacy and between safety and psychological well-being. There is also an expectation of a negative correlation between safety and perceived stress and between safety and depression. If the expected results are found, then it can be inferred that the level of safety an individual feels is important to other aspects of how the individual perceives and copes with life. This study can highlight aspects of safety in which those who have experienced domestic violence may need support in order to decrease the negative mental health effects associated with domestic violence. A scale that can accurately measure the construct of safety will also be beneficial in determining the optimal level of safety for those who have experienced domestic violence to function independently.

**3D Morphometrics of the Cercopithecoid Distal Humerus: Implications for the Reconstruction of Paleohabitats**

*Emma Kristina Curtis, Anthropology*  
*Sponsor: Professor Terry Harrison, Anthropology*

The reconstruction of paleohabitats is a necessary precursor to understanding the environmental pressures that drove hominin evolution. However, the relative scarcity of hominins in the fossil record, as compared to other mammals, makes direct inference difficult. The ecomorphology of cercopithecoids (Old World monkeys) can serve as a valuable indicator of habitat composition given their behavioral diversity and greater relative abundance in Plio-Pleistocene fossil assemblages. By identifying reliable correlations between bone morphology and behavior in living cercopithecoid species, the behavior of extinct species and, subsequently, the types of environments they inhabited can be predicted. The morphology of the distal humerus—which comprises the top half of the elbow joint—is functionally informative regarding the extent to which the elbow is adapted for certain types of motion that correspond to the degree of terrestriality (ground-living) versus arboreality (tree-living) of a species. This study utilizes geometric morphometric analyses to visualize 3D shape variation of the distal humerus among terrestrial, semi-terrestrial and arboreal cercopithecoids. Humeral shape is digitized using 18 landmarks and analyzed in conjunction with quantitative behavioral data. Multivariate analyses of coordinate data are used to determine the accuracy with which individuals can be placed along a terrestrial→arboreal spectrum based on the morphology of this joint surface. Results show a significant correlation between distal humeral shape and percentage of terrestriality, $t_{26} = -6.662, \ p < 0.0001$. Discriminant models reveal 87.3% accuracy in reclassifying individuals by group; attempts to predict the 10% range of terrestriality for an individual prove 86.5% accurate. Overall, these findings indicate that distal humeral shape provides a relatively accurate means of placing individuals along a terrestrial→arboreal spectrum. By relating the spectral distribution of humeral remains in a fossil assemblage to that of a modern-day habitat, ecological analogues of the paleohabitats in which our hominin ancestors evolved can be identified.

**Effects of Supraliminal Implicit Racial Priming on Forensics**

*Paris DeYoung, Psychology*  
*Sponsor: Professor James Uleman, Psychology*

The effect of supraliminal implicit racial priming on moral decision-making will be examined in the context of a transcript of a court case and the subsequent finding of the defendant guilty or not guilty by participants. Participants in the experimental conditions will be unconsciously primed while reading the transcript with the word “black,” or “white” in reference to the supposed color of the t-shirt worn by the accused during the crime, while participants in the “no color” condition will have no mention of specific t-shirt color in the transcript they are presented. It is predicted that the participants who are primed with the word “black” will find the defendant guilty more often than those in the “no color” or “white” conditions. It is also predicted that the participants primed with the word “white” will find the defendant not guilty more often than the “no color” or “black” conditions. Additionally, the more frequently the participants are primed with their condition color throughout the transcript, the more significant the results are predicted to be. Participants who select “guilty” will be asked to suggest a punishment for the defendant, ranging from 12 years in prison to life without parole. It is predicted that those participants in the “black” condition who find the defendant guilty will suggest a harsher punishment than those participants in the “no color” or “white” conditions who find the defendant guilty. It is also predicted that those participants in the “white” condition who find the defendant guilty will select a less harsh punishment than the participants in the “no color” or “black” conditions who also find the defendant guilty. Together, these findings will suggest that supraliminal, implicit racial priming can have a significant effect on moral choice and thus play a significant role in understanding the justice system.
Ambivalence in Diversion Courts
Emma Dickson, Computer Science, Sociology
Sponsor: Professor Jennifer Jennings, Sociology

Since 1989 the number of treatment courts, both drug courts and mental health courts, has been increasing across the United States. These types of courts are designed to observe and foster a defendant’s progress through treatment. Drug courts, in particular, were established to curb an epidemic of petty crime and unnecessarily long convictions. In their original incarnation they failed to anticipate the mental health needs of defendants, many of whom have co-occurring mental health problems. Instead, they viewed defendants as addicts who could be cured. While recidivism rates do decrease for graduates, it is very difficult to successfully graduate and less than fifty percent manage to do so. This work explores the distinctions drawn explicitly in judicial practices and implicitly through social conventions between drug addicted and mentally ill criminal defendants. This study, based on first-hand observations of two drug courts and one mental health court, focuses on how the two groups of defendants were ushered through this process: who was offered or denied advancement to the next stage, how many sanctions were issued and even how judges speak to defendants. Currently, the judicial system treats these two types of defendants very differently: mental health courts sought to treat those in its care while drug courts sought to cure them. The unfortunate reality is that an enormous amount of the defendants who qualify for drug court also have other mental illnesses, and failure to address these needs is likely contributing to the low rate of graduation from drug courts.

The Rise of Latina Teenagers’ Suicide Rate in New York City
Alaïs Diop Diakhaté, Journalism, Spanish
Sponsors: Professor Brooke Kroeger, Journalism; Professor Georgina Dopico Black, Spanish and Portuguese

Statistics show that the rate of Latina teenage girls attempting to commit suicide in New York is increasing annually; yet, this disturbing trend is still underreported in the non-Latino public sphere. It stays discussed in academic or medical studies. In 2013, attempted suicide was almost two times as high for Latinas as for white females (15.6% compared to 8.5% and 10.7% of African American), a 5% increase since 2011 alone. Research shows that these girls have issues at home and at school. They struggle to assimilate into American social environments, a situation which leads to problems of self-image and acculturation. Their familial structure as well as the Latino community they are part of have serious impacts on their behaviors and make them feel more secluded. Their struggles lie in the tension between parents who want to keep their daughters in traditional cultural roles or are financially unstable, and the difficulties they have with integrating into a society that sometimes seems reluctant to their integration. New York is the epicenter for Latina girls attempting to commit suicide. There are specific reasons behind their vulnerability, yet treatments are not always effective. Often times, what seems to work best is to offer help through activities such as artistic workshops or small discussion groups, where they can interact with girls who went through similar struggles and aspire for a better future together.

Determinants of the Eurosceptic Vote in Crisis-Hit Europe
Lucia D’Onofrio, International Relations
Sponsor: Professor Leonid Peisakhin, Politics

Criticism and opposition to the European Union (EU) is on the rise. After the financial crisis of 2008 and the following years of intense economic hardship, the voice of dissent has become louder. The 2014 European Parliament (EP) elections saw the Eurosceptic parties get their highest number of candidates elected in history. This study uses statistical analysis to examine the impact of economic hardship on the increase in the vote share gained by Eurosceptic parties in the 2014 EP election. The results suggest that economic hardship has influenced the increase in Eurosceptic parties’ vote share at the cross-national level and that a strong correlation exists between countries’ contribution to the EU budget and the increase in the Eurosceptic vote. The findings suggest that policymakers should place greater emphasis on the economic and social incentives that the EU experiment has generated for the old EU members. If EU institutions and politicians do not begin to highlight the benefits of the Union, the future of the EU could be at risk, which could result in dire economic and social consequences for the EU members and propagate instability in the rest of the world.

De-Personifying Morality: Abstract Reasoning Changes Intuitive Moral Judgments
Jayson Dorsett, Psychology
Sponsor: Professor Jay Van Bavel, Psychology

Most, if not all, people will agree that it is immoral to cause harm and that immoral acts violate the safety of others. Nevertheless, individuals consistently judge controversial, but harmless, moral scenarios as harmful and wrong, even when they cannot give a reason supporting their judgments (Haidt, 2001). These moral judgments are flexible, changing based on when they are made. For example, when participants take a series of analytical reasoning tasks before reading controversial moral scenarios, higher performance on the tasks predicts less severe moral judgments of the scenarios (Pennycook, Cheyne et al., 2014).
Civil-Military Relations: The Legacies of Ataturk and Reza Khan  
Mary Jane Dumankaya, International Relations  
Sponsor: Professor Shanker Satyanath, International Relations  

Mustafa Kemal Ataturk, founder of the modern Republic of Turkey, and Reza Khan, founder of the Pahlavi dynasty in Iran, were both men of the military. In addition to the similarities between their authoritarian regimes and modernization efforts, the two leaders were also instrumental in shaping their respective national armed forces. This research explores the effects of their leadership on the status of their military institutions in civil society especially in regards to the military coups in Turkey and the Islamic Revolution in Iran. On the one hand, the Turkish military has viewed itself as a protector of the people, conducting multiple democratic coups in the past century as a strict enforcer of Kemalist ideology. On the other hand, the Iranian armed forces, which centered on the Pahlavi dynasty, quickly capitulated with the fleeing of the Shah during the Islamic Revolution, having developed into a force absolutely dependent on the regime. As the legacies of Ataturk and Reza Khan on civil-military relations in Turkey and Iran have profound differences, it is important to understand the role that leaders play in the development of civil-military relations.

German-American Collaboration on Contraception and Eugenics from 1922–1945  
Margaret Eby, Global Public Health/Sociology  
Sponsor: Professor Jennifer Jennings, Sociology  

The ties between German and American eugenicists and population control advocates have been documented through the first half of the nineteenth century, their collaborations often ending with disastrous results. Key players in this transatlantic dialogue were feminists and contraception advocates Helene Stöcker in Germany and Margaret Sanger in the United States. A complex relationship between the two resulted in their meeting at the 1922 Neo-Malthusian conference in Dresden. Five years later, Margaret Sanger’s visit to Berlin inspired the German Committee for Birth Control to open several privately and publicly funded family planning centers. Their academic and professional circles were frequently in contact, and their frequently anti-Semitic and racist views resulted in the misappropriation of advances in contraception for eugenics purposes. Using original sources in English and German, including material from the library in Dresden where Sanger and Stöcker met, the transatlantic timeline of collaboration between the two women and their colleagues can be charted from Weimar Era Berlin to the collapse of Eugenics’ popularity at the end of World War II. Although the legacy of these relationships is still being discovered and questioned (from allegations that Planned Parenthood is rooted in “Nazism” to concerns over the mainstreaming of contraception and abortion) it indubitably changed the understanding of contraceptive policy today.

Editorial Innovation in Print Magazines: Fool’s Gold or a Golden Age?  
Stephanie Eckardt, Journalism, Romance Languages  
Sponsor: Professor Brooke Kroeger, Journalism  

In the days before television and radio, magazines were practically the only readily available form of mass media and entertainment. Though their early twentieth century heyday is long past, independent print publications have seen a resurgence in the last five years against the odds of today’s digital and post-Recession era. Conscious decisions to work with print instead of the many free and widely accessible digital platforms has led to incredible editorial innovation in the new crop of magazines, whose creation has been aided by technology and online resources. In fact, many editors and industry officials interviewed in the independent publishing world have even called today a golden age of print magazines. So many new titles have launched—even by corporate brands and NGOs—that some worry about the competition. Yet beneath the boom hangs the question of its sustainability. Distribution, circulation and advertising models still call for reinvention, and many publications’ financial models are provisional as they find support through crowd-sourcing campaigns, sub-branches such as consulting agencies and even simply day jobs and volunteered contributions. This research explores the extent of today’s so-called golden age and looks forward to the future of magazines.

Assessing the Effects of the Contemporary Wave of Violence on Colombian GDP Growth  
Eddy Angélica Encinales, Economics  
Sponsor: Professor Andrew Paizis, Economics  

Colombia has been in a state of internal conflict for the last 45 years. This latest wave of violence is a combination of
leftist guerrillas fighting for a more egalitarian society; rightist paramilitary groups using self-defense as an excuse to carry out systematic killings of guerrilla members, supporters and peasants; and drug lords advancing an industry that is outside of the margins of legality. Violence affects society negatively through direct and indirect channels that cross economic, political, social and psychological lines. Quantifying all of the consequences of violence is impossible; but this study attempts to look at the effect of violence on Colombian real GDP growth rates in order to isolate its economic effect on the country. This study analyzed violence in conjunction with other economic variables such as agriculture industry and services and also studied the effect of its interaction with the political party of the president in power. Results showed that violence had a negative statistically significant effect on real GDP growth when the president was a member of the Liberal party. The focus of this study is to quantify what can be measured in the Colombian conflict and use these results to shed some light on the cost of violence to Colombian society at large. Colombia is a relatively unexplored case study for internal armed conflicts, but the length of the conflict can help us draw some conclusions about violence. The results of this paper are just one of the many potential answers this case can provide.

A Hearth of Our Own: A Documentary
Gabrielle Ewing, Film and Television, Journalism
Sponsor: Professor Jason Samuels, Journalism

Forced out of Ireland after the economic collapse of 2008, Conor is now one of 50,000 undocumented Irish immigrants living in the United States. Working as a bartender in New York City, he makes as much as a lawyer would in his rural hometown. With his dreams of opening his own bar hanging in the balance, he faces the threat of deportation unless he can marry an American girl—for papers instead of love. *A Hearth of Our Own* comes at a critical point where immigration reform is in the front of the nation’s mind, especially with President Barack Obama’s executive order on immigration. At times like these, it’s important to consider all sides of the argument, and the undocumented Irish have had and continue to have a strong influence on New York. *A Hearth of Our Own* tells the recent history of emigration from Ireland that is often hidden and will broaden the understanding of an immigrant group that has made America their home. It is hoped that this documentary contributes to the immigration discussion on a national level with an angle that has not yet been discussed.

Reducing Test Anxiety Using Mental Contrasting
Amanda Fisher, Psychology
Sponsor: Professor Gabriele Oettingen, Psychology

Exams are used as a measure of knowledge in higher education and may have significant consequences for a student’s future. For this reason, many school- and college-age students have test anxiety: they perceive exams as threatening and experience intrusive and debilitating cognitions and autonomic arousal before and during exams. The model of fantasy realization demonstrates that mental contrasting of a positive future with a negative reality forms goal commitments and leads to goal achievement. Further research shows that mental contrasting of a negative future fantasy with aspects of the positive reality leads to commitment to approaching the negatively-perceived future and can make people approach futures of which they are unfoundedly afraid. The present research investigates the effectiveness of mental contrasting with negative future fantasies in the area of test anxiety. In the present study with student participants, the authors predict that contrasting a feared future concerning a test with positive aspects of the present reality leads to commitment to approaching the feared future, a reduction in state test anxiety and improved performance on a test more so than reverse contrasting and no treatment. The pressure to perform well on exams can have implications for students’ mental health, and mental contrasting may be used as an affect-regulation strategy that can help students rid themselves of unjustified fears and confidently master their feared futures.

Personal Income Tax Competition among States
Alec Fletcher, Economics
Sponsor: Professor Xiaochen Fan, Economics

Using state-to-state domestic migration data, this research tests whether personal income taxation levels among U.S. states affect the flow of domestic migration from 1992–2011. A theoretical analysis of an individual’s migration decision model allowing for different degrees of valuation for public and private goods leads the researcher to hypothesize that personal income taxation levels will not significantly affect net migration since some individuals may value public goods, paid for by taxes, highly. Several panel data linear regression models were developed which purport that neither per capita personal income taxation nor a state’s highest marginal tax rate affect net immigration in a consistent way: some models reported no significant effect, and some actually reported a positive significant effect. One model testing for the existence of tax competition suggested that states experiencing net domestic emigration do attempt to emulate the tax levels of the states where its citizens are emigrating. This research may suggest that states engaging in personal income tax competition will not experience the desired results since taxation changes have inconsistent effects. As optimal public good provision is unlikely to be reached in the presence of tax competition, the ramifications are significant.
Contested Contexts: The Effects of Gentrification on a Public Park
Emily Frank, Sociology  
Sponsor: Professor Vivek Chibber, Sociology

In the heart of the East Village, between Avenues A and B, lies Tompkins Square Park. As the hub of the neighborhood, it is a haven for people from all socioeconomic backgrounds and subcultures. It also provides a concrete illustration of neighborhood change, namely gentrification. To investigate the effects of gentrification on a public park, an ethnographic study was conducted by observing public behavior, how people segregate themselves, how the park is managed and how the populations themselves are managed by park staff. When possible, park-goers were interviewed about their experiences. Based on this research, it was found that the park reflects the evolution of the neighborhood’s social hierarchy. In the past, the homeless had occupied the center; they now spend their time at the edges. Twenty-somethings populate the central areas instead. Longtime neighborhood residents differ in how they view this change: early gentrifiers look at the Tompkins of the past with nostalgia, while longtime residents view the current Tompkins as an improvement from the days of “Needle Park.” In conclusion, public parks can be viewed as reflections of neighborhood change as a whole and pinpoint specific phenomena characteristic of gentrification.

Stability over Starvation: Gaza, Iraq and the Domestic Political Costs of Economic Sanctions
Ellis Garey, Middle Eastern and Islamic Studies, Sociology  
Sponsor: Professor Vivek Chibber, Sociology

The purpose of this study is to examine the effect economic sanctions and blockades have on domestic political stability. While conventional knowledge proposes that economic sanctions have the ability to influence the leaders they target by collectively punishing the public, who then mobilize and pressure their government to capitulate to the demands of the “sender” state, historical experience suggests otherwise. The economic blockade of Gaza initiated by Israel following the election of Hamas in 2007 and the near-total embargo imposed on Iraq following the invasion of Kuwait in 1990 by the United Nations Security Council (UNSC) both aimed to destabilize the existing governments. Yet, in both cases economic sanctions failed in bringing about regime change and were instead accompanied by consolidated political power. An analysis of food insecurity rates in Gaza and Iraq, which rises as a result of restricted food imports and difficulties faced by the agricultural sectors, illustrates the possibility that material crisis caused by an external actor can maintain the domestic political status quo instead of leading to upheaval.

Patterns of Mandibular Molar Expansion in Megadont Hominins
Evelyn Glaze, Anthropology  
Sponsor: Professor Shara Bailey, Anthropology

The evolutionary relationships of the early African hominins have been disputed for the past century due in part to different interpretations of the factors that influence dental morphology. The case for a separate genus Paranthropus including the “robust” australopithecine species interprets the similar dental morphology of these species as support for the hypothesis that such traits are inherited from a common ancestor. Conversely, opponents of such groupings argue that the defining traits of the “robust” species could have evolved in parallel, forming separate East African and South African clades. This research examines one of these defining traits, lower molars that increase in size towards the back of the tooth row, to determine whether there is a common way in which teeth become bigger over evolutionary time. A sample of living primates sharing this trait were quantitatively compared to the fossil hominins in order to determine the similarity of patterns in molar length and width, relative cusp size, and the way these patterns are manifested across the molar field. Disparities both between and within the living and fossil samples demonstrate that there is more than one way for the lower molar row to become enlarged. Although this result does not preclude the common ancestor hypothesis, it does indicate that a common ancestor is not required in order for both species to have developed similar molar characteristics.

Prosperity and Security: A Political Economy Model of Internet Surveillance
Chun Wei Benjamin Goh, Politics  
Sponsor: Professor Alastair Smith, Politics

This paper proposes a game-theoretic model to understand the factors that determine whether and to what extent a country’s government will employ Internet surveillance over its citizens. Surveillance is unpopular with the electorate but useful in decreasing terrorist attacks and is assumed to be partially observable. The model attempts to characterize the optimal level of surveillance as a function of the economy, level of terror aggression and cultural attitudes towards privacy and security. Contrary to popular belief, leaders perceived to be competent have an incentive to employ more surveillance. Terror paranoia also does not always lead to higher surveillance. These comparative statics are tested against data from newly published data from the Web Index and Privacy International. This model will be the first to systematically investigate the choice of surveillance policies across political institutions and contributes to the burgeoning political economy discourse on Internet surveillance.
Growing body of work suggesting that cardiac vagal tone before beginning the study. This work will contribute to a be changed through the use of "false feedback," whereby high vagal tone. This study examines how responsivity can indulging in thoughts of a desired future does not cause them to show weaker goal commitment, than those who have indexes the capacity for self-regulation. Specifically, this research examines the effects of false feedback regarding vagal tone to see if its use allows individuals low in vagal tone to be more responsive to the different types of self-regulatory thought.

Lumbar Spine Morphology as a Tool for Interpreting the Human Past
Zelda Grove, Anthropology
Sponsor: Professor Scott Williams, Anthropology

Reconstructing past lifestyles and activity levels is a main priority in bioarchaeological studies, and the human vertebrae are an underutilized resource for these inquiries. Most studies focus exclusively on pathological or traumatic vertebral conditions, while few consider innocuous conditions that are secondarily developed. This omission prevents complete interpretation of all individuals from a site. This study aims to bridge this gap between disease, trauma and normal development by examining bony pockets (fossae) on the lamina of lumbar vertebrae, which develop throughout a person’s lifetime and are found in varying degrees in most individuals. These fossae are believed to be accentuated by greater levels of activity, but they also appear on individuals who participate in relatively little activity. Next Engine 3D laser scanning and Geomagic software were used to examine late-nineteenth-century individuals from multiple museum collections in order to determine the relationship between the size of these laminar fossae and three fundamental features of vertebral morphology: the intervertebral notch, the wedging of the vertebral body and the distance between the superior articular facets. No significant correlation was found between fossae presence or size and any of the primary morphological features, which suggests that the degree of laminar fossae expression is predominantly determined by an individual’s activity level. These findings have important implications for bioarchaeology as they suggest that laminar fossae are a potentially important tool for interpreting activity patterns in past populations.

Paying for War with the Future: Analysis of the 1999 Kargil Conflict
Kalyani Gupta, Economics
Sponsor: Professor José Luis Montiel Olea, Economics

Military conflict is meant to be a method of addressing socio-economic and political strife when all other channels of resolution have been exhausted. The economic, political and psychological costs of warfare necessitate this. The accumulated economic implications of conflict involve those not observed in the same period as that of the conflict like decreases in production due to casualties. It is difficult to comprehend how a cost of $76 billion sets back an economy, but understanding the accumulated losses is crucial. These...
costs can be best analyzed by seeing how the economy would have fared had there not been war; reality must be compared to its counterfactual. Alberto Abadie, Javier Gardeazabal, Alexis Diamond and Jens Hainmueller have collaborated to create the synthetic control method. This method creates a comparison version of a treated unit from a weighted set of untreated units. This method was applied to the case of the Kargil Conflict between India and Pakistan. The synthetic control method concludes that the war adjusted the path of Indian economic growth to a suboptimal equilibrium. These results help quantify the long run impacts of war and are not limited, like other studies, by direct comparison with just one other country unit.

The Currency Exchange Rate between the U.S. and China
Yipeng Han, Economics, Mathematics
Shun Li, Economics
Kexin Zhang, Economics, Mathematics
Sponsor: Professor Andrew Paizis, Economics

This paper studies the factors determining the currency exchange rate between the U.S. and China over 17 years from 1994–2010. By regression analysis, the authors find that the exchange rate between these two countries can be well explained by the following variables: 1) ratio of the U.S. net exports with China over the U.S. GDP (denoted as NXR), 2) the U.S. nominal interest rate (denoted as USNOMINAL) and 3) the U.S. unemployment rate (denoted as UE). To be more specific, the authors conclude that the exchange rate between the U.S. and China is positively correlated with the first two variables, NXR (+) and USNOMINAL (+), and is negatively correlated with the last variable, the U.S. unemployment rate (-). As can be seen in the sections to come, all three variables are statistically significant at a five-percent level. It needs to be admitted that the topic and economic theory behind it are not entirely new. For example, previous studies have shown that interest rates, net exports and unemployment all affect the exchange rate; however, one of the contributions of this study is that these three variables have been combined to explain the exchange rate and then this approach was applied to the specific situation in China (net exports), where the effect of net exports on exchange rate is particularly deterministic (because China and the U.S do not have trading behavior before 1974, and exchange rate at that time is nearly constant over years; while the rate changes substantially when the two resumed trade after 1974). By applying this approach to the case of the U.S. and China, the effect of net exports on the exchange rate could more clearly be seen.

Millennial Celebrity Stalkers: The Evolution of American Pop Culture
Paula Ho, Journalism, Politics
Sponsor: Professor Brooke Kroeger, Journalism

Celebrity stalking is a Millennial cult hobby in which teenagers or young adults track down their favorite celebrities, snap a picture with them and upload the picture onto a social media platform. Although questionable, it has gained momentum in the past two years. Successful celebrity stalkers, those with thousands of pictures with anyone from Brad Pitt to the members of One Direction, become mini celebrities in their own right. With technological advancements in social media, individuals have been gaining unprecedented access into the lives of Hollywood celebrities. Not only are they able to track a star’s every move, but those stars also voluntarily broadcast and share a chunk of their lives with their fans. As a result, fame has evolved to match today’s increasingly voyeuristic culture. Celebrity stalkers, ages fifteen to twenty-five and concentrated in major cities like New York and Los Angeles, have redefined what it means to meet a celebrity. Handshakes and signatures no longer take precedence. Instead, these individuals wait hours upon hours behind stage doors, outside concert venues, in front of hotels, at airports and around various other lucrative locations to scout out their life-long idols. A picture alone, however, is not enough. The picture must be uploaded onto a social media platform for mass approval. More often than not, celebrity stalking becomes a competition of who is able to collect and keep collecting the greatest amount of “selfies” with celebrities. This hobby addresses a facet of Generation Y—how modern technology has changed the horizons for both fame and fandom. It has encouraged if not exacerbated the role of celebrity culture in America.

The Effects of Mental Contrasting with Implementation Intentions (MCII) on Achievement of Activity and Mood Improvement Goals
Megan Hoch, Psychology
Sponsors: Professor Peter Gollwitzer, Psychology; Professor Gabriele Oettingen, Psychology

Research has demonstrated that Behavioral Activation Therapy (BAT) is comparable to both cognitive therapy and anti-depressant medications in its efficacy as a treatment for depression. The main therapeutic elements of BAT are pleasant activity scheduling and monitoring of daily mood that help combat symptoms of inactivity, anhedonia and decreased motivation. The most common limitation of this therapy is the inability for patients to initiate their treatment related activity goals. The present research investigated whether a self-regulation strategy, mental contrasting with implementation intentions (MCII), can help individuals achieve idiosyncratic goals related to increasing activity...
and mood improvement. Participants with sub-clinical depressive symptoms identified one pleasant activity goal and one mood improvement goal and subsequently learned the MCII strategy or a control strategy (reverse contrasting). One week later, participants in the MCII condition showed greater achievement of both activity and mood improvement goals compared to those in the control condition. The present research suggests that MCII could be used to help depressed individuals overcome symptoms of inactivity and decreased motivation through helping them initiate and achieve their treatment related activity and mood improvement goals. The results also suggest that MCII can be applied as a self-regulation strategy in mental health treatment populations.

**Political Ideology and Exploration**

*Margaret X. Huang, Psychology*

*Sponsor: Professor Patrick Shrout, Psychology*

Although exploration is how most encounter the unfamiliar, little research exists on what predicts engagement. Because political ideology has been shown to be related to openness to new experiences and tolerance of uncertainty, the relationships between political ideology, willingness to explore and engagement in everyday exploratory behavior are of special interest. Specifically, it was hypothesized that liberals would be more willing to explore and would also explore more. To test this, the authors used data from a diary study of eighty-seven NYU students. Participants filled out a background questionnaire and up to 7 diaries over three weeks, although only the first two diaries were used. Consistent with past research, political ideology was correlated with risk taking ($r = .29, p < .01$) and openness to experience ($r = .32, p < .01$). There was a relationship between political ideology and willingness to explore ($r = .33, p < .01$), but this did not translate into a relationship between political ideology and count of exploratory behaviors ($r = .08, p = .48$). In the first study of its kind to relate political ideology to everyday exploratory behavior, more research is needed on how cognitions and attitudes toward exploration translate into actual behavior.

**The Roles of Social Media Language and Implicit Motivations in the Occupy Wall Street Protests**

*Sara Ilyas, Psychology*

*Sponsor: Professor John Jost, Psychology*

Collective action is a social phenomenon that is of interest to disciplines including psychology, sociology, political science and economics. With the improvement of technology, individuals involved in protest movements increasingly engage in conversations on social media outlets such as Twitter. During the last several decades, research has demonstrated that people’s use of language reflects a variety of individual differences such as their gender, emotional state and level of hostility (Pennebaker et al., 2003). Language analysis can therefore provide insight into the complex relationship between social media and an individual’s intrinsic or instrumental motivations for joining a social protest, which may include commitment to the goals of the group and material or personal interest (van Zomeren, 2013). This project examined the Tweets from the 2011 Occupy Wall Street protests to understand whether the motivations for joining a protest vary based on level of commitment to the protest topic. This research contributes to the existing literature on the motivational processes that foster social protest. Additionally, the use of social media afforded a larger sample than is traditionally relied upon in the scientific study of social and political behavior.

**Trust Issues: Political Institutions, Leader Tenure and Foreign Direct Investment**

*Andrea Mariana Islas Regalado, International Relations*

*Sponsor: Professor Alastair Smith, Politics*

Foreign direct investment is vulnerable to expropriation, and multinational corporations seek credible commitments from leaders to ensure that their capital will not be affected by future political developments. Credibility is determined by leaders’ reputations as well as the strength of the country’s democratic institutions, which establish political constraints that limit the executive’s ability to fundamentally alter government policy and to expropriate. In the absence of strong democratic institutions, investors must gather information about leaders preferences from the reputation they gradually develop during their tenure in order to determine their trustworthiness. Using panel data and OLS regression analysis, this paper explores the impact of leader tenure on FDI, distinguishing between autocracies and democracies. The findings are consistent with the theoretical model proposed: the duration of leaders’ tenure has a significant positive effect on FDI only in autocracies, where leaders face few institutional constraints and so investors don’t trust them outright. Tenure has no effect in democracies, where institutions give investors the guarantees they seek regardless of leaders’ time in office. These findings contribute to the literature on FDI and political institutions by specifically testing the impact of leader tenure.

**Eyes in the Sky: An Examination into the Determinants of U.S. and Israeli Unmanned Aerial Vehicle (UAV) Proliferation**

*Eric Lenier Ives, German, International Relations*

*Sponsor: Professor Alastair Smith, Politics*

Since the inception of the Missile Treaty Control Regime in 1987, Israel and the United States have accounted for over ¾ of the world’s unmanned aerial vehicles (UAVs) exports. What factors influence the export and import of
Staying Informed in the Digital Age: Intrusive Advertisements’ Influence on Printed and Online Newsreaders
Olivia Jack, Psychology
Sponsor: Professor Denis Pelli, Psychology

More people are reading news online than ever before, and advertising, rather than sales, has become the key source of revenue for newspapers (Berte and De Bens, 2008). When articles are adapted for either printed or online reading, advertisements must also be adapted. Online ads can be perceived as more intrusive than their printed counterparts (Truong et al., 2010). However, it is unknown whether newsreaders have this perception and whether, if they do, this perception causes them to assess online and printed news differently. This study investigates differences in online and printed newsreaders’ interaction with ads and interpretation of surrounding news articles. Thirty-four undergraduate students read two news stories, either in print or online, while their eye movements were tracked. They were then tested on their ability to recognize ads and recall news content and asked to rate the intrusiveness of ads and the credibility of articles. Online newsreaders spent more time looking at ads, recognized ads better and perceived ads as more intrusive than printed newsreaders. However, readers’ perceived credibility of and memory for articles was consistent across mediums. These findings reveal that online ads lead to increased ad exposure and familiarity without degrading newsreaders’ interpretation of articles.

Internet and Technology Addiction: Is it Time to Check Yourself into E-Hab?
Ethan Jacobs, Journalism, Spanish
Sponsor: Professor Brooke Kroeger, Journalism

The lengthy entries in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) do not acknowledge addiction to the Internet and its related technologies; yet, more and more people in the U.S. are seeking clinical help to overcome this dependence, aided by programs that have emerged over the past few years to address the growing need. This project examines aspects of contemporary society that trigger this condition, how it is distinct from other forms of addiction and, more importantly, how it is essentially no different. It further seeks to illuminate the exigency of this emerging issue as well as the measures professionals are taking to treat patients, starting at the private practice level and extending out to rehabilitation programs, or “E-habs,” and even online fellowships. Furthermore, this study examines the reasons why this issue has gained much more traction in countries like China and Korea and, conversely, why the U.S. is delaying to make it a priority. The results strongly suggest that internet and technology addiction should be treated as a legitimate form of addiction. Furthermore, by investigating a new manifestation of addiction in contemporary society, general attitudes toward addiction are challenged. It is posited that addiction is intrinsic to human beings and that the only variable in the equation is the vehicle by which addiction manifests.

India’s Gender Quota and Rates of Reporting Violence against Women from Scheduled Castes and Tribes
Nadia Kale, Politics
Sponsor: Professor Anna Harvey, Politics

This research project asks whether increased female representation in India increases rates of reporting of violence against women from scheduled castes and tribes. The impact of female representation on the incidence of violence against women has yet to be extensively explored, due to the nonrandom assignment of female representation across electoral districts. In India, however, the Panchayati Raj Act of 1993 introduced a quota system in local levels of government, mandating that one third of seats be reserved for women. For several reasons, the Act was implemented in different states at different times and thereby created increases in women’s representation that were as-if random. One recent study looked at the gender quota’s impact on crimes against all women and found an increase in rates of reporting (Iyer, 2012). However, this study did not account for class distinctions that may influence which women are empowered to report. In exploring the impact of mandated increases in female representation on rates of reporting crimes against India’s most marginalized women, this project finds that while gender quotas have a positive impact on rates of reporting amongst all women, the same does not hold true for women from scheduled castes and tribes.
The Effect of Education on Ideological Polarization in the U.S. Congress: An Instrumental Variable Analysis

Jaclyn Kaslovsky, Politics
Sponsor: Professor Anna Harvey, Politics

This paper attempts to answer the following question: Have increasing levels of education contributed to increasing levels of political polarization in Congress? While many studies have sought to explain increasing congressional polarization, the phenomenon remains largely unexplained. Some evidence suggests that increased education leads to more extreme ideological preferences; and, it is known that the education levels of members of Congress have been steadily increasing, greatly outpacing increases in the general population. Yet to date no study has sought to explain increases in congressional polarization as a function of increases in congressional educational levels. This study addresses this gap in the literature by using an instrumental variable design with eligibility for the 1944 G.I. Bill as an exogenous instrument and the number of postsecondary degrees held by a member of the 89th Congress as the endogenous independent variable. The dependent variable is a measure of ideological extremism derived from roll call votes, known as a DW-NOMINATE score. The results indicate that Democratic Senators in the 89th Congress were in fact polarized by education, while their Republican peers were not.

How Children Learn About Hidden Affordances

Danielle Kellier, Biology
Sponsor: Professor Karen Adolph, Psychology

The activities of daily living present a minefield of objects requiring particular actions: the “hidden affordances” of door handles, jars, zippers and other closures that cannot be perceived directly. Adults have difficulty perceiving whether to push or pull a door handle and whether to press or twist a lid. Can children learn about such hidden affordances without adult models or instruction? This study examined how children learn to open twist-off and pull-off containers whose target opening actions were hidden. Findings indicate that children first explore an object’s overt affordances and then hone in on the target action and finally implement it successfully. For twist-off containers, 12-month-olds performed exploratory actions (e.g., mouthing, banging, shaking) that exploit overt affordances. Occasionally, 18-month-olds displayed cognizance of the hidden affordance by attempting the target twisting action; they displayed fewer futile exploratory actions than younger children, but still failed to open. By 24 months, infants succeeded at implementing the target action and opened the container. Children followed a similar but delayed progression for pull-off containers. These findings have theoretical implications for how children learn to perceive hidden affordances and practical implications for designing objects of daily living to make them more or less accessible to young children.

Examining How Stress Contagion Affects Dyadic Performance

Andrew Kelly, Neural Science
Sponsor: Professor Tessa West, Psychology

Although stress is generally considered to be detrimental and associated with accelerated aging and impaired decision making (Matthews, Gump et al., 1997; Kassam, Koslov et al., 2009), this study hypothesizes that a shared experience of stress may have positive effects. The authors tested an experimental method of inducing stress for future implementation in dyad studies to later test the hypothesis. Participants performed a difficult counting task in front of evaluators (stress condition) or with no evaluators (control condition). A trend of higher SNS reactivity was present in the stress condition (M = -10.75, n = 8) compared to the control condition (M = -3.2, n = 10), t(16) = -1.185, p = .25. In ongoing studies, these manipulations are being used to examine how prior experiences of stress affect later social interactions and cognitive performance between dyads. Exploring the effects of stress on a group is relevant to professional cooperative settings along with the development of social coping strategies.

Sociolinguistic Variation of <y> and <ll> in Spanish

Dennis Keselman, Spanish and Linguistics
Sponsor: Professor Gregory Guy, Linguistics

As the third most widely spoken language in the world and spoken in the greatest number of countries, Spanish contains large regional variety. While this variety is often explained in terms of political and geographical lines, there exists a notable linguistic variation that is present in most native speakers of Spanish regardless of regional characteristics and even seems to show random variation within an individual’s speech. This variation is the alternation between the realization of the characters <y> and <ll> as a palatal approximant, represented linguistically as [j] like the <y> in “yellow,” or as an affricate, represented as [dʒ] like the <j> in “judge.” The goal of this project is to find the different rates of use of either of those two variants by speakers of various socioeconomic class, gender, race and age of many dialects of Spanish including those of Monterrey, La Habana, Madrid and Medellin. This study will quantify the relative frequencies of these two variable sounds (for the letters <y> and <ll>) in order to see if the articulation of these letters systematically varies based on regional dialects and social factors. The alternation between different sounds for the letters <y> and <ll> is one of the most prominent variables in the Spanish language, but there is a lack of significant research on this variable. While it appears that speakers
arbitrarily shift between different pronunciations of $<y>$ and $<l>$, this study shows whether or not the rates of their usage of each sound are correlated with social factors, an important question throughout sociolinguistics.

Baudelaire to Hilton: The Chronological Development of the Flâneur and its Role in Confessional Literature and Luxury Branding

Sian Kitchener, Global Liberal Studies
Sponsor: Professor Christopher Packard, Global Liberal Studies

This thesis explores three main issues. First, as background, this study examines the relationship between literature and luxury, in terms of the relationship between affluence and “high culture”; the unspoken relationship between confessional literature and luxury and the work of Baudelaire in clarifying it; and the permutation of traditional confessional literature as seen in a chronological list of authors succeeding Baudelaire. Second, this thesis analyzes the use of literature and confession in luxury branding by compiling case studies including brand ambassadors, designers’ memoirs and social media “stories.” Third, it considers how literature may make use of the luxury connection by defining a common motive in publishing confessional literature and luxury consumption with reference to postmodern narrative identity theory as well as providing a case study of the author’s luxury-influenced PR and marketing plan put into action by the London Review of Books and London Review Bookshop. The main arguments of this thesis are supported by several research articles and studies as well as extensive research and practical application with the London Review of Books.

Collective Self-Esteem and College Satisfaction
Drew Kogon, History, Psychology
Sponsor: Professor James Uleman, Psychology

This study investigates the impact of reference programs on NYU students’ collective and global self-esteem. “Reference programs” are programs in which some, but not all, students are offered admission to the university on the condition that they attend a two-year program before continuing to the college to which they originally applied. Collective self-esteem refers to how much students identify with their college, perceive worthiness of membership, privately believe in the college’s prestige and perceive positive peer opinion of the college. Participants in this study were first-year students in the College of Arts and Science (a four-year college) and Liberal Studies: the Core Program (a reference program of comparable size of first-year students). Participants responded to an online questionnaire that measured collective self-esteem and global self-esteem. Results indicated that while there were marginal differences in global self-esteem, there were significant differences in all subscales of collective self-esteem as well as the degree to which the participant felt they belong in the college they attend. Liberal Studies students scored lower on scales that assessed collective self-esteem, global self-esteem and sense of belonging to college than their CAS counterparts. Furthermore, participants in CAS ranked Liberal Studies students significantly lower in general ability than Liberal Studies participants while there was no difference in how Liberal Studies and CAS participants ranked students in the CAS. Finally, results indicated that there is a significant positive correlation between self-esteem and collective self-esteem, particularly for Liberal Studies participants. These findings suggest that students in a reference program may identify with their college to a lesser degree than their non-reference counterparts, which may be a result of feeling stigmatized as a member of the program. Future research is needed to address self-identification and stigmatization in this context.

Microfinance and Women’s Empowerment
Mary La Rocque, International Relations
Sponsor: Professor Alastair Smith, Politics

Bridging the gap between socially responsible investment bankers, World Bank officials and non-profit workers, the idea of microfinance has become paramount to the development industry. By investing in the untapped potential of the “unbanked,” microfinance sponsors economic growth and development through a sustainable and less paternal approach. However one of the important caveats of the industry is its focus on women. Almost 73% of all microfinance borrowers are women. A fact claimed by many to show microfinance’s intense emphasis on women’s empowerment. The purpose of this study is to test this claim and analyze the effects of microfinance on women’s empowerment. Through the use of traditional OLS regression, this study determined whether or not a highly developed microfinance sector increases the female enrollment in secondary school. The model also tested the claim that microfinance will lead to a proportionally higher increase in girl’s enrollment as compared to boys. Afterwards an additional study was conducted using household survey data from the DHS database to determine if microfinance leads to an increase in women’s financial independence. The results of this study showed limited and, in a few cases, negative effects of microfinance on women’s development indicators. There are three proposed reasons for this lack of significant results: a) microfinance causes negative incentives and encourages girls to be employed in small family businesses instead of enrolling in school, b) the effects of microfinance follows a generational effect and is therefore not displayed in the limited years the study addresses and c) in the majority of countries enrollment rates are already fairly high which causes little variation to be explained within the values.
Could I Have a French Accent in My Native American English? First Language Phonetic Drift in Second Language Environments

Benjamin Lang, Language and Mind, Linguistics
Sponsor: Professor Lisa Davidson, Linguistics

While it is well-known that a speaker’s native language heavily influences the sound system of their second language, previous research has tentatively suggested that one’s native language can also be shifted by their second language even at the earliest stages. This study examines whether the vowel system for American English-speaking novice learners enrolled in a study abroad program in Paris with no prior experience in French could drift as a result of exposure to French. Production of American English vowels was found to be unaffected by the acquisition of French vowels over a 6-week period. However, experienced American English-speaking late learners of French compared to novice learners demonstrated tendencies of French influences on American English production, reproducing findings from previous studies. Taken together, these results demonstrate a trend that the extent of a first language phonetic system’s response to pressures from a second language phonetic system varies as a function of time spent studying the second language and of the quantity of input during this time, with increased amounts of time and of input signifying higher likelihood to change. The ramification of these findings for language development, linguistic experience and cognitive models of speech perception and production are discussed.

The Syrian Jewish Community of Brooklyn

Joshua Z. Lavine, Hebrew and Judaic Studies, Journalism
Sponsor: Professor Jason Samuels, Journalism

The Syrian Jewish Community of Brooklyn is an online multimedia project that explores the unique history of the Syrian Jewish community. Through interviews, pictures, maps and text, the project takes one on an educational journey through time to discover what makes this community both successful in the modern world yet steadfast in its religion and traditions. With few interruptions, the cities of Aleppo and Damascus were known for their rich Jewish culture and commerce dating back to Roman times (according to some Syrian Jews, the time of King David). Due to factors such as changing trade routes and the establishment of the State of Israel in 1948, this once thriving community has dwindled to fewer than 100 inhabitants in Syria today. The first Syrian Jews settled in New York in the early 1890s. Eventually, the majority of the community in New York migrated to Brooklyn. Today, the neighborhoods of Gravesend, Flatbush and Midwood are flourishing with Syrian Jewish culture, which includes many restaurants, schools, shops and synagogues. The traditional atmosphere and structure of the community are key elements that have enabled these people to survive and prosper for many generations.
No Intention of Doing: Effect of Non-Conscious Goal Activation on Illusion of Control

Fannie Law, Economics, Psychology
Sponsor: Professor Peter Gollwitzer, Psychology

This study investigates the effect on positive illusion when individuals are acting towards a non-conscious goal. Specifically, the study addressed whether individuals exhibit perceived control over a situation after recognizing they are acting towards a goal of which they are not aware. Participants were randomly assigned to either of two conditions (disclosure or no-treatment control) in a between-subjects design. The study involved collecting physiological data using sensors to assess whether participants recognized they were primed toward non-conscious goals through increased signs of arousal, a phenomenon called the explanatory vacuum. Participants were then given a task to evaluate their illusion of control. Predicted results from preliminary analysis suggest that individuals who experienced arousal from norm-violating behavior while pursuing a non-conscious disclosure goal were more likely to exhibit positive illusion. This study also assessed whether the opportunity to misattribute negative affect to another environmental condition would diminish the adverse effects of such arousal. This research can shed light on how people rationalize their behavior when confronted with the realization that they are not consciously aware of their motives and to what extent the effects of pursuing such goals affect them. Because there is a causal link between thought and behavior, testing biases in mental processing may in turn provide explanations for actual behavior and, ultimately, examine salient beliefs about how thoughts influence behavior.

Censoring China: Economic Stalemate

Nicole Lem, Global Liberal Studies
Sponsor: Professor Matthew Longabucco, Global Liberal Studies

This study examines the effects of China’s Internet censorship on a socio-political level by focusing on the information and technology revolution. This research was conducted through analyzing a specific event: Google’s departure from mainland China, what it means and its role in the flourishing economy. The spread of the Internet has equated to the mass distribution of information, so much so that we are now living in what many scholars call an information, or knowledge, society. Using Jean Francois Lyotard’s claim that knowledge is a commodity, knowledge becomes a stake in the competition of power between citizens and the state. The development of an information economy has spurred Chinese citizens to demand more freedom and inclusion. The legitimacy of Chinese authority is in a waning state, and its impending collapse is inevitable. Diffusion of knowledge is the economic foundation of society and with it comes social action. Google’s departure from China reflects that their economic growth does not come without political reform. This topic is crucial to any future foreign engagement with China.

Climate Change’s Effect on Maine Lobsters

Lauren Lewis, Environmental Studies, Journalism
Sponsor: Professor Jason Samuels, Journalism

When Americans think of Maine, many almost immediately think of lobsters. Whether it is hard-shell, soft shell, lobster rolls or festivals, Maine’s lobster industry pulls in over $350 million annually. However, the industry is not foolproof. Every season brings in new reports on what catches will be like for the year. Most recently, scientists detected an increase in Maine’s water temperature, causing many lobsters to move north to colder waters, as previously happened in Long Island Sound. With constantly changing and unreliable weather patterns, it seems like someone would be crazy to enter into such an inconsistent industry, but lobster boats run in the family, passed down from generation to generation. This piece looks into the lives of Maine’s lobster community to see why they continue in the family business, even with all of the industry hardships. Many of these families feel that lobstering is just in their DNA, and they couldn’t imagine another way of life. Ultimately, these families do not have any sort of back up net. This project looks into a very important and immediate effect of climate change—one that will affect the entire state of Maine, and, ultimately, the national food community.

Family Net Worth, Abilities and Students’ College Abroad Decisions in China

Bei Liao, Economics and Mathematics
Sponsor: Professor Konrad Menzel, Economics

This study develops and estimates a college abroad decision model for students in selective Chinese high schools. Students choose between studying in China and abroad. High school students, having different family backgrounds and ability levels, make college abroad decisions based on the value attached to either choice. They are categorized into either “high net worth” household group or “low net worth” household group according to their family’s net worth. This model, with the help of econometrics tool, was used to examine, in both groups, the extent to which moving decision is determined by students’ abilities and the family’s net worth and how the pattern is different from one group to the other. Several interesting results emerged from this empirical work. Primarily, the exact amount of family net worth does not directly have a strong effect on students’ decisions. However, whether students belong to the “High Net Worth” group or not has a stronger impact on the decision. That is to say, as long as household net worth exceeds...
a certain threshold, there is no clear relationship between net worth and the probability of moving. Furthermore, it was found that household high net worth is not a sufficient condition for moving, whereas not household net worth not exceeding the budget constraint can be a burden to moving. Unobserved long-term characteristics such as parental education level, developmental environment or awareness of the possibility of moving affect students’ decision as well. This project gives some insight into the characteristics of international students from developing countries.

Small States in the World Bank: What are the Economic Gains from Membership?
*Ai Na Liu, Sociology*

Countries with small populations face exclusion from the improved growth levels of their larger peers as a result of the macroeconomic challenges inherent to size. Though small states have performed reasonably well over an extended period of time, indivisible fixed costs and diseconomies of scale are intrinsic characteristics of small states that impede economic development. This research project examines the economic gains associated with membership in the World Bank for small countries. It observes the growth in GDP, foreign investor confidence, percent of new GDP that is invested instead of consumed, monetary supply and income volatility in small versus large economies. The study predicts that though overall gains from membership will be lower for small states as a result of higher costs of participation and global integration, membership status will increase international credibility in international markets and reflect concrete benefits from joining. This analysis runs robust regressions for eight dependent variables in 1985, 2009 and 2013, and findings reveal that large states generate higher gains than small states from World Bank membership. Their gains in GDP indicators, FDI, GFCF and M2, are consistently greater than small economies with the exception of GDP volatility. Small states observed lower and decreasing trends of GDP volatility tied with membership duration, while large states experienced higher and increasing trends of volatility. Findings suggest that though membership in the World Bank may not help small states overcome limitations of size or achieve economic gain equivalent to larger members, it may serve as an important buffer for GDP volatility for small states entering the international stage.

Forming Opinions about Capital Punishment
*Ai Na Liu, Sociology*

This study examines factors that form individual perspectives on capital punishment. It seeks to answer two questions: What do people consider most when thinking about capital punishment? To what extent do these factors affect their opinions? Unlike prior research on capital punishment, which focuses on the historical, demographical or factual explanations behind support for or against the death penalty, this study focuses on what people truly consider. In particular, this research explores how the extent and accuracy of people’s knowledge regarding capital punishment as it operates in the United States of America shapes their attitude towards the death sentence. Current literature suggests that geography, race and the historical practice of lynching determine public opinions; however, this paper suggests education may be the most important contributor to the formation of opinions about capital punishment. What seems to be a deeply divisive issue, if only public opinion polls are examined, becomes more uniform when people’s underlying knowledge of capital punishment is considered. The more people accurately know about capital punishment—the moral dilemmas, the costs, the characteristics of those subjected to capital punishment and the alternative methods of punishment—the less likely they will support its use. Yet, given an ideal justice system where most of this knowledge is irrelevant, most seem willing to support capital punishment in principle.

Distance Learning
*Micah Loewinger, Journalism, Philosophy*

Distance Learning details the life of Omar, a gifted college student suffering from schizophrenia. This film tells the story of how delusional thinking, auditory and visual hallucinations and crippling social anxiety forced Omar to leave his busy New York college life behind. At home, Omar turns to online education and online employment. In the face of his crippling illness, the internet provides Omar a new means to engage with society and pursue his lofty dreams of becoming a mathematician. At the same time, Omar’s new online life promotes his isolation and creates further distance between him and his loved ones. Furthermore, Distance Learning looks into Omar’s conservative Muslim upbringing and his struggle to reconcile the belief system of his parents with his own anarchist outlook and vegan lifestyle. Distance education is a booming industry, yet still considered inferior to its traditional brick-and-mortar alternative by many employers and academics. However, for vulnerable populations, including the mentally ill, this new mode of learning may be the key to a fulfilling life.
the US and the UK respectively. Specifically, it deconstructs three elements regarding the relationship between the YouTubers and their audiences. First, their humorous videos amass a following of Muslim and non-Muslim viewers. This not only distinguishes them from other Muslimah vloggers but also provides a counterweight to the dominant male Muslim YouTubers. Secondly, while YouTube encourages these women to develop their individuality, it simultaneously hinders their ability to reach a wide audience. Lastly, the contradictory definition of “moderate” Muslims limits the YouTubers’ ability to foster a conversation with their viewership and combat misinformation. This analysis stems primarily from Kundnani’s studies on Islamophobia and Senft’s networked reflective solidarity theory. The results are presented through an interactive video installation, combining interviews with the YouTubers, their audiences and academics. This piece draws from McDonald’s theories on ethnographic film and StoryCode’s research on transmedia. Today, amateur netizens can become celebrities from their bedrooms. Consequently, the political, cultural and technological weight of turning on the camera warrants study. Furthermore, this project experiments with the possibilities of interactive media, a novel field that journalists and filmmakers are currently exploring.

The Role of Rural Chinese Property Rights in Migration and Land Allocation Decisions

Luisa Majnoni d’Intignano, Economics
Sponsor: Professor Christopher Flinn, Economics

From the early 1980s until 2002, Chinese farmers regularly faced the risk of land expropriation if their household size was reduced. In 2002, however, the Rural Land Contracting Law (RLCL) was passed, almost completely outlawing land reallocations and bringing overall rural property rights closer to those of a market economy. This study examines how this legal change has affected migration and land allocation decisions as well as land productivity across China since 2002. A theoretical framework is constructed to describe how land and labor should be optimally allocated within a village when households are facing secure and insecure property rights. These models predict that households with a history of high expropriation risk should exemplify an increase in labor productivity as a result of a rise in migration as well as production after 2002. Preliminary results indicate that across China mean labor productivity has increased though at the cost of greater variability. It is less clear whether migration levels have been affected by the RLCL. Although China’s period of incomplete rural land property rights attracted the attention of many economists, only a limited amount of research has been done to examine the effects of the groundbreaking RLCL.

Thinking Thin: Reducing Women’s Preoccupying Thoughts about Body Weight, Size and Shape through Mental Contrasting

Mia Malone, Psychology
Sponsor: Professor Gabriele Oettingen, Psychology

The present study examines whether mental contrasting (MC), a self-regulatory strategy wherein individuals mentally contrast a desired future with the present reality including the obstacles standing in the way of attaining the desired reality, could lead to a reduction in the frequency and intensity of preoccupying thoughts about thinness in women who display features of thin-ideal internalization. Participants completed a series of questionnaires in order to determine the frequency of their preoccupying thoughts about thinness as well as the degree of negative symptomatology associated with thin-ideal internalization. Participants then identified a thought that most plagued them and learned MC or an ineffective strategy of indulging. Two weeks after the initial session, participants in each condition were again contacted to complete a series of similar questionnaires aimed at measuring the continued or decreased frequency and intensity of their self-identified preoccupying thought concerning thinness. By focusing on the preoccupying thoughts that serve to reinforce cognitive distortions underlying negative appearance schemas and applying the strategy of MC, this research hopes to provide a new efficient and cost-effective means of further aiding the clinical interventions available to women suffering from eating disorders or other body related disorders.

A Study of Community-Based Archaeological Methods in Practice: Fort Ward, Alexandria, Virginia

Lia Masur, Anthropology
Sponsor: Professor Jane Anderson, Anthropology

There are many sides to an archaeological story, and this research will shed light on different perspectives of archaeological representation and meaning. The focus of this project is in different community groups’ definitions of accurate representation and ethical community engagement. Literature on community involvement in archaeological excavation and representation as well as the definitions outlined by archeologists to form a cohesive explanation of the many forms community-based archaeology can take place in were all analyzed for this study. Theorists like Sonya Atalay, Whitney Battle-Baptiste and Lee D. Baker, among many others, have made huge contributions to the methodology and ideology of community-based archaeology. These theorists’ idealized, cohesive definition of community-based archaeology was then compared to the reality of implementation in an archaeologically rich city in Northern Virginia. The case study on the city-wide community archaeology program in Alexandria, Virginia,
demonstrates how community-based frameworks function in a real-life setting. An analysis of the complications and benefits shows how essential community-based research is in decolonizing archaeology, while simultaneously connecting it to contemporary issues. Community-based archaeology is the most ethically appropriate way to conduct archaeological and anthropological research. This study shows that while it is not a simple or easy approach, the results it can yield are valuable to the discipline.

**Black Twitter: The Maintenance of Racial Boundaries through Lexicon**  
*Mia Matthias, Anthropology and Linguistics  
Sponsor: Professor Renée Blake, Linguistics*

According to Pew studies, one in four African-Americans who use the Internet has a Twitter account, twice the number of Hispanic and White users. While contested, the term “Black Twitter” has come to index a cultural space for African-American/Black expression. This paper tracks three lexical items that come into use within Black communities on Twitter from 2008 to 2015 using an Application Programming Interface (API). This study shows how lexical items are both invented and popularized by factions of Black Twitter and what happens from qualitative and quantitative perspectives when these items are appropriated in other online or media spaces. This work expands on scholarship about African American English (AAE) by using quantitative methods to track the path of appropriation and subsequent influence on patterns of usage. This data is then contextualized through ethnography and analysis of how racial and cultural capital are understood, both convert and overt.

**A Gendered Dutch Disease: The Effect of Natural Resource Wealth on Women’s Rights**  
*Raj Mathur, History, International Relations  
Sponsor: Professor Leonid Peisakhin, Politics*

Over the past decades, scholars have proposed numerous explanations for why certain countries respect women’s rights less than others. In a 2008 paper, Michael Ross hypothesized that petroleum in fact accounts for this variation. The export of oil appreciates a nation’s currency, making its tradable goods sector less competitive and thus eliminating the low skill jobs in which women in many developing countries first enter the workforce. As women stay at home more, respect for their rights diminishes. While compelling, scholars have heavily criticized Ross’ theory. Through several OLS regressions, the robustness of his results is tested in two ways. First, because the mechanism by which Ross believes petroleum hinders women’s rights should also apply to any resource, this study expanded the analysis to include minerals and coal. Second, gender equality was measured more holistically by considering women’s political, social and economic rights. This study finds that although oil has a significant negative effect on the aforementioned rights, mineral and coal do not. It is posited that these latter resources are simply not exported in significant enough quantities to have an impact on women’s rights. This study concludes that policymakers wanting to assure gender inequality should work towards reducing global dependency on petroleum.

**Working, not Walking, for Water: How Empowering Women Improves Access to Clean Water in Developing Nations**  
*Natalie McCauley, Environmental Studies, International Relations  
Sponsor: Professor Alastair Smith, Politics*

The developing world is dying of thirst: 748 million people lack access to clean water. Women shoulder much of the burden when their communities do not have clean water, often walking for miles each day to collect enough water for drinking, cooking and cleaning. This study of 122 developing nations from 1990–2012 finds a link between women and water that goes beyond women as household water managers. Statistical evidence suggests that when women are empowered by participating in parliament, attending school and working for wages, developing nations have more access to clean water. Substantively, increasing female representation in the national parliament to 50% in an average nation would result in 5.2% of the population gaining access to clean water—a significant improvement. As the 2015 deadline for the United Nations-set Millennium Development Goals looms, this project aims to inspire shifts in international development strategies to focus on empowering women as a necessary step to achieving universal access to water. If women in the developing world are actively empowered, they can work, not walk, for sustainable water access.

“Cherry-Picking” the Material Record of Border Crossings: Examining Artifact Selection and Narrative Construction among Non-Migrants  
*Leah Byck Mlyn, Social and Cultural Analysis  
Sponsor: Professor Cristina Beltrán, Social and Cultural Analysis*

Since 2000, over 4 million people have been apprehended trying to cross without authorization into the U.S. from Mexico via the Arizona desert. During this process millions of pounds of artifacts associated with migration have been left behind. Subsequently, humanitarian groups, artists, local U.S. citizens and anthropologists have collected and used these artifacts in a multitude of ways. Through interviews and participant observation data, this project examines collection practices and narrative construction
among artifact collectors in order to explore how and if these objects “speak” and the effects of what is collected, interpreted and deployed in various contexts.

**Effects of Culture on Gender Discrimination**
*Diane Min, Psychology*
*Sponsor: Professor Tessa West, Psychology*

In today’s diverse workplace, it is important to understand how individuals’ unique cultural backgrounds can lead to discrimination in the workplace. This study investigates how perceivers’ cultural background affects discrimination based on group gender composition. Participants completed a virtual group task with four simulated bots. Before the task, participants completed a collectivism scale (Jackson et al., 2006), and after the task, participants evaluated the competence of their group-mates. Participants high in collectivism on two of five subscales (prioritization of in-group goals and acceptance of in-group norms) rated their group-mates more favorably when placed in a female-dominant relative to male-dominant group. Similarly, male perceivers high in collectivism on one subscale (concern for the well-being of in-group members) also rated their group-mates more favorably when placed in a female-dominant relative to male-dominant group. Past research has only considered how elements of a task (i.e., whether individuals are rewarded based on group or individual performance) affect bias based on group gender composition. This study is one of the few to explore how characteristics of a perceiver influence group gender composition’s relationship with intragroup evaluations.

**Reading between the Phone Lines: The Impact of Mobile Phone Penetration on Literacy in South Africa**
*Raeesa Imraan Munshi, Politics*
*Sponsor: Professor Oeindrila Dube, Politics*

This paper analyzes the impact of mobile phone penetration on improving literacy outcomes in South Africa. Through an approach that quantifies the power of increased mobile phone ownership to predict household-level literacy outcomes over twelve years and data that offers over a million household-level observations, the analysis shows heterogeneous effects of cell ownership based on education. For those who lack formal education, access to a mobile phone increases the chance of literacy by 14%. This positive effect is, however, diminished with every additional year of formal education completed and becomes negligible for those who have six or more years of schooling and negative thereafter. The findings demonstrate sizable mobile phone driven literacy benefits to un- and under-educated individuals above school going age—a finding with important ICT and education policy implications to future development in underserved South African communities.

**An Examination of Impulsiveness in APED Users and Healthy-Controls While Performing an Affective Go/No-Go Task: A Preliminary Report**
*Bryan S. Nelson, Mathematics, Psychology*
*Sponsor: Professor Tom Hildebrandt, Psychiatry, Mt. Sinai Hospital*

Roughly 3% of the adult U.S. population report taking Appearance and Performance Enhancing Drugs (APEDs), which have a high dependency rate. More than just addiction, there seem to be countless reports about the consequences of APED use such as impulsiveness, with effects potentially more potent for users that begin as adolescents. This project intends to expand this findings to include a healthy control group. The present study will examine the long-standing issue of impulsiveness within APED users. It is hypothesized that APED users will demonstrate higher impulsivity than healthy controls. The study’s questionnaire will compare various factors such as primary influence to take or not take steroids between users and controls. To examine impulsiveness, a Go/No-Go task will be used. Both the questionnaire and the Go/No-Go will be administered via web-modules. It is hoped that this research will further the literature on impulsiveness in APED users and can create a more comprehensive picture of how APED users differ from their non-APED bodybuilder counterparts. In particular, this research intends to further existing methodologies for studying this population by providing a simpler and less costly means of sampling. Moreover, the author endeavors to provide an effective open-source Go/No-Go task for future researchers’ use.

**The Impact of ASEAN-China Free Trade Agreement on Trade Patterns**
*Hu Min Lee, Economics*
*Yeow Choon (Seam) Ng, Economics*
*Sponsor: Professor Andrew Paizis, Economics*

Since its inception, the Association of Southeast Asian Nations (ASEAN) has sought to further economic cooperation within the regional bloc and beyond. In 2002, it signed the ASEAN-China Free Trade Agreements (ACFTA) with China. As with all FTAs, the ACFTA has brought about a net welfare benefit to ASEAN as a whole but has resulted in uneven effects on individual countries within ASEAN. This paper investigates the uneven effects of the ACFTA on the economic significance of Singapore and Malaysia and provides economic reasoning for the observed differences in the magnitude of the regression coefficient estimates, based on the geographical proximity and nature of industries in the different countries. In addition, evidence was found that given the uneven effects of the FTA, the major countries are willing to sign the FTA because the shifting economic importance of the other ASEAN countries does not threaten
their relative economic importance and because the region
as a whole benefits from the FTA due to increased total
trade volumes.

Social Support: How Mothers Teach Their Children
about Hidden Affordances
Gloria Norton, Psychology
Sponsor: Professor Karen Adolph, Psychology

Closures are ubiquitous in daily activities: e.g.,
toothpaste tubes, cabinets, cereal boxes, zippers, buttons,
shoelaces. The target actions for opening each closure are
not directly perceptible; instead, they must be learned. By
observing how mothers teach children to open containers, it
can be better understood whether social support helps chil-
dren learn the necessary actions for activities of daily living.
47 mothers were asked to teach their 12- to 54-month-olds
to open containers. Mothers had 30 seconds to get their chil-
dren to open over-cap (Tupperware) containers to retrieve a treat. Six categories of social support were identified: 1) general encouragement to keep children on task, 2) verbal
instruction about the target action, 3) gesturing the target
action or critical location on the container, 4) modeling the
action by opening the container, 5) stabilizing the container and 6) hands-on guidance. Overall, social support decreased with children’s age and general encouragement was the
most frequent form of social support. Before 30 months of
age, children only opened successfully when mothers sta-
ilized the container or provided hands-on guidance; after 30 months, children opened successfully without mothers
decreasing task demands. These data provide information
about how mothers teach their children to cope with activi-
ties of daily living.

The Effect of Same-Race Peers and Faculty on the
Academic Success and Social Engagement of Minority,
First-Generation College Students
Deanna Oliver, Global Public Health/Sociology, Politics
Sponsor: Professor Jennifer Jennings, Sociology

The purpose of this project is to identify the relationship, if any, between the academic and social involvement of minority, first-generation college students and their engagement with faculty and peers of the same race. The primary phase of this research involved distributing a survey to assess academic achievement, social engagement, the presence of same-race peers and the presence of same-race faculty. The final phase required compiling data and identifying relationships among variables. The results of this study indicate a strong association between students’ engagement with same-race peers and advisors, on the one hand, and their academic performance and involvement on campus, on the other. Despite the growing body of research related to the success of first-generation college students, there is little

research focused specifically on minority, first-generation college students, who may in fact be at greater risk of academic failure and social disengagement. In order to create environments conducive to the success of these students, educators and researchers must understand which factors and circumstances most heavily influence their academic performance and social involvement.

The Generation that Transformed Fashion: How Young
Chinese Millennials Have Transformed the Fashion
Industry
Sasha Padbidri, Global Liberal Studies
Sponsor: Professor Ascension Mejorado, Liberal Studies

This thesis argues that the consumer habits of Chinese
millennials are redefining the terms “fashion” and “luxury.”
It further examines how the current Anti-Graft Campaign as
initiated by the Chinese government in 2013 unknowingly
triggered this phenomenon by forcing foreign luxury brands
in China to distance themselves from the terms “elite” and
“luxury” and to subsequently reposition themselves to a
younger and Westernized consumer base. Through observ-
ations, interviews and case study analysis, this thesis also
explores how the destigmatization of the “Made in China”
logo and the resurgence of Chinese creativity has subse-
quently emerged as implications of both the government’s
actions and increasing demand from Chinese millennials.
At the same time, this thesis looks at how overseas luxury
consumption from Chinese tourists has affected how brands
have reconstructed their China strategy. Indeed, in meticu-
lously combining the aspects of governance, consumerism
and the business of fashion, a broad perspective is presented
on how brands can successfully market to this group of
consumers.

Motor Planning in Infant Locomotion: Infants Align
their Feet to Stop Walking
Katherine Pan, Psychology
Sponsor: Professor Karen Adolph, Psychology

When infants freely explore the environment, they start
and stop walking in bouts varying from one step to hundreds
of steps. Sometimes infants stop walking at an obstacle,
to change postures or for no apparent reason. This study
wanted to determine whether infants plan to stop before
they actually do. Foot alignment was used as a measure
of planning: whether they stop walking with their toes and
heels completely aligned or with the feet offset front to
back. The number of times infants end walking bouts with
their feet aligned was quantified. The study also examined
whether infants make adjustments by pivoting their foot
after they end a bout with their feet misaligned, a behavior
taken to signify a correction for poorly planned stopping.
13- to 19-month-old infant walkers were video recorded as
they moved freely in a laboratory playroom for 20 minutes. At the end of each independent walking bout, infants’ foot placement was examined. Preliminary analyses reveal that both younger and older walkers align their feet to stop. This suggests stopping may be constrained by biomechanical factors. Additional analyses will examine whether alignment differs depending on the reason for stopping, the length of the bout and infants’ walking skill.

**Sisterhood of Survivors: Reintegration of Formerly Trafficked Women in Nepal**  
**Komal Patel, Anthropology, Journalism**  
**Sponsor: Professor Noelle Stout, Anthropology**

Human trafficking has become one of the most widespread human rights violations, leading to anti-trafficking movements that primarily focus their efforts on preventing trafficking and rescuing survivors. Likewise, most of the scholarly literature addressing trafficking is centered on prevention and rescue. The reintegration of formerly trafficked persons, or survivors, therefore, remains highly understudied and immensely important. Based on interviews with survivor-activists and two months of fieldwork with activists from Samrakshak Samuha Nepal, an anti-trafficking organization based in Kathmandu, this project assesses which reintegration method, shelter-based or community-based, is better and identifies what factors contribute to successful reintegration. This thesis argues that the community-based approach allows for more freedom in creating reintegration programs, as shelters tend to restrict survivors’ movement. It is also shown how a community-based method allows for organizations to incorporate empowering work programs that give survivors a sense of agency and a chance to regain their status in society, which survivors define as successful reintegration. It is argued that reintegration should be survivor-led, as survivors have a sense of trust and understanding between one another that assists with successful reintegration. Research on the social reintegration of survivors promises to strengthen the fight against human trafficking.

**The Effect of Winning Coalition Size on Human Rights Protections: An Instrumental Variables Analysis**  
**Alida Pecanin, Politics**  
**Sponsor: Professor Anna Harvey, Politics**

Do more democratic political institutions lead to increased protections for human rights? Existing work describes a positive relationship between democratic institutions and human rights (Poe and Tate, 1994; Fein, 1995; Bueno de Mesquita et al., 2003). Endogeneity issues are not accounted for in existing work, making any inferences from these results false. This thesis tests whether existing findings withstand accounting for the endogeneity of institutions. More specifically, this thesis tests Bueno de Mesquita et al. (2003), which suggests larger sizes of the group whose support is essential for the leader’s survival (the winning coalition, W) increase human rights. The instrumental variable design used by Acemoglu et al. (2001) is adapted so that an instrumental variable (early European settler mortality rates in colonies) is used to predict the endogenous independent variable (political institutions). Settler mortality rates capped at 250 deaths per 1000 were used to predict W in order to study its effect on human rights policies. Results suggest that capped settler mortality is a good predictor of W and the relationship between W and human rights is significant, which confirms results from Bueno de Mesquita et al. (2003): more democratic institutions do appear to lead to increases in rights protections, even after addressing endogeneity concerns.

**Being Argentine in New York City**  
**Marie Pederson, Sociology, Spanish**  
**Sponsor: Professor Ruth Horowitz, Sociology**

As globalization progresses, people from countries predominately populated by immigrants are immigrating to new places. This movement changes the social, political and economic dynamics of both the host and sending communities. How do modern immigrants conceive of themselves as an individual and as part of a community in this evolving context? What do these immigrants’ perceptions illuminate about the socio-political structure of the host country? Based on twenty-one in-depth interviews with Argentine immigrants in New York City, this project investigated community formation, perceptions of racial identification and differences in immigration and socio-political context between the two places. Like many people who immigrate to the U.S., most respondents left Argentina in search of a better financial situation. Unlike many other immigrant groups, most Argentines in the U.S. are highly educated and have found work in professional jobs. What’s more, higher socio-economic status and “whiter” physical appearance allow this group to assimilate reasonably seamlessly into American culture. Since most Argentines are of European ancestry but from South America, they are conflicted over how to identify racially within the U.S. context. This tension, which came to light in the interviews, highlights the continued importance of race in the U.S. and illuminates the structured divisions of U.S. society.

**Conceptions of Community and Censorship on Tumblr**  
**Avina Pereira, Sociology**  
**Sponsor: Professor Ruth Horowitz, Sociology**

Through in-depth online interviewing, this study examines the transformation of Tumblr’s eating-disorder community following the website’s 2012 policy banning
content promoting self-harm. By investigating the intersections of users’ conceptions of censorship and community, this study unpacks their largely supportive attitudes towards the policy as an extension of social service. It was further found that while the policy has been somewhat effective in reducing promotional material, it primarily functions to protect the disordered from pro-anorexia harassers who have significantly decreased their presence since the policy’s implementation out of fear of being terminated. The policy also legitimized the growth of a new community of harassers, the anti-pro-anorexia community, who take on the responsibility of reporting and publicly shaming blogs they consider promotional. This study follows up qualitatively on the findings published in *Perspectives of Public Health* (2013) that found Tumblr’s ban on promotional content did not diminish the promotional community but sequestered it away from the public eye. Moving away from the moralistic narrative of deviance that dominates sociological discourse on this topic, this study focuses on examining the functional implications of the policy as reported by the users of the site.

Actions Are Not Black and White: Motor Decisions in the Gray Zone
Dhandevi Persand, Psychology
Sponsor: Professor Karen Adolph, Psychology

People perform a variety of actions: walking, running, jumping, crawling and so on. Frequently, walkers encounter a “gray zone” situation where several actions provide viable options for navigating an obstacle. So, for any given situation, how do people select an action from among the alternatives? In three experiments, this study investigated whether action selections are biased, averaged or random and what factors influence people’s decisions. In Experiment 1, participants’ decisions to go over or under a horizontal bar at varying heights were compared to their actual abilities. The gray zone encompassed the heights participants could successfully navigate by going over and under. Participants consistently transitioned from going over to under the bar at heights just below the maximum of the gray zone, indicating a bias to go over and remain upright. In Experiments 2 and 3, participants navigated the bar with ankle weights or on a squishy surface that disrupted upright balance and made...
Two speakers facilitates phonetic convergence. In the current study, speakers with a General American dialect repeated words recorded by two target talkers, one with a General American dialect and the other with a New York City (NYC) dialect. Results revealed that speakers were more likely to modify their speech when listening to the General American talker, supporting the finding that speakers are more likely to converge when there is greater similarity between their own dialect and the dialect of the target talker.

The Effect of Social Class on Interpersonal Orientation
Adam J. Peterson, Psychology
Sponsor: Professor Tessa West, Psychology

Correlational research suggests that higher socio-economic status (SES) individuals prioritize independence, personal freedom and choice whereas lower SES individuals prioritize interdependence and social connectivity. Recent experimental research involving subjective SES manipulations and dependent variables such as empathic accuracy have supported these findings but fallen short in explicitly demonstrating a causational link between SES and interpersonal orientation. The present research sought to fill this gap by investigating whether inducing high SES would lead to an independent orientation and inducing low SES would lead to an interpersonal orientation. Participants were randomized to either a high or low SES condition and then had their temporary subjective SES manipulated in accordance to their condition. Following this, participants were given behavioral and self-report measures to assess their interpersonal orientation. Although subjective SES was successfully manipulated, the results of this manipulation were insignificant and thus unable to support the notion of a causational link between SES and interpersonal orientation. Although this study was unable to provide support for a causational link, it was still able to replicate previous correlational findings. Further research should therefore include a larger sample size to better elucidate the relationship between subjective SES and interpersonal orientation.

The Roles of Regional Dialect and Language Distance on Phonetic Convergence
Rebecca Piper, Language and Mind
Sponsor: Professor Susannah Levi, Communicative Sciences and Disorders, Steinhardt School of Culture, Education, and Human Development

Phonetic convergence is the phenomenon in which people unintentionally and temporarily change small phonetic details of their speech to sound more similar to another talker. Previous research has revealed multiple lexical, social and task factors that affect the presence and degree of phonetic convergence. Of interest to the current study are the influences of regional dialect and language distance, which is the dialectal similarity of the language of the speaker who converges and the other talker (the target talker). It is unclear whether more or less similarity between the dialects of the two speakers facilitates phonetic convergence. In the current study, speakers with a General American dialect repeated words recorded by two target talkers, one with a General American dialect and the other with a New York City (NYC) dialect. Results revealed that speakers were more likely to modify their speech when listening to the General American talker, supporting the finding that speakers are more likely to converge when there is greater similarity between their own dialect and the dialect of the target talker.

International Influence on Ghana’s Healthcare: Implications for the Millennium Development Goals
Emma Pliskin, Global Public Health/Anthropology
Sponsor: Professor Helena Hansen, Anthropology

The United Nations and its signatories created the Millennium Development Goals (MDGs) in 2000 as a tangible timeline and focus for the world’s efforts in improving livelihoods. The goals, to be met by 2015, focus on eight categories (eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other diseases; ensure environmental sustainability; and develop a global partnership for development), and the focus of this study are the health-specific goals. In considering these goals, we must necessarily consider the individualized impact that these words and concepts have on the lived experience of those under the auspices of these Goals. How do they affect the day to day? How do they permeate the discourse, practice and understanding of self in countries implicated by these goals? What contradictions exist in the space between those who determine what development should be and those who embody, or internalize, those ideals? Interviews were conducted in Accra, Ghana, to better understand the ways in which international interventions in general are embodied by those practicing public health, medicine and policy and by the people with whom they work. This study also examines the dichotomy between what is “modern” and what is “traditional,” what “First” and “Third” world means and, finally, how economic and political structures allow the former to interpret and define the needs and practices of the latter. It was found that the idea of “Westernization” was conflated with “modernization.” Consequently, the MDGs operate under assumptions that are not necessarily applicable to the Ghanaian healthcare landscape. The goals manufacture a healthcare system intended to change the conceptualization and practice of healthcare into a thriving, “modern” ideal. Target countries suffer from this misappropriation and the paradoxes that arise therein. These concepts are thus essential for the field of global public health and require anthropological, historical and political consideration in current developing public health initiatives.
Three Strikes and You’re Out: Impact of America’s “Tough on Crime” Policy

Amber Poon, Politics
Sponsor: Professor Oeindrila Dube, Politics

Over the past two decades, the socio-economic implications of the Three Strikes law, a mandate to increase sentences for repeat offenders, have drawn nationwide attention and raised serious questions about the effectiveness of mass incarceration. Does the adoption of the Three Strikes law throughout the United States deter violent and property crimes? And, has Three Strikes placed fiscal constraints on education, health and public welfare? The cost-effectiveness of Three Strikes laws remains widely contested in academic, political and legal circles, and this project seeks to address these primary questions by conducting a data-driven, empirical analysis of all 50 states for years 1984–2011. However, it is important to understand that states adopted Three Strikes with slight variations in sentencing guidelines that define third strike charges and prior convictions included under the law. To address these differences, unlike previous studies, this study focuses on a sub-group analysis that contrasts states according to the political party of their governors. On average, Republican-led states with Three Strikes in place have a higher incarcerated population than states with a democratic or independent governor. However, the increase in prison population does not result in lower crime rates. Additionally, the impact on state finances is reflected by the moderate increase in police protection and slight decrease in welfare spending. Fortunately, despite the policy’s limited role in crime prevention, virtually no negative impact on education and health-hospital expenditure, posited by some studies, was observed.

I Want to Hold Your Hand: Infant Supported Walking

Raquel Rahmey, Psychology
Sponsor: Professor Karen Adolph, Psychology

This project aims to understand the role of “supported walking” in the development of independent walking. Before infants can walk independently, caregivers help infants to walk by holding their hands or supporting their torsos to provide the necessary balance control that infants cannot generate on their own. Although supported walking has been noted in the literature for nearly a century and is recognized on major milestone charts, researchers know surprisingly little about the circumstances in which supported walking occurs and whether supported walking facilitates, impedes or is inconsequential to the development of walking. This project addresses these gaps in the literature by describing supported walking during free play and examining whether support differs by infants’ locomotor status (whether crawler or walker), age, walking skill and whether infants are on the floor or on an elevation. Preliminary findings show that caregivers provide younger, less experienced walking infants with more support than older, more experienced walking infants. Further analyses will examine how much support infants receive on elevated surfaces and whether support is related to how well infants walk. This work may aid health professionals in using caregiver supported walking as a tool to aid motor development for infants with disabilities.

The Embodiment of Ethnic and Gender Violence: Trauma Narratives of Rapes and Other Human Rights Assaults in May 1998 Indonesian Riots

Artricia Marina Rasyid, Anthropology
Sponsor: Professor Angela Zito, Anthropology

In May of 1998, Indonesia’s capital city, Jakarta, was seized by large-scale riots of mass burning, looting and rape. To date, scholarship on the riots has emphasized the racialized nature of the unrest, as the violence was directed at Indonesia’s ethnic Chinese minority. Comparatively few studies have focused on the sexual violence component, which is considered both a juridical and socio-cultural taboo in Indonesia. Most mass media documented the riots using a separatist discourse of the native Indonesian “Us” versus the Chinese “Others” thereby further discursively framing the riots as an ethnic conflict. Drawing on anthropological theories of semiotics and contemporary feminist human rights debates, this thesis contributes to the still-marginal body of scholarship on cultural productions created on the subject of May 1998 riots’ Chinese rape victims. The analysis is based on fieldwork in Jakarta, during which artistic installations, films and biographies on May 1998 were engaged; interviews with human rights activists were conducted; and the repertoires of activists’ campaign materials were analyzed. This study contends that artistic, or narrativized symbols, are laden with a sense of national identity and unity. It is also argued that May 1998 cultural productions constitute a project of anamnesis, as they invite Chinese and non-Chinese alike to reimagine their national destiny and to reclaim their agency in the wake of ethnocidal and economic violence. Thus, this project extricates the politics of narrative circulation and interpretation and gauges the extent to which artistic and cultural projects on May 1998 riots not only signify memories of suffering but also mobilize a human rights and political claim about gender equality and racial solidarity.

Reducing Perceived Political Polarization

Odile Rodrik, Psychology
Sponsor: Professor Tessa West, Psychology

This study examined whether having individuals think about their conflicting goals would increase their accuracy in estimating the attitudes of members of a rival political party. Specifically, this study found that Democrats and
Over the course of human evolution, the need to walk on two legs has influenced the shape of our skeleton, including the skull. Because it must balance atop a vertically oriented vertebral column, human skull dimensions have been modified to minimize forces placed on neck musculature. Intentional cranial vault modification is a cultural practice and marker of identity that comes in two main forms, anteroposterior and circumferential. This practice alters the shape of the human skull, and thus, how the skull balances. Three morphologically distinct samples of South American crania were analyzed metrically in order to quantify changes to the cranial vault and face induced by intentional vault modification and to assess how these changes affect the way in which the skull balances. A MicroScribe 2Dx was utilized to collect 41 craniometric points, and linear skull dimensions were extracted from 3D coordinate data. Results indicate that circumferential deformation has the greatest impact on how the head balances and produces more strain on the neck musculature than anteroposterior deformation. The differential patterns between these two groups suggest broader implications for making transitive inferences about the day-to-day lives of these individuals within the archaeological record.

How Much Babies Move, Where They Go and Why
Joshua Schneider, Psychology
Sponsor: Professor Karen Adolph, Psychology

How do infants explore their environment? Independent mobility, first crawling and later walking, opens up new opportunities for learning. Recent work shows that infants with more walking experience spend more time in motion and accumulate more walking steps and fewer falls during free play with caregivers (Adolph et al., 2012). This project expands on previous work by describing spontaneous locomotor exploration in 13-, 15- and 19-month-old infants—how much they move, their methods of locomotion, accumulated steps, distance traveled, area covered and locations visited—and by determining the effects of infant’s age, walking experience and walking skill on the quantity and type of exploration. Although previous work showed a robust effect of age and walking experience on spontaneous infant walking, preliminary results failed to replicate these effects. Instead, infants showed large individual differences in total locomotor exploration (crawling and walking steps) independent of age and walking experience. Additional analyses are underway to examine the stability and source of the variation; the distribution of activity will be quantified in order to determine whether locomotor exploration occurs in bursts or is sustained throughout the play session. Understanding individual differences in infant locomotor activity is fundamental in developing interventions for children with deficits in motor development.

“The rise of social media platforms in fashion has created a sense of what Sarah Banet-Weiser calls a neo-liberal brand culture within the Instagram audience. Constant sharing...
and real-time stories have constructed perceived personal relationships and understanding between online personalities and the larger population of social media users. Using the inherent “instantaneity” of these platforms, bloggers are able to create a personal narrative and a sense of authenticity, allowing for the development of a personal “brand” which appears less mediated than that of a corporation. These blogger “brands” are therefore viewed with a less critical eye, which creates the opportunity for bloggers to employ native advertising and subtly targeted marketing. Using fashion bloggers as a case study for the larger effects of social media marketing and online branding, this paper identifies the specific points of these platforms that currently reshape the play between concealment and revealment in advertising and branding. Viewing fashion as a symptom of current trends—both economic and cultural—this case study allows for an investigation into the changes in our understanding of contemporary culture and the ways in which it is represented. This paper serves to identify both the benefits, in terms of branding, and drawbacks of social media marketing as well as the lack of rules currently associated with the budding possibilities.

**The Impact of Perceiver Collectivism and Group Gender Composition on Evaluations of Task Groups**

_Danusha Selva Kumar, Psychology_

_Sponsor: Professor Tessa West, Psychology_

Previous research shows that when perceivers who are members of a task group are high in collectivism, group gender composition biases their intragroup evaluations of their group-mates. The current study investigated whether group gender composition and perceiver level of collectivism impact evaluations of group members when perceivers are not members of the group. Participants viewed simulated interactions of five person task groups. Despite high power, B = .99, gender composition and its interaction with perceivers’ level of collectivism did not significantly affect evaluations. However, lower scores on two subscales of the collectivism scale (willingness to rely on group mates and enjoyment of group work) led to more negative overall evaluations. Moreover, male perceivers low on a third subscale (concern for the well-being of group mates) evaluated female targets more negatively than male targets. Results suggest that gender composition only biases evaluations when perceivers are members of the group. In addition, although previous research shows that intragroup gender biases (based on group gender composition) increase as a perceiver’s level of collectivism increases, the current research shows that when perceivers are not members of the group, gender biases (based on target gender) decrease as a perceiver’s level of collectivism increases.

**Affordable Housing: Is Mixed-Income Housing Delivering Its Promises?**

_Manel Sentouhi, Metropolitan Studies, Politics_

_Sponsor: Professor Maria Josefina Saldaña-Portillo, Social and Cultural Analysis_

Over the past decade, more than 100 mixed-income housing buildings have been constructed in New York City alone as an attempt to alleviate poverty-stricken neighborhoods and the ever-growing lack of affordable housing. Because mixed-income buildings reserve at least 20% of their units for low-income residents and sell the remaining units at market-rate, a diversity of socio-economic class exists within these buildings. In the eyes of the government, this diversity is seen as a way to decentralize poverty within urban cities and as a way for residents of all backgrounds to come together as a community, but recent news and research may note otherwise. During the summer of 2014, news sources brought to light a feature of numerous mixed-income housing buildings which became known as the “Poor Door,” a separate entrance constructed specifically for low-income residents’ use. This raises the question whether mixed-income housing is really aiming for community building across socio-economic differences. The purpose of this study is to investigate the effects of mixed-income housing on New York City communities. With the expectation of building 80,000 new affordable housing units in New York City over the next 10 years, in accordance to Mayor De Blasio’s **Housing New York: A Five-Borough, Ten-Year Plan**, the aim of this study is to evaluate whether mixed-income housing, in its present form, is the best solution for addressing both the lack of affordable housing and the issues of socio-economic and racial housing segregation within New York City. The results from this research reveal that mixed-income housing alone fails to provide an all-inclusive community and fails to address root causes of poverty, signaling the vital need of social services to accompany mixed-income housing.

**The Effect of Increases in the Federal Minimum Wage on Domestic Violence Rates: A Differences in Differences Analysis**

_Brittany Sherman, Politics_

_Sponsor: Professor Anna Harvey, Politics_

This research project asks the following question: Do economic conditions impact rates of domestic violence? In order to adequately address issues of causal inference, federal minimum wage increases were used as an exogenous source of variation in individual-level economic conditions. A differences in differences design was also conducted, taking advantage of the preexisting variation in state minimum wages in order to address the possibility that federal minimum wage increases are correlated with other factors that may impact rates of domestic violence. The results of
the analysis indicate that law enforcement agencies in states affected by the federal minimum wage increases between 2007–2009 reported lower rates of domestic violence, post-treatment, than agencies in states not affected by these increases. These findings are robust to several strategies that address the heterogeneity across law enforcement agencies. Importantly, the findings suggest improved economic conditions can negatively impact rates of domestic violence, contributing to the policy debate about strategies that may decrease the problem of domestic violence.

Conservative Talk Radio and the Alarmist Discourse of Ebola
Lynn Shin, Anthropology
Sponsor: Professor Sonia Neela Das, Anthropology

Although scholars have explored conservative talk radio’s impact on civic knowledge and political socialization, discursive features of the medium remain underexplored. This study advances the discussion by looking at two U.S.-based conservative talk radio programs and their discussion of the Ebola outbreak of 2014. Drawing on discourse analysis of two nationally syndicated talk shows, Glenn Beck and Michael Savage, this study investigates how radio hosts use “Ebola” as a discursive foil for talking about broader issues such as politics, ethics, race, and religion. This study argues that the hosts preferentially talk about Ebola, not in terms of its symptoms and its progression in the US and West Africa, but instead to argue against the political left and the Obama administration. Further, underlying their arguments against the Obama administration’s mishandling of the Ebola disease is a particular epistemological framework that structures their arguments as “commonsensical” and rational. Finally, it is proposed that these arguments are grounded in larger ideas of conservative and religious values, which conflate partisanship and politics with morality and ethics.

Internal Peace through Trade? The Effects of Trade Liberalization on Domestic Conflict
Amber Smoczyk, Politics, Spanish
Sponsor: Professor Oeindrila Dube, Politics

What is the impact of liberal trade policies on the instance of domestic conflict in developing countries? This paper looks at domestic conflict as a measure of riots, protests, and strikes and examines whether the prevalence of these forms of conflict increase in the years after trade liberalization in a sample of sixty-five countries in Africa, Asia, and Latin America. Conflicting opinions on free trade claim globalization either a) exploits developing countries and increases inequality or b) leads to overall GDP growth and stability. The theory put forth in this study suggests that if the first idea holds, domestic conflict will increase post-liberalization. If the second is true, conflict will decrease. Through regression analysis using liberal trade policies as a dummy independent variable, this study shows that liberalization does indeed lead to GDP growth but does not lead to an increase in inequality. Furthermore, positive GDP growth is negatively correlated with instance of conflict, which permits us to infer that liberal trade policies do not, in fact, lead to increased domestic unrest and conflict in the form of riots, protests, and strikes. Results vary slightly across region, but in no instance was a significant increase in conflict associated with trade liberalization found.

On Technology and Civil Resistance: An Empirical Analysis
Alba Sorge Berenguer, International Relations
Sponsor: Professor Leonid Peisakhin, Politics

Five years after the cascade of demonstrations and regime change that swept across the Middle East and North Africa, the question persists: To what extent were these movements of civil resistance digitally enabled? This study comprises a large-N econometric analysis to test the effect of information and communication technologies (ICT) on direct civil acts of resistance in the 76 countries with a majority-Muslim population. Specifically, the study focuses on the time period of 1989–2013 and includes three indicators of ICT diffusion as independent variables: landlines, mobile phones, and Internet use. The analysis reveals that 1) cellular phones are a statistically significant predictor of civil resistance but only in authoritarian regimes, 2) Internet use is not statistically significant at all and 3) landlines are statistically significant in all regime types across all countries with a Muslim-majority population. A second analysis reveals extant variance within different types of authoritarian regimes.

Effects of Mindfulness Following Meditation on Construal Level
Andrew Steinhart, Psychology
Sponsor: Professor Yaacov Trope, Psychology

Researchers have previously established that decentering, or viewing emotions objectively as not accurate representations of reality, is an important aspect of mindfulness that leads to improved emotion regulation. However, the exact underlying mechanisms of why decentering leads to improved emotion regulation have yet to be explored. This study proposes that construal level might play a role in the improvement of a meditator’s affect following a meditation. Researchers have previously linked high-level construals with improvements in emotion regulation. This project examines whether mindfulness leads to individuals forming higher level construals of objects and events following a mindful meditation. In this study, the construal level of
Understanding the Rise of the Far Right: A Study of Immigrant Discrimination and Front National Support in France
Adriana Stephan, French, International Relations
Sponsor: Professor Martin Schain, Politics

This research project employs statistical analysis to better understand support for the far right party in France, the Front National, by focusing on immigrant, economic, and socio-demographic variables and support for the party in both the 2007 and 2012 Presidential Elections. Despite extensive analysis on the topic, the effects of these variables is highly ambiguous. To gain a better understanding of what drives far right support in France, new indicators of immigrant presence were introduced in order to uncover a more definitive answer about how immigrant presence affects support for the far right. Furthermore, while it is true that large majorities of the French electorate have misgivings about immigrants (revealed through surveys), it is uniquely Front National supporters who give this factor such priority in determining how they vote. Therefore, measuring support for the Front National underestimates overall discrimination towards immigrant groups in France, particularly discrimination that can result due to political discourse in the media. In addition to a multivariate regression analysis, this project includes an original survey experiment distributed electronically, in which French citizens read excerpts from news articles and responded to questions assessing their political preferences and measuring their level of discrimination towards immigrants. While this study focuses solely on France, far right parties in Western Europe belong to the same party family and can be treated as members of a larger group. Therefore, this analysis has implications beyond France and lends significant insight into how and why far right parties are gaining ground throughout Western Europe.

Selling Music City
Luna Szoke, Journalism, Politics
Sponsor: Professor Jason Samuels, Journalism

Music Row, an area just southwest of downtown Nashville densely populated by recording studios, record companies, record stores and music venues that has long been considered the epicenter of the country music industry, is being threatened by a recent boom in the real estate market. Recording studios like RCA Studio A, famous for being the place where Dolly Parton recorded “Jolene,” have been threatened to be leveled off in the near future to make way for new high-end condos. RCA Studio A was saved by a generous, preservation-minded buyer, but many other studios in the area have not been so lucky. With many record labels and other famous institutions also moving their headquarters out of Music Row, it begs the following questions: How is development affecting these historic recording studios? Is it entirely necessary for studios and engineers to be in Music Row to operate? What will this mean for the future of Nashville’s economy and music industry? It will be the purpose of this documentary to answer these questions. To do so, I travelled to Nashville to spend some time getting to know the businesses of Music Row, the parties involved in trying to save the studios and the ones trying to turn them into condos. Songwriters, recording engineers, agents, venue operators, real estate agents and, of course, musicians were all interviewed. From all of this material, a short documentary film was edited that coherently portrays the varying events and viewpoints that make up the story of Music Row.

Contingent Consent and Conscription
Jonathan Tan, International Relations
Sponsor: Professor Alastair Smith, Politics

Conscription is one of the major policy bargains of the modern state: citizens contribute their time, effort and livelihoods towards national defense in exchange for the right of political participation. In the face of war, however, how do states compel their citizens to comply with a policy as damning as conscription? Strong democratic institutions constrain government behavior in order to produce credible commitments and fair procedures. Citizens thus consent to government demands contingent upon assurances of credibility and fair play. Using cross-sectional time series data (1960–2013) and three OLS linear regression models, this study explores the effect of conflict and regime type on the probability of conscription. The findings are consistent with the theoretical model advanced: democracies are more likely to adopt conscription than autocracies if they are at war. This suggests democracies indeed are better able to extract contributions to public goods from their citizens. This study advances democratic theory and sheds light on institutional
choices governments have in order to elicit greater cooperation from their citizens without the use of coercion. It also contributes to insights on the bases of effective democratic governance.

**Same Shapes, Different Ways: Investigating Individual Differences on the Raven’s Advanced Progressive Matrices**
*Terence Tan, History, Psychology*
*Sponsor: Professor Samuel Juni, Applied Psychology, Steinhardt School of Culture, Education, and Human Development*

Standardized intelligence quotient (IQ) tests reward correct answers not the thought processes behind one’s solution. However, two individuals who arrive at the correct answer might employ very different strategies and problem-solving heuristics. What are these strategies, and what can they tell us about the individuals who choose them? This study explores individual differences in problem-solving strategies on a widely used multiple-choice test of fluid intelligence, the Ravens Advanced Progressive Matrices (RAPM). Participants explained their thoughts and strategies as they solved 18 items on the RAPM. Each subject’s explanation for each item was coded along five dimensions that assessed, for example, how subjects grouped given elements in each item. Finally, correlations amongst these five dimensions were assessed in two ways: between items and between individuals. It was found that individuals who scored highly were different from those who scored poorly in four ways: their solutions were less novel, they construed the matrix in distinct rows and columns, they used all parts of the matrix when solving it and they spent more time forming an idealized response before looking at the response choices. The results suggest there are qualitative differences between high and low scorers on the RAPM that are inadequately captured by the unitary nature of an IQ score. Implications on the makeup of intelligence are discussed.

**The New Narrative: Unraveling Misconceptions about Rape on College Campuses**
*Kristine Thomason, Journalism, Psychology*
*Sponsor: Professor Jason Samuels, Journalism*

This online multimedia project and short documentary film highlights survivors’ stories with the goal of understanding and dispelling misconceptions about sexual assault, specifically in a university setting. One Justice Department survey found that only twelve percent of college sexual assault victims reported the crime. What is keeping them from coming forward? After talking to multiple survivors, it became clear that one reason is they don’t know to label their experience as sexual assault since it doesn’t align with the stereotypical rape narrative present in society. Then, if they do acknowledge and report their assault, their stories are often cast off by administrators, law enforcement, friends and family who hold similar stereotypes. Even more troubling, these accepted ideas create a setting where perpetrators can not only get away with assaults but also believe they haven’t truly committed a crime. In this project, survivors, activists and specialists were interviewed in order to seek to understand where misunderstandings about rape come from and why they’re perpetuated. One major goal of this project is to help reconstruct the common narrative by shining a spotlight on survivor voices that aren’t normally heard and, in doing so, uncover how, as a society, we can begin to reshape the conversation about rape.

**Swaying Science: How Congressional Characteristics Affect Science Roll Call Behavior**
*Kelly Tripathi, Chemistry, Politics*
*Sponsor: Professor Oeindrila Dube, Politics*

The 2000s represented what has come to be called the “War on Science,” characterized by the massive reduction of stem cell research, refusal to ratify the Kyoto Protocol and the rise of global climate change denial. This study considers the impact of legislators’ characteristics, from gender, party, military experience, religion and occupational backgrounds on their science related voting. It explores the difference between voting behavior on “Academic” votes, votes that determine the general process by which science is produced and promoted by subject area, against “Political” votes, votes that determine how scientific discoveries are regulated and implemented by issue. An empirical analysis shows characteristics influence political votes more so than academic. These findings suggest that when scientific issues become most salient to the public, legislators are more affected by their characteristics than by their constituents’ preferences. It was further found that legislators with a medical background vote more frequently against science policy compared to their counterparts. This finding suggests a science background does not lead to more pro-science voting behavior. In addition, this study seeks to show the quantitative effect of President Bush’s term and a Republican majority in Congress on the increasing polarization of science across party lines.

**Asymmetric Dominance in Gastronomy: An Experimental Study**
*Ahileas Tsahiridis-Krausser, Economics, Philosophy*
*Sponsor: Professor Andrew Paizis, Economics*

This paper investigates how the choices of agents in a food and beverage environment change under the influence of adding asymmetrically dominated alternatives. An asymmetrically dominated alternative is dominated by one item in a choice set but not by another. As various behavioral economists have shown, adding such an alternative to a
choice set can increase the probability of choosing the item that dominates it, a revolutionary violation of the Irrelevance of Independent Alternatives Axiom. While plenty of examples can be found in the literature from the 1970s and onward pertaining to the introduction of brands, only hypothetical examples in the realm of gastronomy are mentioned. After collecting data in the form of manipulated menus from over 552 diners at New York establishments and having econometrically determined the statistical significance of its implications, this study will argue for verifying the findings of Huber et al. and Ariely and Robertson and will thus supplement the prevailing theory of choice in behavioral economics from a unique angle.

More than Just a Subway Dance: Litefeet as a Multifaceted Means of Upward Mobility
Madeleine Vidger, Sociology
Sponsor: Professor Ruth Horowitz, Sociology

This study follows a group of young African American males who comprise Litefeet, a dance movement that emerged in the mid-2000s on the subway system of New York City. Litefeet is an improvised, energetic, acrobatic dance form that appropriates the subway car as its stage. In addition to gaining popularity among train riders, the advent of social media has accrued online fame for these public performers, leading to high-profile projects with international brands, figures in the music industry, commercials and magazine spreads. Their success has transformed Litefeet into a means of upward mobility for the individuals involved, who, as African American males born out of the inner city, have largely been excluded from conventional opportunities for economic prosperity. However, Litefeet is about more than doing flips across train cars: members participate in other art forms that supplement the performance, such as music making and clothing design. Making use of ethnographies collected from traveling around with NYC’s most renowned subway dance crew, the dynamic structure of creative young entrepreneurs that holds Litefeet together as a modern artistic movement and clothing design. Making use of ethnographies collected from traveling around with NYC’s most renowned subway dance crew, the dynamic structure of creative young entrepreneurs that holds Litefeet together as a modern artistic movement and clothing design.

The Urban Death Dilemma: Making Room for Memorialization in Twenty-First-Century New York City and Beyond
Claire Voon, Art History, Journalism
Sponsor: Professor Brooke Kroeger, Journalism

Approximately 51,000 people die annually in New York City, and two-thirds of the deceased are prepared for earthen burials. But many cemeteries within the five boroughs increasingly struggle to find space as their land supplies deplete each year. Urbanization, beginning in the nineteenth century, has left graveyards landlocked and unable to expand their boundaries, and no plans exist to establish a completely new cemetery. Drawing on original interviews with industry professionals and extensive historical research, this project explores how New York City’s cemetery business plans to respond to land pressures and continue operating to serve those who purchased burial rights for perpetuity. As space becomes increasingly scarce and sales decline, many cemetery directors are devising solutions that not only maximize the potential of any remaining land but also establish sufficient funds to continue maintaining the grounds indefinitely if they do reach capacity. Cemeteries also have to consider current consumer trends when innovating; the rise of cremation and increased environmental concerns, which weren’t relevant until recent decades, reveal some desire to shift from resource-consuming burials, and research in new models of memorialization is emerging. The urban death industry is gradually evolving, reflecting changing attitudes in how we decide to memorialize loved ones.

Know Thy Outgroup: Promoting Accurate Judgments of Political Attitude Differences through a Conflict Mindset
Kate Voorheis, Psychology
Sponsor: Professor Yaakov Trope, Psychology

People tend to assume political outgroup members hold different beliefs than they do. At first glance, this is not surprising. However, research has consistently demonstrated people inaccurately view Americans with opposing ideologies as being more polarized than they actually are. This project tested a novel way by which accuracy in perceiving outgroup members’ attitudes can be increased. It was proposed that individuals might exaggerate self-outgroup attitude differences because they construe outgroup members as being highly distant from the self. Thus, bridging the perceived distance between oneself and outgroup members could facilitate more accurate perceptions. It was proposed that tacitly activating a mindset (i.e., a general mode of processing information) characterized by the consideration of conflicting perspectives may serve this purpose. Indeed, it was found that participants who were instructed to write about their own conflicting goals construed outgroup members as being closer to the self and, in turn, were more accurate in perceiving their attitudes. Erroneously perceiving how others experience social reality holds pernicious consequences for achieving social progress. The present research raises a key implication for generating greater accuracy in social judgments.
**Motivation and Perception: Do Rewards and Costs Direct Attention to Visual Stimuli?**

Carrie Webb, Psychology  
**Sponsor:** Professor Emily Balcetis, Psychology

What individuals wish to see can influence what they really see. This study examines whether people’s motivations affect the ways they perceive a basic feature of a visual target, its color. This study investigated whether people direct visual attention towards elements of a visual stimulus associated with financial gain more readily than elements associated with loss. It tested the psychological process by which motivations affect color perception and whether this happens because of a “perceptual readiness” to orient visual attention towards a reward-associated color. Using a within-subjects experimental design, this study examined whether participants’ desires to see certain colors increased their perceptual readiness to detect that color in stimuli that are ambiguous. Results show that participants perceive more dots of a particular color associated with reward and fewer dots of another color associated with loss. The implications of such motivated attentional biases for legal decision-making, medicine and other disciplines are also discussed.

**The Effect of Social Information on Reactions to Facebook News Posts: A Survey Experiment**

Leah Wiedenmann, Politics  
**Sponsor:** Professor Anna Harvey, Politics

Americans increasingly get their news about political events from social media. One consequence of this trend is that individuals are increasingly exposed to the reactions of others to news about political events. But do the opinions of others about a political event affect individuals’ own reaction to that event? Previous research suggests individuals’ social context can in fact influence their beliefs and preferences. But when individuals’ preferences appear to be correlated with those of their peers, it is also possible either that peers directly affect the individual or that individuals self-selected into a peer group sharing their preferences. This project uses a survey experiment to test whether respondents’ reactions to Facebook posts are affected by the support each post has received from others in the form of likes and shares. Results show that respondents tend to not change their preferences and that previous levels of information generally have insignificant effects on opinion formation. That social media users are not significantly responding to the amount of likes and shares shows that people are influenced by more complex structures that exist both in and outside of social media.

**Learning to See**

Carina Mia Wong, French, Journalism  
**Sponsor:** Professor Jason Samuels, Journalism

*Learning to See* tells the story of the blind Brazilian drummer Vanderlei Pereira who lost his sight at the late age of 31. The documentary follows Vanderlei’s journey of slowly losing his vision from the age of six and how he learned to live with his blindness. *Learning to See* explores how Vanderlei’s loss of vision has impacted his life and informed his humanity. This film is told through the eyes of Vanderlei, both literally and figuratively, as it plays with visually representing what it looked like to go blind. This creative representation will lead to the humanity of Vanderlei’s story and, therefore, help humanize those who live with disabilities for a greater audience.

**Construal Level Theory in Teaching versus Learning**

Vanessa Wu, Psychology  
**Sponsor:** Professor Yaacov Trope, Psychology

There is a fundamental asymmetry between teachers and learners in terms of where information ends up. Teaching focuses on explaining knowledge the teacher already has to other individuals (away from themselves), whereas learners focus their attention on understanding the information presented to them (for themselves). To understand this asymmetry, this study explored Construal Level Theory (CLT) under two conditions, teaching and learning. It looked at how individuals perceive information on a global-level (more abstract) or local-level (more concrete details) based on their roles in an information-exchange relationship with between subjects experiments. CLT postulates global-level thinking with perceived distance; in the explored exchange relationship situations, the distance evoked is social distance to the information. There has been research on CLT within material-exchange relationships such as gift giving and consumerism, but understanding information processing in teaching and learning has long term implications on areas such as education, life skills like job training and clinical treatment. The probability of participants classifying critical information trials on a global-level was not different between teachers and learners. However, a manipulation check showed that the more individuals thought of themselves as teachers, the more likely they were to classify objects through global-level features. The more people perceive themselves as teachers, rather than learners, the more they process information globally.

**Specialization or Displacement? Re-Examining the Impact of Less Educated Immigration on U.S. Labor Market**

Nan Zhao, Economics  
**Sponsor:** Professor Kevin Thom, Economics

A large number of less educated workers have immigrated to the United States in the past two decades. Previous literature exploiting comparative advantage models demonstrates imperfect substitutability between immigrant
and native workers. They also suggest that less educated immigrants tend to specialize in occupations intensive in manual and physical skills while comparably educated native workers pursue jobs that are more intensive in communication skills. In this case, immigration causes native workers to reallocate, inducing specialization and mitigating possible losses. However, a potential alternative exists where immigration simply displaces native workers in manually intensive jobs, leaving only those in communication intensive positions. Such displacement effect is unclear. This study aims to re-examine the hypothesis of specialization at a micro-level. Merging occupational skill-intensity data from O*NET and individual-level CPS across the U.S. post-1990, this research assesses whether an increase in less educated foreign-born workers induces native workers to shift to new occupations with different skill contents or whether this specialization is in fact a disguise of a negative employment effect. At a critical time for immigration reform, this research will help to better understand the effect of immigration on labor market outcomes.

**The Influence of Group Membership on Parent-Child Conversations about Helpful and Harmful Behaviors**  
*Anna Zhen, Psychology*  
*Sponsor: Professor Marjorie Rhodes, Psychology*

Children use social groups to navigate the social world. Previous research has shown children believe individuals hold special moral obligations towards in-group members, which do not extend to out-group members. This study investigated one possible factor that influences the development of this belief: parent-child conversation. In this 2 (Group membership: within-group vs. between-group) x 2 (Behavior: helping vs. harming) x 2 (Speaker: parent vs. child) within-subjects design, the study’s authors examined whether parents subtly communicate to their children that different moral standards govern within-group versus between-group social interactions. Parents and their four-year-old children (N = 17) participated in a storybook reading task. In this storybook, a character contemplated helping or harming someone with either the same skin color (within-group) or a different skin color (between-group), and speakers discussed whether these behaviors should or should not occur. It was found that, over all, parents gave broad, non-specific explanations as to why people should perform helpful behaviors and avoid harmful behaviors. Yet, for within-group helpful behaviors only, parents gave fewer non-specific responses, suggesting there are more specific reasons why helpful behaviors are obligated among fellow group members. This finding has implications for how parental input influences children’s developing theories on norms of social category based interactions.

**Effects of Chinese Censorship Policy on Chinese Citizens’ Social Media Activity**  
*Kevin Zhen, Politics*  
*Sponsor: Professor Anna Harvey, Politics*

This thesis asks whether the censorship policies of the Chinese government affect the social media activities of Chinese citizens. Existing studies have suggested the Chinese government does not censor posts on social media that are critical of the government more often than posts that are not critical of the government. However, these studies do not address the problem of self-censorship. This is problematic because the Chinese government may be inducing self-censorship of public criticism of the government. This self-censorship may reduce the frequency of posts critical of the government to levels tolerable to the government. Governmental leaders may then choose to allocate their censorship resources to focus on deterring coordinated collective action. The government would then appear to be much more tolerant of public criticism than it actually is. This research project asks whether Chinese citizens self-censor criticism of the government from their posts on social media sites relative to their propensity to criticize the government in private. If the findings show self-censorship plays a significant role in the social media activities of Chinese citizens, this will have a profound effect on how political scientists think about and approach Chinese censorship in future studies and experiments.

**Money Doesn’t Buy Friendship: Trade Effects on Political Cooperation**  
*Cathy Zhu, International Relations*  
*Sponsor: Professor Alastair Smith, Politics*

As international trade continues to grow and contribute to global development, countries depend more frequently and more deeply on one another. This study asks whether strong economic interaction is indicative of positive political relationships. Using a statistical analysis of country pairs over time, the study examines the effects of bilateral trade relationships on indicators of political cooperation including voting patterns in the UN and country alliances. However, results show that while there is some evidence UN voting patterns are slightly influenced by trade, trade does not significantly account for how countries choose their allies; trade relationships are thus not a particularly important motivator for important foreign policy decisions.
The role of a liberal arts education is to give broad knowledge to students to prepare them to face the world. Students can often graduate from college without gaining the most basic understanding of the sciences. Some may even prefer this, believing that science is reserved for a specific segment of our society. In fact, since Leonardo da Vinci, science has been infiltrating all aspects of society, from communication to energy to medicine, from the vineyards of Bordeaux to the classrooms where philosophical debates take place. Thus, scientific knowledge and an understanding of the basic principles of how it is obtained is absolutely essential for anyone hoping to understand and contribute to the world. As the ultimate goal of a university is to spread and foster knowledge and truth, it must provide a strong scientific education to all students.

—Claude Desplan, Professor of Biology

G-Tetrads within the Context of a Self-Assembled 3D DNA Structure
Hatim Abdallah, Chemistry, Nutrition and Dietetics
Sponsor: Professor Nadrian Seeman, Chemistry

One of the main issues faced by many crystallographers is the inability to crystallize complex biomolecules. The ability to crystallize molecules is a route for structural determination of virtually any biological structure. For this reason a method of indirect crystallization was proposed (Seeman, 1989). If one can create a DNA motif that can self-assemble into crystals that diffract to good resolution, this motif can then be used to host molecules within its structure. One such DNA motif is the DNA tensegrity triangle, which is a rigid DNA motif with three double helices connected pair-wise by three four-arm junctions (Liu, Wang et al., 2004). The triangles connect via sticky ends to form a 3D crystalline lattice (Zheng, Birktoft et al., 2009). This project is geared towards hosting a G-quadruplex within the DNA scaffold in the hope of developing a route for the insertion of guest molecules via this structure. A G-quadruplex is a biological structure that forms in various genetic sequences, including those that make up the telomeric region of chromosomes. The formation of these structures has been linked to telomere shortening and the proliferation of cancer cells (Simonsson, 2001). The structure forms via guanine base interactions and is a perfect test system for the DNA tensegrity triangle system as it adds no heteroatoms to the structure. Both a symmetric and asymmetric system were used in this project. The symmetric space group is R3 and the asymmetric is P1, due to the lack 3-fold rotational symmetry. The symmetric crystals yielded a resolution of 6.7Å with a = 102.93Å, α = 112.41°, and cell volume of 733969Å. The asymmetric crystals yielded a resolution of 6.3 Å with a = 86.41Å, b = 104.25Å, c = 101.18Å, α = 110.72°, β = 109.05°, γ = 106.80° and cell volume of 671667Å.

Crystal Resolution Dependence of Self-Assembled 3D DNA Crystals on Sticky End Length and Sequence
Hatim Abdallah, Chemistry, Nutrition and Dietetics
Chirag Shah, Economics
Andre Tan, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

This laboratory has reported a self-assembled 3-D crystal via 2-nt sticky ends based on a tensegrity triangle (Zheng, Birktoft et al., 2009; Liu, Wang et al., 2004). The current study analyzed the effect of sticky end length and
sequence on crystal formation and resolution. X-ray diffraction data from beam line NSLS-X25 revealed that the crystal resolution was somewhat better for the 2-nt sticky end having an TG:CA (4.2 Å) base pair than AA:TT (4.75 Å), GA:CT (4.9 Å) and CC:GG (6.0 Å). Moreover, the 1-nt sticky end (C:G) yielded a diffraction pattern whose resolution (3.5 Å) compared favorably with all the three 2-nt sticky end systems (Ohayon, Chandrasekaran et al., 2013). For motifs with 3-nt sticky ends, the sequence GAG:CTC produced small crystals while larger crystals were obtained with the sequences TAG:ATC (4.20 Å) and TAT:ATA (6.0 Å). Triangles having a 2-nt CC:II sticky-end diffracted to 4.7 Å while triangles having 4-nt sticky with sequence GCTC:CGAG diffracted to 5.2 Å at APS-ID19. The results indicate that the lengths and sequences of the sticky ends define the interactions between motifs and also have an impact on the resulting resolution. Redesigned assemblies are expected to form 3-D crystals with better resolution that can aid in the scaffolding of biological macromolecules for crystallographic structure determination.

The Effect of Chronic Unpredictable Stress on eIF4E Transgenic Mice, a Mouse Model of Autism Spectrum Disorder
Zonia Ali, Neural Science
Sponsor: Professor Eric Klann, Neural Science

Autism spectrum disorders (ASDs) are a highly prevalent group of neurodevelopment disorders with a complex and unclear etiology. Interestingly, individuals with ASD are more susceptible to stress, although the reasons are unclear. Stress is a natural biological response to perceived threats; chronic stress, however, upsets this response by unbalancing the hypothalamic-pituitary-adrenal (HPA) axis. Chronic stress can result in learning and memory deficits and reduced activity of the mammalian target of rapamycin complex 1 (mTORC1) signaling pathway, which regulates cap-dependent translation. Crucially, long-term memory requires protein synthesis. This study explored the effect of chronic stress on mTORC1 signaling, learning and memory and autistic-like behaviors in 4E transgenic (4E Tg) mice, a rodent model of ASD. A chronic unpredictable stress (CUS) protocol was used to demonstrate that chronic stress decreases the phosphorylation of mTORC1 proteins in the hippocampus and prefrontal cortex of wildtype mice. This study then investigated whether CUS affects ASD-like behaviors and/or learning and memory in 4E Tg mice. In stressed 4E Tg mice, the results showed a significant increase in freezing during cued fear conditioning but no change in ASD-like behaviors. This may indicate a relationship between chronic stress and fear memory in 4E Tg mice. This research may ultimately lead to a better understanding of the biological and behavioral effects of chronic stress in ASD and potential targets for stress alleviation.

Combination of Interleukin-15 and Fractionated Radiotherapy for Cancer Treatment
Joseph Aryankalayil, Psychology
Sponsor: Professor Sandra Demaria, Pathology, NYU School of Medicine

The common gamma-chain cytokine interleukin-15 (IL-15) promotes the proliferation of activated T cells, has low toxicity and lacks regulatory T cell stimulation, all of which makes it an attractive candidate for immunotherapy. This study tested the hypothesis that IL-15 administration strengthens the pro-immunogenic effect of hypofractionated RT and contributes to inducing anti-tumor responses in the TSA breast cancer model. Tumor inoculated mice were randomly assigned to one of 4 treatment groups (N=4-5/group): control, RT, IL-15 or RT+IL-15. RT was delivered in 8 Gy fractions over 3 consecutive days, starting on day 13 post-tumor inoculation. IL-15 (2 μg/mouse) was administered daily for 10 days starting on day 12. Tumor regression was seen when RT was combined with IL-15. This suggests that IL-15 can potentiate T cell responses elicited by RT. Combination therapy consistently showed a marked increase in CD8+ T cells expressing the activation marker CD137 while the increase was modest with each monotherapy. In addition, this study showed a significant increase in the ratio of effector CD4+ T-cells from combination therapy. Overall, these results support the hypothesis that IL-15 is a valuable partner for combination treatments with local RT.

Cryptic Genetic Variation Revealed via Perturbation of Intersex in 16 DGRP Lines
Christopher Aseervatham, Biology
Sponsor: Professor Mark Siegal, Biology

Cryptic genetic variation (CGV) characterizes genetic variation among individuals of a natural population that has no evident phenotypic effect until the individuals are perturbed environmentally or genetically. This study explores this concept with a genetic perturbation involving the knockout of the intersex (ix) gene in 16 randomly chosen Drosophila Genetic Reference Panel lines. ix is expressed in both sexes and is involved in the development of female specific characteristics in Drosophila melanogaster. Initially the ix knockout was tagged with GFP for ease of identification in future crosses. Knockout males were selected and crossed with the 16 DGRP lines that were randomly picked to introduce the mutation into the DGRP background. The next cross was a sibling cross between the male and female progeny, who are heterozygous for GFP-tagged ix knockout and the corresponding
DGRP chromosome. The resulting heterozygous DGRP progeny were selected as the control for phenotypic variation between the 16 lines while the homozygous GFP tagged ix knockout progeny were used to observe the variation in phenotypic changes within the lines. The phenotypes were analyzed using cuticle preps for female specific characteristics including vaginal teeth count, presence of fused dorsolateral anal plates, spermatheca number and sixth tergite pigmentation. The resulting data will provide geneticists with a first look at a systematic approach to studying the frequency and effects of CGV in a natural population.

Investigating the Medicinal Effects of Plant Extracts on the Heart Rate and Width of Daphnia Magna and the Pulsation Rate of the Dorsal Blood Vessels in Lumbriculus Variegatus
Felix Asiamah Appiah, Liberal Arts and Sciences, Borough of Manhattan Community College, CUNY
Sponsors: Professor Brahmadeo Dewprashad, Science, Borough of Manhattan Community College, CUNY; Professor Maria Greene, Science, Borough of Manhattan Community College, CUNY

Capula (Doliocarpus major) and Mauby (Colubrina arborescens) are plants that grow mainly in parts of South America and the Caribbean and are used for their reputed stimulant and antihypertensive properties respectively. Previous work indicated that extracts from these plants respectively increased and decreased the heart rates of Daphnia magna and the blood vessel pulsation rates of Lumbriculus variegatus. This research project seeks to develop additional dose-response data for extracts from these plants and to also investigate the effect of these plant extracts on the size of the heart of the Daphnia and the dorsal blood vessels of black worm.

Self-Assembly of Three-Dimensional Lattices Using Triangular 3D Double-Crossover DNA Motifs
Steven Azzam, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

The growth of crystals designed and constructed from self-assembled DNA motifs is one of the long-stated goals of the growing field of structural DNA nanotechnology. The purpose of developing such systems is to provide a macromolecular scaffold, capable of binding, orienting and juxtaposing a variety of molecules from cellular macromolecules to organic conductors and optical memory components. In order to create this macromolecular scaffold, a tensegrity triangle was designed with edges consisting of double-crossover (DX) DNA (Liu, Wang et al., 2004; Fu and Seeman, 1993). The DX motif is composed of two parallel, interlinked double helices in order to strengthen and stiffen DNA-based structures. Three of these DX formations are arranged in a triangular shape (containing 8 helical turns per edge) to form a motif which extends in three dimensions via sticky-end cohesion and thus creates a crystalline lattice. The crystals grown using this motif reach sizes of up to 300 microns, large enough to be seen clearly under a dissecting microscope diffracted only to ~22 Å. Optimization of crystal growth conditions are underway to improve the resolution of the crystals. Once X-ray diffraction data is obtained for these crystals, the exact coordinates of each atom in the motif will be known explicitly, and it will be used to organize guest species such as gold nanoparticles in 3D (Kuzyk, Schreiber et al., 2012).

Evolution of Bicoid-Dependent Enhancers across Twelve Drosophila Species
Isabel Baker, Biology
Sponsor: Professor Stephen Small, Biology

Enhancers are cis-regulatory sequences in the genome that are bound by transcription factors to activate gene expression. The spatio-temporal mechanism of enhancer-transcription factor binding is critical in regulating gene expression. In embryonic development of Drosophila melanogaster, the maternal transcription factor Bicoid (Bcd) is expressed in an antero-posterior gradient and binds various enhancers involved in body plan establishment. Bcd is missing from evolutionarily older insects, where its function seems to be fulfilled by another transcription factor called Orthodenticle (Otd), which is also a direct target of Bcd in D. melanogaster. It is predicted that there is an evolutionary pattern in enhancer sequence turnover that corresponds with the Bcd and Otd binding. Quantitative analysis was used to elucidate the conservation of Bcd dependent enhancers across 12 Drosophila species. Preliminary analyses compared the rate of evolution with expression patterns, enriched motifs and number of Otd and Bcd binding sites in these enhancers. The authors are currently in the process of analyzing the correlations of enhancer evolution and various developmental factors to demonstrate how the specific mechanistic details encoded in cis-acting factors are valued during molecular natural selection.

The Birds of Urban Green Spaces: The Effects of Tree Species Richness on Avian Biodiversity
Elle Barnes, Environmental Studies
Sponsor: Professor Jennifer Jacquet, Environmental Studies

Urban agglomerations, defined as areas with populations in excess of one million people, have large impacts on local ecology: they fragment habitat and alter biodiversity patterns. Studies show that tree diversity is
higher in urban ecosystems than rural ones. However, the relationship between tree diversity and avian diversity is not well studied. This project examined the richness and composition of tree and avian communities in 18 green spaces covering 8000 acres in New York City to determine if a relationship between tree and avian diversity exists. Estimated tree species richness across all green spaces was 52 species: 33 native and 19 non-native. Tree richness is not evenly distributed among the spaces, with some spaces having as few as one tree species. Avian richness values were gathered from the citizen-science database eBird, which describes real-time data on bird distribution. Bird richness was compared between green spaces with varying size and tree richness. Preliminary results have shown that large green spaces with more diverse tree species support a more diverse community of birds and have identified three invasive bird species that occur in nearly every space.

Structure-Function Relationships in a Novel Class of Small-Molecule Cancer Chemotherapeutics

Kaustabh Basu, Chemistry
Sponsor: Professor James Canary, Chemistry

Small-molecule drugs offer an interesting way to deliver targeted therapy to cancer tumors while minimizing side effects and damage to healthy tissues. This project reports on a novel compound known as C45Na, which displayed more than 90% inhibition of melanoma and breast cancer growth in vivo. However, the drug was found to vary in activity at pharmaceutical concentrations, and its effectiveness in mouse models appeared to depend on the method of preparation. This project first details the methods by which it was discovered that C45Na forms large-scale aggregates in solution and that these aggregates are influenced by the method of sample preparation. The second phase of the research utilized synthetic chemical to design a range of new drug molecules structurally similar to C45Na, which would be more soluble and whose effects would help point to the intracellular mechanism by which C45Na and similar compounds act to inhibit tumor growth. Through a combination of synthetic and analytical chemistry and biological assays upon newly synthesized molecules, significant progress has been made towards developing this new class of potential chemotherapeutics and, more importantly, towards a fuller understanding of its mechanism of action within the cell.

The Role of the Repressor Tramtrack (Ttk) in Timing the Developmental Program of Drosophila

Tim Bishop, Biology
Sponsor: Professor Stephen Small, Biology

The development from an embryo into a multicellular adult with many cell types and complex organs requires a tremendous amount of molecular control. Most of this development is regulated by proteins called transcription factors (TFs) that directly bind to DNA in regions called cis-regulatory elements (CREs) and regulate gene expression. In the fruit fly Drosophila melanogaster, a TF called Bicoid is responsible for head development and patterning of the embryo along the anterior-posterior axis. Bicoid activates expression of a hierarchical system of segmentation genes that are expressed into finer and finer stripes, which ultimately control the placement of body structures in the adult fly. Organization of these genes is controlled by combinatorial input of Bicoid activation and a system of repressors. Among these repressors is Tramtrack (Ttk), a TF with multiple effects on early embryo segmentation and decisions on cell fate and organogenesis. Ttk binding sites have been found in the regulatory regions of a number of known Bicoid target CREs. In initial experiments, removal of Ttk binding sites from these CREs led to expression of the target genes that were normally inactive in the embryo. The effects of these Ttk binding sites on the transcription of these genes will be further assayed by performing similar experiments in which Ttk binding sites are removed and added from Bicoid target CREs. Also, the expression of segmentation genes will be measured in flies lacking Ttk. The preliminary work suggests that Ttk’s activity as a repressor is necessary to ensure proper temporal expression of Bicoid targets, with CREs containing strong Ttk binding sites being repressed longer than those with weaker Ttk binding sites.

Investigating the Mechanism of Singlet Fission using Coherent 2D Electronic Spectroscopy

Ilana Breen, Chemistry
Sponsor: Professor Daniel Turner, Chemistry

Singlet fission, a process discovered at NYU in the 1960s, has aroused renewed recent interest because of its potentially robust applications, including solar cells. Singlet fission is a photochemical, spin-allowed process in which a singlet electronic state converts to two triplet states. The phenomenon is rare but can be observed in special molecular crystals, where a chromophore in an excited state shares its energy with a neighboring chromophore and thereby yields two triplet excited states. This research aims to show that coherent 2D electronic spectroscopy can provide insight about the mechanism of singlet fission. Specifically, it aims to study how vibrational modes affect the decay process. Since polyacenes and other conjugated molecules are known to undergo singlet fission, anthracene, tetracene and rubrene have been crystallized. The crystals were grown through vapor deposition in a homemade sublimation apparatus and characterized through microscopy, X-ray crystallography, fluorescence
spectroscopy and UV-Visible absorption spectroscopy. The crystals will be studied in the lab’s spectroscopic system to elucidate the femtosecond electronic dynamics of singlet fission.

**Small Amplitude Excitations in the Gauge-Higgs Interaction Model**

*Gordon Chavez, Mathematics*  
*Sponsor: Professor Daniel Zwanziger, Physics*

This project is a gauge theoretical study of the Higgs mechanism and resulting physics. Essentially, this study examines the interaction between light and the Higgs field and shows how electromagnetic waves acquire mass-energy from their interaction with the Higgs field. A Lagrangian was used that was originally formulated as a phenomenological model of superconductivity, where the gauge field was the electromagnetic field and the scalar field was the superconducting electron-pair condensate. However, the model can be applied to the study of many physical systems. The study found propagating wave solutions and instabilities with an Einstein-form \( E=mc^2 \) dispersion relation. This study is made more interesting and relevant given the 2012 discovery of the Higgs particle at CERN. The model used is indeed the model for Abelian gauge-Higgs interaction, where the gauge field is electromagnetism and the scalar field represents the Higgs field. This model’s solutions can impart an understanding of the physics generated by the Higgs.

**The Molecular Role of E-cadherin in Contact-Mediated Cell Polarization**

*Kimberly Chen, Biology*  
*Sponsor: Professor Jeremy Nance, Cell Biology, NYU School of Medicine*

Polarization is an essential process for key developmental events. *Caenorhabditis elegans* embryos polarize radially by excluding the polarity protein PAR-6 specifically from contact sites. This restriction is possible due to the transmembrane protein HMR-1/E-cadherin. HMR-1 polarizes cells by recruiting the RhoGAP PAC-1 to cell-contacts. This results in the inactivation of Rho GTPase CDC-42, the protein responsible for localizing PAR-6, at cell-contacts. In *hmr-1* mutant embryos, PAC-1 is recruited to cell-contacts by other factors but fails to function, and thus cells remain unpolarized. It is unknown how HMR-1 regulates PAC-1 function. By ectopically expressing PAC-1 to contact-free surfaces and producing cells that fail to polarize, it was shown that PAC-1 cannot function without HMR-1. The results, obtained through immunostaining and structure-function analysis, suggest that HMR-1 and/or a component of the cadherin-catenin complex are required to activate PAC-1. Determining the role HMR-1 plays in *C. elegans* cell polarization provides insight into E-cadherin homologs of other biological systems. Furthermore, studying polarity defects in relation to cell-cell adhesion may lead to better understanding of cancer metastasis, which requires a loss of polarity.

**Learning Distributed Representations from Temporal Relational Graphs**

*Youngduck Choi, Computer Science, Mathematics*  
*Sponsor: Professor David Sontag, Computer Science*

Distributed representations (embeddings) of concepts are a powerful tool for machine learning, summarization and information retrieval. For example, in natural language processing, using word embeddings as the input for deep learning of convolutional neural networks results in state-of-the-art accuracy on tasks ranging from sentiment analysis to part-of-speech tagging. However, it is less clear how to learn embeddings from non-textual data such as medical records of diagnoses and medications across time or the products viewed and purchased by customers of an e-commerce website. Two strategies for learning distributed representations are presented: one takes as input a weighted graph derived from co-occurrence counts across time, while the other directly uses the temporal data. Using these, this study shows how to learn distributed representations for all of medicine including diseases, medications, procedures and lab test results. It is believed these embeddings will be broadly useful across medical informatics. This study introduces several new benchmarks and uses them to perform a comprehensive evaluation of the learned semantics of these embeddings, comparing them to embeddings learned from medical text. Finally, this study demonstrates how to use the embeddings within a supervised prediction task of early detection of Type 2 diabetes.

**Analysis of the “Euglenoid” Motion: Locomotion by Shape Deformations**

*Olivia J. Chu, Mathematics*  
*Sponsor: Professor Trushant Majmudar, Mathematics*

Unicellular microorganisms typically swim using their flagella, constantly needing to push or pull to move forward. Some microorganisms, such as the unicellular protist *Euglena*, have developed an alternate strategy for locomotion known as “euglenoid movement,” or “metaboly,” in which the contour of the organism’s surface changes in a wave-like pattern. Currently, euglenoid movement is widely recognized but not well understood. Fundamental questions such as why or when this strategy of motion is activated and the hydrodynamic efficiency of the strokes remain unanswered. When in water, *Euglena* exhibits conventional flagellum-driven motion. However, when the
organism is placed in a medium slightly more viscous than water, it begins to exhibit this somewhat bizarre euglenoid movement. This fascinating phenomenon is a current topic of research in mathematical biology. This research created an automatic system of analysis for metaboly, along the way doing work in mathematical modeling and image processing. This work is a step towards better understanding Euglena’s motion.

**Measuring Gamma Oscillations in the Visual Cortex with MEG**

*Nicholas Chua, Neural Science*

*Sponsor: Professor Jonathan Winawer, Psychology*

Previous electrophysiological studies have identified oscillations in the electromagnetic field produced by the brain when viewing certain slow moving or static images. These oscillations arise from neural activity in the visual cortex and have been hypothesized to play an important role in cognitive and perceptual tasks. The oscillations lie within the gamma frequency range (30-80Hz) and have peak amplitudes of ~50Hz. Gamma oscillations are measured by transforming electrophysiological readings into frequency constituents using the Fourier decomposition. Like the equalizer of a stereo, this allows the power of the signal with respect to frequency bands to be visualized. Hermes et al. (2014) measured electrical signals in the human brain using electrocorticography (ECoG) and demonstrated the selective presence of gamma oscillations for specific visual images. ECoG is an invasive method performed on volunteers who have pre-existing electrodes implanted on their cortex to monitor epileptic seizures. Magnetoencephalography (MEG), on the other hand, is non-invasive and allows us to collect more data and present more diverse and intermediary visual stimuli. This allows an increased understanding of gamma oscillations which have been hypothesized to be related to attention or the transfer of information between distant parts of the cortex (Fries, 2005). The results confirm that gamma oscillations can be reliably measured in healthy human subjects using MEG and that the presence of this signal is dependent on specific spatial aspects of visual stimuli.

**Through the Looking Glass: Synesthesia and Modern Wearable Technology**

*Zach Cimafonte, Computer Science*

*Sponsor: Professor Ken Perlin, Computer Science*

Synesthesia is a neurological condition in which one sensory pathway can cross with another or replace the other entirely. For example, synesthetes might “taste” colors or “hear” flavors. In prior research projects, this experience has been manually induced by strengthening connections between these senses through repeated exposure and learning. This project focused on the construction of a downloadable software application for Google Glass to create those “strong” connections in the wearer, or at least to mimic the synesthetic experience. Using Google’s Glass Development Kit and custom image/signal processing algorithms, video input is continuously captured from Glass’ head mounted camera and certain pixel values from the RGB matrix are averaged into a profile. The video feed’s color profile is converted into synthesized audible musical frequencies spanning the entire circle of fifths which are emitted via Glass’ bone conduction speaker. By leveraging the power of wearable technology this software provides anyone with the opportunity for unprecedented synesthetic experiences and a means for persistent neurologic and psychological research.

**Automatic Advice Generation for GPU Kernels**

*Daniel Cohen, Computer Science*

*Sponsor: Professor Mohamed Zahran, Computer Science*

Writing a working program for a Graphics Processing Unit (GPU) comes with relative ease; however, writing efficient (i.e., fast and makes the best use of the underlying hardware) code is far from trivial, given the fact that many GPU hardware parts are still exposed to the programmer such as the different memory types. In addition, the methods of increasing execution speed for certain programs can vary from GPU models. This study introduces an advice generator that helps GPU programmers write more efficient code by giving them advice in response to specific bottlenecks detected in their code when running on a simulated GPU, with the main goal of enhancing performance. Programs with various bottlenecks were submitted to the generator and all were able to be iteratively improved to a more efficient implementation. As GPUs are beginning to be used in many different applications both commercial and academic, this tool allows a programmer to write a naive algorithm and iteratively improve their code without investing the full time to learn the intricacies of the hardware.

**Examining the Effects of Continuous versus High-Intensity Interval Training on Learning, Memory, Cognition and Mood at a Behavioral and Electrophysiological Level**

*Christen Crosta, Neural Science*

*Sponsor: Professor Wendy Suzuki, Neural Science*

Acute aerobic exercise causes improvements in mood, prefrontal cortex-dependent cognitive functions and electrophysiological markers of these behaviors (Hillman et al., 2012). High intensity interval training (HIIT), an exercise regimen comprised of brief bursts of vigorous aerobic exercise interspersed with low intensity recovery periods, has
significant physiological advantages over continuous aerobic exercise (CAE). These advantages include significantly higher average heart rates; increased levels of circulating catecholamines, cortisol and growth hormones; increased lactate levels; and enhanced blood glucose utilization (Boutcher, 2011). While the enhanced cardiopulmonary benefits of HIIT are well known, it is unknown if HIIT has superior cognitive, mood and brain-related benefits relative to CAE. Through a randomized controlled trial, this study examines whether the enhanced physical benefits of HIIT are accompanied by enhanced cognitive and mood benefits at the behavioral and electrophysiological level. 48 subjects will conduct a variety of mood questionnaires and neuropsychological tasks while having their brain signals recorded through electroencephalography (EEG) both before and after either a 44-minute session of HIIT, CAE or walking (control). As HIIT produces heightened physiological responses over CAE, it is hypothesized that an acute bout of HIIT will also produce greater mood, cognitive and electrophysiological enhancements over an acute bout of CAE.

A large variety of heterologous transgenic systems are used in research on model organisms. Established systems include two-component binary systems (e.g., split-Gal4, LexA, TrpR and QF) and hormone-inducible systems (e.g., LexPR and XVE). Some of these transgenic systems can be turned into repressible systems by adding a repressor, such as Gal4-80 and QF-QS. This project aims to determine which of the available transgenic systems show successful expression at low toxicity in Ciona and to characterize their temporal and spatial expression patterns. Ciona embryos will be transfected by electroporation and fixed for direct visualization. The amount of reporter expression will be visualized with fluorescence microscopy, and toxicity of transgenes assessed by the extent of change to nuclear morphology. The ultimate goal is to develop protocols for effective use of heterologous transgenic systems in Ciona. For these viable transgenic systems, the author expects to identify optimal transgene amount, onset and duration of expression, efficacy of spatial control and optimal hormone concentrations for inducible systems. These systems offer the potential for tighter regulation of transgene expression over that of more traditional systems such as Gal4. This would contribute greatly to developmental research on the chordate model C. intestinalis.

DNA can self-assemble into three-dimensional structures through Watson-Crick base pairing via sticky ends. Triplex-forming oligonucleotides (TFOs) have recently been shown to bind to a DNA tensegrity triangle motif by forming base triplets at an oligopurine site (Zheng, Birktoft et al., 2009; Liu, Wang et al., 2004; Rusling, Chandrasekaran et al., 2014). Since it has been demonstrated that TFOs can also bind to oligopurine sites spanning crossovers within double-crossover motifs, this study examines whether the same is true for the triangle (Rusling, Nadhakumar et al., 2012). Both asymmetrical and symmetrical triangles were redesigned to include a
binding site(s) for the TFO. Preliminary results obtained on non-denaturing (native) gel analysis recently have shown that both the asymmetric and symmetric motifs can form with the correct target size. In addition, a 13-mer TFO was also capable of binding to both triangles resulting in a shift in the triangles’ mobility. The ability of the modified triangles to self-assembly into 3D crystals was also examined and preliminary results suggest that they are capable of crystal growth. The binding of the triplex strand to the asymmetric system has been assessed via the addition of a TFO containing a cy5 dye. The use of TFOs could enable further specific modifications to the triangle motif or possibly stabilize and reinforce the sticky-end interactions between neighboring tensegrity triangles.

Nikola: Automatic Electricity Reduction through Behavioral Learning and Smart Energy Sensors
Robert Gardner, Computer Science, Economics
Adam Jackrel, Computer Science
Sponsor: Professor Lakshminarayanan Subramanian, Computer Science

Saving energy is hard. New York City has among the highest cost of electricity in the country, which makes conservation a priority. Consumers lack the information and the incentive to use electricity more efficiently. “Nikola” is a sophisticated energy management policy engine that automatically reduces excess energy usage with minimal disruption to users. To generate these policies, the system predicts user behavior from data collected by energy and environmental sensors. The energy sensors measure the power consumption of connected devices while the environmental sensors gather local conditions such as temperature, humidity and light. Both transmit to the central server. The sensors are ultra low-powered, are connected wirelessly and do not modify existing infrastructure. The system is designed to be minimally intrusive to the users and not interfere with their daily routines. Disaggregation models will generate device specific profiles in order to be able to accurately determine the kind of device connected and optimize the generated policies for that device. The system was tested in small deployments in New York University’s Computer Science Department and in the Leslie Entrepreneurship Lab. Finally, the utility of these automated energy management policies was demonstrated in synthetic experiments involving variable pricing models offered by Con Edison. In this field, existing research has focused on improving the quality of data collection. However, this research explores new ways of automatically reducing wasteful energy practices without action required from the user.

Heat Stress Response of Saccharomyces cerevisiae
MSN2 and MSN4 Mutants
Daniella Giardina, Biology
Sponsor: Professor Mark Siegal, Biology

In a colony of genetically identical Saccharomyces cerevisiae (baker’s yeast) cells, growth rate is expected to have a normal distribution. However, there is consistently an abnormally large population of slow-growing cells in each colony, and these cells happen to be more resistant to heat stress. Two stress response proteins, Msn2 and Msn4, may play a role in the cell’s heat resistance. To study the relationship between Msn2, Msn4, and heat stress, a series of heat shock experiments was conducted. Four strains of yeast—non-mutant, \( \Delta \)msn2 (lacking the MSN2 gene), \( \Delta \)msn4, \( \Delta \)msn2\( \Delta \)msn4—were kept at room temperature (control), heated to 51°C or heated to 51.5°C. By comparing the growth of the heat shocked cells to that of the control cells, the survival rates of the different strains could be calculated. Variation between strains illuminates how Msn2 and Msn4 (or the lack thereof) affect survival and growth in heat stress environments. Knocking out MSN2 and/or MSN4 is expected to weaken the stress response of the cell and make it more susceptible to damage. Targeting a similar mechanism in tumor cells may allow scientists to more easily treat cancer.

Genetic Screen to Elucidate Meiotic Inter-Homologue Bias for Repair
Ashima Goel, Biology
Sponsor: Professor Andreas Hochwagen, Biology

Meiosis is a process that results in the formation of haploid gametes from diploid progenitor cells. Crossover recombination between homologous chromosomes is essential for the proper assortment of chromosomes during meiosis and is initiated by programmed DNA double strand breaks (DSBs). A poorly understood inter-homologue (IH) bias pathway during meiosis promotes DSB repair through homologous recombination between chromosomes. The goal of this project is to identify novel mutations affecting meiotic DNA repair patterns by performing a mutagenesis screen in Saccharomyces cerevisiae. This screen is based on the premise that in the presence of active IH bias, deletion of the DMC1 gene—a gene required for strand invasion and DSB repair—arrests meiotic progression. However, in the absence of IH bias (upon mutagenesis), strains with a \( \Delta \)dmc1\( \Delta \) mutation are able to sporulate. In order to immediately uncover bypassing mutations, an engineered haploid strain that is competent for sporulation is used for screening. Point mutations generated by EMS mutagenesis that bypass the checkpoint arrest and sporulate are selected based on the spores’ ability to survive diethyl ether treatment. Spores that pass this primary screen will be analyzed.
in a secondary screen monitoring DSB initiation to further differentiate between recombination-deficient and recombination-proficient clones. This will allow identification of mutations in the following three categories: those involved in DSB formation, checkpoint arrest and components of the IH bias machinery. Understanding IH bias will help us better understand the processes underlying meiosis and meiotic recombination, and the mistakes therein, which lead to infertility and various birth defects in humans.

Searching for Novel Clock Genes in *Drosophila* Lateral Ventral Neurons

Irfan Gondal, Biology

Sponsor: Professor Justin Blau, Biology

*Drosophila melanogaster* have circadian rhythms, consisting of a 24-hour cycle, similar to mammalian organisms. Circadian rhythmicity in *Drosophila* is controlled by a host of clock genes that are regulated through transcriptional and translational feedback loops. Four genes (*clock, cyclin, period* and *timeless*) are the fundamental genes involved in a core transcriptional feedback loop that generates the clock. However, other genes fine-tune the clock, and the focus of this investigation was to find some of these genes. Circadian rhythms in *Drosophila* are controlled by a set of about 150 pacemaker cells. Among these pacemaker neurons are 4 Lateral Ventral Neurons (LNvs), the so-called “master pacemaker neurons.” They set the pace for other neurons in the central brain and distinctively produce the neuropeptide Pigment Dispersing Factor (PDF). Microarrays performed in previous studies identified 249 genes that oscillated between dusk and dawn. Of these 249 genes that showed a greater than 1.5 fold-change, this study investigated the importance of 70 of these genes in circadian rhythms using either RNAi or overexpression specifically in the LNvs. Eight genes were found that altered circadian rhythms. *Drosophila* offers a simple neuronal system to study circadian activity, and the discoveries made in this model system are directly applicable to their mammalian counterparts, which have orthologous genes involved in a similar pathway.
From SNPs to Screens: Evaluating Germline Variants in Telomere Genes for Susceptibility to Cancer and Related Syndromes in the Ashkenazi Jewish Population

Gabrielle Gussin, Biology
Sponsor: Dr. Vijai Joseph, Memorial Sloan Kettering Cancer Center

Aberrant telomere function is a common mediator of tumorigenesis. Genome-wide association studies have been instrumental in discovering cancer risk loci in genes related to telomere function and maintenance. However, further studies are required to determine the frequency of these potentially oncogenic germline variants in different populations. The first aim of this study was to identify and evaluate germline variants in telomere-associated genes in order to test the hypothesis that these variants are associated with susceptibility to cancer and related diseases. This hypothesis was formulated in part based on preliminary data, which demonstrated that DNA variants at the RTEL1 (regulator of telomere elongation helicase 1) and TERT (telomerase reverse transcriptase) loci are associated with increased risk for several types of cancer and related immunological disorders. The second aim was to examine the frequency of these mutations in the Ashkenazi Jewish (AJ) genetic isolate compared to the general non-AJ population. The long-term goal is to discover which variants confer statistically significant associations for different cancers and whether demographic co-variants including age, sex and ethnicity modify these risks. This study found that the carrier frequency of RTEL1 mutation p.R1264H, which underlies bone marrow failure and cancer predisposition syndromes, was ten-fold greater Ashkenazi ancestry compared to the general non-AJ population. These results provide further evidence that p.R1264H is likely an AJ founder mutation.

Cyclochirality and Atropisomerism in Peptoid Macrocycles

Michael Haugbro, Chemistry
Sponsor: Professor Kent Kirshenbaum, Chemistry

Complex forms of molecular chirality are a central focus in the development of novel therapeutics. In order to ensure the highest level of specificity in drug targeting, a complete understanding and control of molecular conformation is needed. This study reports the synthesis and conformational investigation of a series of cyclic peptoid hexamers which exhibit two such forms of chirality: cyclochirality (a form of ruffling-induced chirality) and atropisomerism. While initially designed to inhibit the interaction between β-catenin and TCF in an effort to treat colon cancer, their utility is extended to a study of peptoid macrocycle chirality. Upon cyclization of the linear peptoids, two cyclochiral isomers are generated which differ in their backbone dihedral angles. Incorporation of an asymmetric aniline residue in the macrocycle results in two distinct atropisomers due to the steric hindrance associated with rotation around the stereogenic carbon—nitrogen bond. When these two effects are combined during synthesis of these macrocycles, a total of four isomers with distinct 3D structures are generated, which must be considered when designing potential therapeutics. Circular dichroism, NMR, HPLC and X-ray crystallography are being employed to study the topology of these macrocycles.

Examining Probabilistic Information in Visual Working Memory

Maija Honig, Psychology
Sponsor: Professor Daryl Fougnie, Psychology, NYU-Abu Dhabi

Working memory, the ability to keep information in mind for short time periods, is limited, even for simple visual features. For example, an item of dark red color may be remembered as a different color, perhaps as light red or pink. Our understanding of visual working memory has been advanced by examining the distributions created from averaging errors across trials (e.g., Wilken and Ma, 2004; Zhang and Luck, 2008). However, this approach has not been able to determine whether individuals store only single point estimates in memory or whether they retain richer representations such as probability distributions over feature space. Here, the authors looked for evidence of probabilistic representations using a color working memory task in which a certain color was more likely to appear. If participants had probabilistic representations in working memory then reports will be biased towards the expected color, and the amount of bias will be related to the uncertainty in memory. The authors will measure both bias and estimates of uncertainty in individual trials to determine whether uncertainty is predictive of bias. This would suggest that people have probabilistic information in memory and that people combine this information with their own uncertainty to make judgments about the environment.

The Effects of Lead on the Growth of Phaseolus vulgaris

Elhizeh Hydara, Liberal Arts, Borough of Manhattan Community College, CUNY
Sponsor: Professor Catarina Mata, Science, Borough of Manhattan Community College, CUNY

The purpose of this research is to determine the effects of lead (II) nitrate (Pb(NO₃)₂) on the growth of Phaseolus vulgaris (red kidney beans). Lead (II) nitrate is a white powder or crystalline inorganic salt that is soluble in water and highly toxic. It is a byproduct of formerly industrial
areas and their surroundings, and as a result, it poses a risk to the environment and human health. It inhibits photosynthesis in plants and therefore may affect the proper growth of plants like Phaseolus vulgaris. To determine this, red kidney beans were planted on potting soil and the test plants were given 1200 ppm of (Pb(NO₃)₂) weekly. The length and diameter of the shoot as well as the width of the leaves were then measured and recorded over a time period of 30 days. The (Pb(NO₃)₂) treated plants germinated faster and grew better than the controls over the period of the experiment. The number of bean pods produced was also greater on the test plants than on the control plants by the end of the experiment. The small amount of nitrate found in (Pb(NO₃)₂) may have provided the test plants with extra nutrition and as a result, grew better than the control plants.

Effectiveness of a Nurse-Practitioner Run In-Patient Unit for the Treatment of Chest Pain
Sirajul Islam, Biochemistry
Zahra Zhu, Biochemistry
Sponsor: Dr. Steven Bergmann, University of Connecticut School of Medicine

Nurse practitioners (NP) are increasingly being utilized in hospital settings. However, the safety and effectiveness of NP in treating in-patients with chest pain is not established. The goal of this study was to evaluate the effectiveness of a 100% NP-based cardiac unit by evaluating its utilization of diagnostic testing and patient outcomes in comparison with previously reported data from our group. This research performed a retrospective analysis of 814 consecutive patients presenting to Mount Sinai-Beth Israel with chest pain and assigned to the NP unit and compared the data for diagnostic testing, length of stay, and return rates to that of 250 previously reported patients admitted to a unit run by Hospitalists and House Staff. Statistical analysis was performed using an independent t-test or Z scores as appropriate. The NP unit that utilized myocardial perfusion stress testing as the primary modality for the diagnosis of chest pain resulted in a decreased length of stay and a decreased readmission rate compared with that seen in patients admitted to the Hospitalist unit. These results support the safety and effectiveness of an NP based cardiac unit for the treatment of patients admitted to the hospital with chest pain.

The Introduction of a DAE Motif into a Four-Turn Asymmetric DNA Tensegrity Triangle
Rahul Jain, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

The experimental technique of X-ray diffraction makes it possible to perform crystallography, the study of the periodic arrangements of atoms and molecules. By providing information on atomic and molecular structure of various molecules at high resolution, crystallography provides insight into form and function. However, the process of obtaining crystals for x-ray diffraction experiments remains heavily based on trial and error. One way to improve crystallization of various macromolecules is to organize the material using a scaffolding material. This led to the design of the first rationally designed three-dimensional DNA crystal, which self-assembles by using a tensegrity triangle motif that coheres via non-covalent sticky-ended interactions (Zheng, Birktoft et al., 2009; Liu, Wang et al., 2004). Previous attempts have been made to crystallize a double crossover DAO motif using a symmetric three-turn triangle but the crystals obtained didn’t have the designed R3 space group (Li, Yang et al., 1996). The current project designed a double-crossover DAE motif into a four-turn asymmetric tensegrity triangle. The DAE motif has a persistence length that is twice as long as a linear duplex DNA. Its well-characterized rigidity would be ideal in the formation of crystalline lattices (Sarda, Vologodskii et al., 2003). The ultimate goal would be to crystallize proteins bound to the DAE portion of the triangle containing the protein binding sequence for X-ray analysis of the protein structure.

Analysis of Subcellular Localization of Receptor Tyrosine Kinases Involved in Precardiac Cell Migration in Ciona intestinalis
Tanim Jain, Biology
Sponsor: Professor Lionel Christiaen, Biology

Collective cell migration is essential for proper cardiac development; abnormal migration can lead to congenital heart defects. In Ciona intestinalis, a chordate closely related to vertebrates, two pairs of bilaterally symmetric cardiac progenitor cells termed trunk ventral cells (TVCs) provide the simplest model for the study of collective cell migration and polarity. Receptor tyrosine kinases (RTKs) are trans-membrane surface proteins that signal to the actin cytoskeleton to guide cell migration in response to extracellular cues. Analysis of the subcellular localization and polarized distribution of four RTKs potentially involved in the collective migration of TVCs (DDR1/2, EGFR, FGFR, VEGFR) was conducted. RTK subcellular localization was determined by expressing fluorescently tagged RTKs with GFP-tagged Rab GTPase proteins that mark subcellular compartments including endosomes, lysosomes, and the Golgi body. The tissue-specific constructs were introduced in Ciona embryos through plasmid electroporation. The co-localization of RTKs with Rab GTPases, determined using Imaris software, indicates whether they are targeted for recycling or degradation after their endocytic removal from the cell membrane. Analysis of the co-localization
of the target RTKs and Rab5 shows where in the TVCs the RTKs may operate and how this positional information is related to directed migratory behaviors.

**Less Is More: The Genes for Cross Talk Mediated Nutrient Use Efficiency in Arabidopsis**
*Tim Jeffers, Biology*
*Sponsor: Professor Gloria Coruzzi, Biology*

Designing nutrient use efficient (NUE) crops to the synthetic fertilizer components Nitrogen (N), Phosphorus (P) and Potassium (K) is essential for environmental protection and global food security. In a classic plant nutrition study, Murashige and Skoog observed that plants grown under low-N conditions could obtain comparable biomass to plants grown on high-N by varying the amount of P and K. Despite this discovery of nutrient cross talk in 1962, most current genomic studies exclusively investigate the molecular responses to single nutrient concentration ranges. To address this knowledge gap, this study generated a modified version of this three-triangle motif, which corresponds to approximately triple the volume of the single triangle system, which was 308708 Å³. Crystals of the design cohering via 2-nucleotide sticky-ends that diffracted to 6.2 Å resolution at the Advanced Photon Source (APS) at Argonne National Laboratory Beam Line ID19. The diffraction data was processed through the P1 space group. The volume of the unit cell is 918154.0 Å³, which corresponds to approximately triple the volume of the single triangle system, which was 308708 Å³. Crystals of a modified version of this three-triangle motif with 3-nucleotide length sticky ends were also grown to try to improve diffraction resolution.

**Distribution of Torsion Subgroups of Elliptic Curves over the Rationals**
*Samuel Jeralds, Mathematics*
*Sponsor: Professor Yuri Tschinkel, Mathematics*

In mathematics, objects known as elliptic curves form a basis for the study of algebraic geometry and cryptography. These curves have a number of properties of interest: most notably, the algebraic structure that can be imposed on the curves. When looking at elliptic curves whose coordinates are rational numbers—whole numbers, fractions and repeating or terminating decimals—it is possible to geometrically define an “addition” of points on the curve by drawing lines between them. A special subset of points on such curves is called the torsion subgroup. These are collections of points that, when added to themselves repeatedly as defined by this special addition, will eventually sum to themselves. While it is known that torsion subgroups can take one of fifteen different forms, little is known about how these forms relate to the equation of the curve. This project imposed an order on a set of elliptic curves and calculated the distribution of the types of torsion subgroups in certain ranges of the ordering. The final data yielded a surprising symmetry in distribution of types related directly to the equations of the elliptic curves.

**Self-Assembly of 3D DNA Crystals with 3 Triangle Sub-Units**
*Michael Alexander Jong, Chemistry*
*Sponsor: Professor Nadrian Seeman, Chemistry*

Tensegrity triangle DNA motifs can self-assemble into 3-D lattices through sticky-ended cohesion. While only a single motif was used to produce the first crystal lattice, in recent experiments two different tensegrity triangle motifs have been shown to self-assemble into a single lattice via sticky-ended cohesion between differing motifs to create an alternating pattern. The purpose of increasing the number of lattice components is to obtain a greater level of control over the unit cell. This method was extended to design lattices that form using three different triangle motifs. The system was designed such that the motifs arrange themselves in a 3-way alternating pattern via complementary sticky-ended cohesion, thereby self-assembling into a crystalline lattice. This study obtained crystals of the designed cohering via 2-nucleotide sticky-ends that diffracted to 6.2 Å resolution at the Advanced Photon Source (APS) at Argonne National Laboratory Beam Line ID19. The diffraction data was processed through the P1 space group. The volume of the unit cell is 918154.0 Å³, which corresponds to approximately triple the volume of the single triangle system, which was 308708 Å³. Crystals of a modified version of this three-triangle motif with 3-nucleotide length sticky ends were also grown to try to improve diffraction resolution.

**Introducing a Novel Technique for Adipose Derived Mesenchymal Stem Cell Isolation**
*Ardalan Khalafi, Global Public Health/Chemistry*
*Sponsor: Dr. Davood Varghai, Neurological Surgery Imagery Laboratory, Case Western Reserve University School of Medicine*

Adipose-derived stem cells (ADSCs) are a subtype of mesenchymal stem cells (MSC) with the same properties as other MSCs. These cells are currently used for tissue regenerative purposes. The abundance of adipose tissue in the body as well as the minor donor site morbidity (comparing to other MSC sources) makes adipose tissue an ideal source of stem cells. Although a number of methods have been described for ADSC isolation, an optimal method has yet to be defined. In this study, the “non-enzymatic blending method,” a novel method of ADSC isolation, was...
Deceptively Dichotomous Determinants: Analyzing the Functional Differences between Closely Related Transcription Factors That Pattern the Early Drosophila Embryo
Kishan Kishan, Biology
Sponsors: Professor Rhea Datta, Biology; Professor Stephen Small, Biology

Developmental defects are the cause of many major diseases in humans; however, their molecular bases are largely unknown. The development of the head, thorax and other anterior structures of the genetically tractable Drosophila melanogaster are controlled by proteins called transcription factors (TFs) that directly bind DNA to activate and regulate genes required for development. One such TF is Bicoid (Bcd), a protein that activates target genes along the anterior-posterior axis of the embryo in a position dependent manner. It is the combinatorial interactions of Bcd and its targets that determine segmentation patterns established in the early fly embryo. The nature and specific components of these TF interactions are an area of ongoing research. This study explored the specific interactions of Bcd and one of its direct gene targets, Orthodenticle (Otd). Although these two proteins bind to similar DNA sequences and are expressed at the same time in development, they activate different targets to direct head development. Previous data have identified numerous Bcd targets, but the direct targets of Otd remain unknown. Using both a molecular and a bioinformatic approach, it was possible to identify a novel dataset of Otd-dependent regulatory regions, showing that Bcd and Otd activate different sets of target genes in vivo. Further study of the Bcd/Otd relationship will focus on determining if these Otd-dependent fragments are actually functional and on performing motif analysis to understand what determines the differential binding. The identification of Otd-dependent regulatory regions is an important tool in deciphering the molecular bases of functional differences between closely related proteins such as Bcd and Otd. This novel interaction pattern could be applied to various systems in developmental biology.

Expression of the NR2B Subunit of the NMDA Receptor at A xo-spinous Synapses is Increased Following Induction of Activity-Based Anorexia in CA1 of the Dorsal Hippocampus of Female Pubertal Rats
Lauren Klingensmith, Neural Science
Sponsor: Professor Chiye Aoki, Neural Science

Anorexia Nervosa (AN) is a neuropsychiatric disorder of unknown etiology with onset in adolescence that is characterized by self-induced restricted caloric intake. Activity-based anorexia (ABA) is an animal model of AN in which rodents with free access to a running wheel during food restriction paradoxically become hyperactive even during their period of access to food. Due to changes in cognition and synaptic plasticity during puberty, this study used electron microscopic immunocytochemistry to investigate if expression of the NR2B subunit of the N-methyl-D-aspartate (NMDA) receptor changed in CA1 of the female dorsal hippocampus in response to the ABA induction. While immunocytochemistry reveals increased expression of NR2B subunits both presynaptically and postsynaptically for the ABA animals, most is known functionally about postsynaptic NR2B subunits where expression of NR2B subunits both presynaptically and postsynaptically for the ABA animals, most is known functionally about postsynaptic NR2B subunits where elevated NR2B localization and increased proportion of NR2B labeled synapses for the ABA group compared to Control were seem. Further analysis indicated this increase was driven by ABA High animals with excessive food-restriction evoked hyperactivity. The findings suggest that the experience of food restriction-evoked hyperactivity of ABA affects NR2B-mediated excitation and synaptic plasticity in spines of CA1 pyramidal neurons and contributes to stress-induced hippocampal plasticity. These results allowed better understanding of molecular mechanisms underlying AN and could provide valuable insight to individual differences in the etiology of AN to lead to possible treatment.
Targeting of the PALB2 Tumor Suppressor to Phosphorylated RPA
Joyce Kong, Biochemistry
Sponsor: Professor James Borowiec, Biochemistry and Molecular Pharmacology, NYU School of Medicine

The PALB2 (Partner and Localizer of BRCA2) tumor suppressor is an ongoing research interest because it is a susceptible gene for breast cancer. Mutations in PALB2 are found to increase risk for breast cancer. PALB2 functions to maintain genomic integrity and acts to localize the BRCA2 (Breast Cancer 2, early onset) tumor suppressor to sites of DNA damage. During DNA replication, cells experience replication stress. Phosphorylation of heterotrimeric replication protein A (RPA) stabilizes replications during replication fork stalling. Deregulation of RPA phosphorylation reduces DNA synthesis at replication forks during replication stress. One role of phosphorylated RPA is mediated through PALB2. Phosphorylated RPA recruits PALB2 to DNA. RPA phosphorylation also increases the association of both PALB2 and BRCA2 to RPA-bound nuclear foci during cells’ replication stress. Thus far, the RPA1 and RPA2 subunits have been shown to interact with both CHAM, MRG, Coiled-coil domain of PALB2. When RPA1/2 is bound to PALB2, it facilitates PALB2 and BRCA1 interactions to decrease replication stress. Biological assays prove RPA1/2 interactions with CHAM and MRG15 of PALB2. RPA2 mutants or PALB2 mutants reveal a result of DNA damage after replication stress. This demonstrates the importance of phosphorylated RPA to recruit factors in relieving replication stress at stalled forks. The structure of the C-terminus of PALB2, beta-propeller, has been identified to form a complex with a BRCA2 peptide. Interactions between RPA and PALB2 open to new methods to suppress breast cancer. Findings of the presence of Lens Epithelium-derived Growth factor (LEDGF) to phosphorylated RPA opens new roads of interactions at replication forks.

The Book of (Neuro)Genesis: Spatial Patterning of Neuronal Progenitors in the Inner Proliferation Center (IPC) of Drosophila melanogaster Optic Lobes
Clara Koo, Biology
Sponsors: Professor Claude Desplan, Biology; Dr. Filipe Pinto Teixeira Sousa, Biology

A fundamental question in neurobiology is how an enormous diversity of neurons is produced from a small group of neuronal progenitors. In the Drosophila melanogaster embryonic ventral nerve cord and the Outer Proliferation Center of the developing optic lobes, a temporal progression of transcription factors (TFs) in neuronal progenitors instructs the systematic production of different neuronal types. Temporal patterning of TFs has been shown to be a universal strategy for neuronal specification, with different TFs being employed in different systems. However, although spatial patterning of progenitors increases the diversification of neurons by modulating the implementation of temporal patterning, it has yet to be shown whether it is sufficient in generating neural diversity on its own. Here, evidence is provided that in the ventral tip of the proximal Inner Proliferation Center (vtp-IPC) of the developing optic lobes progenitors do not progress through a TF temporal progression. The results strongly suggest that neurogenesis in the IPC is dictated exclusively by spatial cues. The vtp-IPC is spatially compartmentalized, producing only three neuronal types. In understanding spatial patterning as a mechanism for neuronal diversity, this knowledge can be applied to advance new discoveries in invertebrate and vertebrate neural systems.

The Role of CSN3 and CSN8 in Sleep Regulation
Elizabeth Ku, Biology
Sponsor: Professor Nicholas Stavropoulos, Neuroscience and Physiology, NYU School of Medicine

Although sleep is known to serve many biological functions across species, the molecular mechanisms that regulate sleep are not fully understood. By using RNA interference (RNAi) to target and reduce the activity of individual genes in the brains of Drosophila melanogaster, it was discovered that pan-neuronal direction of RNAi against CSN3 or CSN8 correlates to substantially decreased sleep duration in Drosophila. This finding indicates these genes are essential for normal sleep behavior. It was further found that pan-neuronal reduction of CSN3 or CSN8 activity did not affect the circadian sleep rhythms, suggesting that the genes may act to mediate other mechanisms impacting sleep, such as sleep homeostasis. Sleep deprivation experiments were conducted to test this hypothesis. Though the preliminary results of this study indicate that flies with reduced CSN3 or CSN8 neuronal activity may unexpectedly continue to display a homeostatic sleep rebound after having been deprived of sleep, further investigation is needed to confirm these results. Continuing to examine the role of CSN genes in Drosophila, an organism known to share key similarities in its sleep properties with mammals, will contribute to the better understanding of sleep mechanisms in humans.

Using Molecular Dynamics Simulations to Calculate the Dielectric Properties of Phosphorus Oxoacids
Manav Kumar, Chemistry
Sponsor: Professor Mark Tuckerman, Chemistry

By determining the dielectric properties of phosphorus oxoacids, it is possible to develop new hydrogen fuel cell membranes using phosphorus oxoacids based polymers as well as to gain a deeper insight into their role in biological...
systems. The dielectric properties of an ionic, and proton conducting liquids helps explain the charge screening, charge stabilization and ion (proton) conduction that occurs. To calculate the dielectric properties, the total molecular dipole moment must first be determined. Currently, it is impossible to determine the total molecular dipole moment using experimental methods, and highly non-trivial using computational methods. A proposed computational method that has shown some success utilizes Maximally Localized Wannier Functions analysis, partitioning the periodic electron density, and applies it to a trajectory generated using ab initio molecular dynamics. Using both ab initio molecular dynamics and classical molecular dynamics to calculate the dielectric properties it was determined that the average total molecular dipole moment was in very excellent agreement even though there was a difference between the calculated dielectric constant value from ab initio molecular dynamics and classical molecular dynamics.

**Self-Assembly of a Three-Turn Tensegrity Square**

*Lakpa Lama, Chemistry*

*Isabelle Levin, Individualized Major*

*Victoria Zlotnikova, Neural Science*

*Sponsor: Professor Nadrian Seeman, Chemistry*

Structural DNA nanotechnology facilitates the construction of various nanostructures in 1-, 2- and 3-dimensions. Previous work has shown the affective self-assembly of the tensegrity triangle into a 3D lattice (Liu, Wang et al., 2004; Zheng, Birktoft et al., 2009). Further work has been done to expand the notion of the tensegrity triangle to a tensegrity square motif. It has previously been reported that a two-turn DNA tensegrity square containing either 5, 6 and 7 nucleotide pairs between junctions was able to successfully self-assemble into a 3D lattice (Chen, Mohsen et al., 2013; Wady, Mohsen et al., 2013; Chen, Jurgensen et al., 2014). Potential applications of such motifs require the design of larger motifs that could accommodate protein hosts for X-diffraction studies. The current research designed a symmetric 3-turn tensegrity square. Gel studies have shown the successful formation of the motif while optical images have demonstrated the self-assembly of the motif into 3D crystals. X-ray diffraction analysis will reveal the actual arrangement of the motif. Furthermore, this study proposes that employing a similar approach will lead to the successful self-assembly of RNA lattices that can bind proteins. The use of RNA tensegrity squares will be very amenable to the formation of 3D RNA crystals since the corners of RNA squares tend to adopt 90 degree-angles. RNA-binding proteins such as zinc-fingers play significant control over numerous cellular functions such as transcription. Due to their importance in the biological field, several discoveries regarding RNA-binding proteins potentials continue to be unveiled.

**Using a Novel, Combinatorial Profiling Technique to Decode the Fragile X Proteome in Mouse Hippocampi**

*Joseph Lebowitz, Psychology*

*Sponsors: Professor Eric Klann, Neural Science; Dr. Aditi Bhattacharya, Neural Science*

Fragile X mental retardation protein (FMRP) regulates protein synthesis, particularly in neurons. In individuals with Fragile X Syndrome (FXS), transcriptional silencing of the *Fmr1* gene leads to loss of FMRP and, in turn, changes in neuronal protein expression and function. In FXS, there is also increased activity of mammalian target of rapamycin complex 1 (mTORC1), extracellular-regulated kinase 1/2 (ERK 1/2) and p70 ribosomal s6 kinase 1 (S6K1), all of which promote protein synthesis and help regulate synaptic structure, plasticity and signal transmission. BONLAC, a novel, combinatorial proteomic profiling technique, was used to examine the altered protein expression in FXS and WT mouse hippocampi. Western blot analysis was then used to validate candidate hits from the proteomic screen. As FXS is the leading monogenetic cause of autism spectrum disorders (ASD), identifying differences in protein expression between FXS and WT conditions will add to the currently incomplete understanding of the underlying causes of ASDs. This may lead to the establishment of an effective biomarker for early detection in affected humans, provide a basis for the development of a diagnostic test or provide a direct target for therapeutic intervention.

**Exploring the Role of a Transmembrane Protein in the Drosophila Color Vision Circuit**

*Gina Lee, Biochemistry*

*Sponsor: Professor Jessica Treisman, Cell Biology, NYU School of Medicine*

Neural circuits, the basis of sensory perception in the central nervous system, are established through synaptic connections that require growing axons to locate appropriate target cells. Within the visual system of *Drosophila melanogaster*, networks of synaptic connections are arranged in a stereotypical manner in distinct layers of the brain. The photoreceptors that mediate color vision, R7 and R8, terminate in two distinct layers within the medulla, R7 in M6 and R8 in M3. R7 and R8 detect specific wavelengths of light: R7 is UV-light sensitive, and R8 is blue or green-sensitive. An RNAi screen in the lab to identify cell-surface molecules that provide targeting information to the axons of these color photoreceptors yielded a novel candidate, CG8909 (homolog of Low density lipoprotein receptor-related protein, Lrp4), a transmembrane protein with LDLR, EGF and beta-propeller domains. Preliminary findings reveal that knocking down this candidate in photoreceptors and lamina neurons causes defects in targeting of R8 axons to the appropriate M3 layer.
Most R8 axons terminate inappropriately in M6, the same layer as R7. Currently, CRISPR-Cas9 technology is being employed to generate a deletion within the gene locus of CG8909 in order to validate the RNAi phenotypes. Lamina neurons are known to attract R8 to the M3 layer, and some guidance molecules involved in this process have been described, but the interactions that prevent R8 from projecting beyond M3 are still unknown. It remains to be seen whether CG8909 acts as a receptor in R8 for a guidance cue expressed in the brain, or whether it functions in lamina neurons as a termination signal for R8.

**Design of Self-Assembled Mixed Chirality 3D DNA Crystals**

_Jia Ji Lin, Chemistry, Chemical and Biomolecular Engineering_

_Sponsor: Professor Nadrian Seeman, Chemistry_

One of the main goals in structural DNA nanotechnology is to produce 3D macroscopic objects with an underlying robust nanoscale structure through precise molecular control. It was previously demonstrated that a 3D DNA tensegrity triangle motif, consisting of DNA in its natural D-configuration, can self-assemble via sticky-end interactions to form 3D crystals (Liu, Wang et al., 2004; Zheng, Birktoft et al., 2009). DNA in the L-configuration, L-DNA, are an exact mirror-image of D-DNA. Based on previous computer model simulations, an AB system with one triangle consisting of D-DNA and another of L-DNA has a center of symmetry within the unit cell, which may improve the X-ray diffraction resolution on crystals based on this AB system (Wang, Sha et al., 2010). D-DNA and L-DNA do not hybridize because of their stereoisomeric difference; however, molecular simulations have suggested that connecting a D-DNA triangle with an L-DNA triangle may be energetically possible by matching the stereoisomerism of the two-base sticky-ends or complete ends on both triangles. In this present work, this is tested theoretically via model building and simulations by assembling a system of D-DNA triangles bound to central L-DNA triangle through D-DNA sticky ends and determining the possibility of constructing a 3D crystalline lattice based on this AB system. The possible improvement in X-ray diffraction resolution will further elucidate the precise ordering of these structures and has potential applications in the design of nanoelectronics or molecular scaffolds.

**A Better Healer than Time? Reactivation-Induced Flexibility of Different Fear Memory Systems**

_Qi Lin, Psychology_

_Sponsor: Professor Elizabeth Phelps, Psychology_

It can be hard to forget. Although some types of memory, like human fear conditioning, can be updated or erased during reconsolidation process, it is still unknown whether human explicit memory also undergoes reconsolidation. This study asks if update during reconsolidation has the same effect on fear conditioning memory as item recognition memory. After learning the pairing of electrical shocks and one of the two categories (fish or birds) on Day 1, participants either saw an image of the shocked category in the reactivation session and then saw the images without getting shocked in the extinction session (reactivation group) or went through extinction without reactivation (no-reattivation group) on Day 2. On Day 3, fear conditioning memory and item recognition memory were tested. Results showed that the reactivation group showed both worse fear conditioning memory and item recognition memory than the no-reattivation group. However, the effect of extinction during reconsolidation on item recognition memory was less significant than on fear conditioning memory. The results demonstrate that both fear conditioning memory and explicit memory can change during reconsolidation but that explicit memory is less sensitive than fear conditioning memory. This sheds light not only on the reason why treatments of anxiety related disorders that only target fear conditioning memory sometimes fail but also on how to develop more effective treatments that also target explicit memory.

**Salinity Tolerance of a Marine Ciliate Co-Isolated with Eggs of the Sea Urchin Lytechinus variegatus**

_Michael Llano, Science, Borough of Manhattan Community College, CUNY_

_Grace Loussakou, Science, Borough of Manhattan Community College, CUNY_

_Sponsor: Professor Christine Priano, Science, Borough of Manhattan Community College, CUNY_

An unidentified ciliated marine protist was initially co-isolated with eggs of the green sea urchin _Lytechinus variegatus_, an intertidal organism. To identity this protist and elucidate its relationship with the sea urchin, it is essential to establish conditions for its maintenance in the laboratory. The purpose of this study was to determine optimal salinity conditions required to grow this ciliate in culture. Protoplast growth was examined in varying salinity levels as found in intertidal zones. Salt water was prepared using Instant Ocean sea salt. Six 10 mL protist cultures were inoculated on the same day in the salinity range of 0% to 5.5%. A 3.5% salt culture served as a control for the natural salinity of ocean water. Cultures were given equal amounts of Marine S fish food and agitated at 25 rpm at room temperature. For each culture, protists were counted every 24 hours using a hemocytometer. Results indicated that a minimum concentration of 1.5% sea salt supported protist reproduction and that protists could tolerate salinity up to 5.5%. Most cultures grew exponentially for three to four days before growth slowed.
However at concentrations below 3.5%, protists swelled in size and more contaminating organisms were observed. It was concluded that optimal salt conditions for laboratory growth is between 3.5% and 5.5%. These results will help optimize conditions for growing and maintaining this protist in the laboratory and will thereby facilitate future work aimed at characterizing this protist species and investigating its possible symbiotic relationship with the green sea urchin.

The Temporal Requirement of Nicotinic Acetylcholine Receptor Subunits Regulating Sleep
Charalambia Louka, Neural Science
Sponsor: Professor Nicholas Stavropoulos, Neuroscience and Physiology, NYU School of Medicine

Sleep is a crucial animal behavior that impacts health by affecting metabolism, learning and memory, immunity and many other bodily functions. Despite the importance of sleep in our everyday lives, the brain mechanisms that regulate sleep are still not well understood. *Drosophila melanogaster*, the fruit fly, is a model organism whose sleep state shares key similarities with mammalian sleep and can be used to identify genes that function within the brain to regulate sleep. Previous studies in this lab have shown that genes encoding for the nicotinic acetylcholine receptor subunits play a role in sleep regulation. To further characterize the temporal requirement of these genes, this study investigated whether their expression functions to assemble brain circuits involved in sleep regulation during fly development or if the activity of these genes plays a role in regulating sleep in the adult fly brain on a day-to-day basis. To answer this question, a conditional genetic system was used to control the expression of these genes at different times of the fly life cycle. Understanding how these genes work is critical in piecing together a more comprehensive model of sleep regulation that will eventually allow the molecular mechanisms underlying sleep in humans to be understood.

AD Takes Its Toll: Stimulation of the Toll-like Receptor 9 to Reduce Amyloid Beta Deposition in Alzheimer’s Disease
Helen Lyo, Biology
Sponsors: Professor Henrieta Scholtzova, Neurology, NYU School of Medicine; Professor Thomas Wisniewski, Neurology, NYU School of Medicine

Alzheimer’s Disease (AD) is the 6th leading cause of death in the U.S. and the most common cause of dementia. It is characterized by memory and cognitive decline over time, of which there is no effective cure. The neuropathology of AD is associated with the presence of amyloid beta in the vessels and parenchyma and the formation of tau...
neurofibrillary tangles. The role of microglia/macrophage and inflammation is also important in the pathogenesis of AD. In this project, the innate immune system is pursued as a way to effectively activate macrophages/microglia to reduce amyloid beta deposition. Specifically, the Toll-like Receptor 9 (TLR9) recognizes unmethylated cytosine-guanosine-rich DNA oligonucleotides (CpG ODNs) to activate signaling pathways for immune cells. A particular concern with immunization for AD is cerebral microhemmorhages associated with increased cerebral amyloid angiopathy (CAA), a buildup of amyloid beta deposition in blood vessel walls. This novel treatment approach was explored through the transgenic mouse model Tg-SwDI, which expresses severe early-onset CAA. The mice were divided into two groups: 4-14 months before onset of amyloid beta pathology and 8-18 months after onset. Data show that modulation of microglial function via TLR9 activation is an effective way to lower amyloid beta deposition. It was determined that the CpG ODN treatment significantly reduced total vascular and parenchymal amyloid burden in both groups. There was no associated neuroinflammation such as increased astrocytosis and microgliosis observed in CpG ODN treated mice. This novel treatment approach can potentially serve as an effective, non-toxic therapeutic method for AD in humans.

Confocal Raman Microscopy (CRM) Studies of the Interaction of Phenothiazine Dyes with MCF-7 Breast Cancer Cells
Abdoul Majid Kone, Science, Borough of Manhattan Community College, CUNY
Sponsor: Professor Shanti Rywkin, Science, Borough of Manhattan Community College, CUNY

Phenothiazine dyes are approved drugs to treat topical cancers. This technique is called photodynamic therapy or PDT and the mechanism of cancer cell death is unknown. This research studies the interaction of the phenothiazine derivatives—methylene blue and toluidine blue—with MCF-7 cells, a tumorigenic breast cancer cell line, using confocal Raman spectroscopy. Since Raman spectroscopy is a labile free technique that provides vibrational details at the cellular level, it is hypothesized that it will be possible to monitor intracellular damage, and specific organelle interaction or damage after PDT treatment. Using confocal Raman spectroscopy this study provides a visual confirmation of the loss of cytochrome c which plays a central role in apoptosis that signals the cell to begin the process of programmed cell death. Based on the sharp drop in cytochrome c levels after treatment with toluidine blue, this is a more potent photosensitizer when compared to methylene blue.

Reducing Contamination of Ethiopian Waterways from Wet Coffee Processing
Natalie McCauley, Environmental Studies, International Relations
Sponsor: Professor Jennifer Jacquet, Environmental Studies

Ethiopia epitomizes the global water crisis: nearly half the population has no access to clean water. Coffee, one of Ethiopia’s most profitable industries, produces wastewater that contaminates Ethiopia’s waterways on a large scale—the effluent from one ton of coffee processed generates as much waste as 2,000 people per day. To quench the thirst of its citizens, Ethiopia must move its coffee industry toward less wasteful processing methods; but, current data is insufficient for coffee or water quality stakeholders to make informed decisions about how to improve water quality while maintaining the productivity of the industry. Drawing on experimental evidence from studies of singular regions in Ethiopia and in other coffee producing nations, this project presents a framework for determining which changes in coffee processing can most improve water quality. Once the baseline data is collected by field researchers, the framework presented here can be applied to different coffee growing regions across Ethiopia to determine the best course of action to maintain water quality in this thirsty nation.

Development of Hedonics: Ontogeny of Olfactory and Limbic System Circuits Supporting Maternal Odor and Predator Odor Responses in Rats
Kysa McSky, Neural Science
Sponsor: Professor Regina Sullivan, Child and Adolescent Psychiatry, NYU School of Medicine

Sensory systems must detect environmental stimuli and tag information to that odor. This provides the animal with information to emit the appropriate response. Tagging a sensory stimulus may be particularly important in the olfactory system, which is connected to limbic structures such as amygdala, prefrontal cortex (PFC) and hippocampus. The olfactory system is well-developed at birth, yet components of the limbic system gradually functionally emerge. This study explored whether rat pups’ responses to appetitive and aversive odors change during development as a function of the expanding convergence of the limbic system with the olfactory system. Long Evans Rat pups were assessed using C14 2-deoxyglucose autoradiograph (2-DG) and exposed to appetitive odors and aversive odors. Brains were processed and analyzed with Image J. Behavioral responses to aversive and appetitive odors were relatively maintained across development with some weakening of responses to preferred odors by weaning. In early development, all odors, regardless of value, are primarily represented by neural activation within the olfactory bulb and anterior piriform cortex. The response patterns of all odors expanded to include activation
of the hippocampus, prefrontal and orbitofrontal cortex by weaning. This suggests that processing during infancy is not stable but changes as the rat enters adulthood.

Arguments and Actors in the Recent U.S. Genetically Modified Organism (GMO) Debate
Katherine Mintz, Environmental Studies
Sponsor: Professor Jennifer Jacquet, Environmental Studies

The American public remains divided on the issue of genetic modification. A 2014 Pew Research Center survey revealed that 57% of respondents consider GMOs generally unsafe. In comparison, 88% of surveyed scientists from the American Association for the Advancement of Science consider GMOs generally safe. To understand the information that influenced the public’s divergent response to GMOs, 200 headlines and articles from four U.S. newspapers published between 2011–2013 were analyzed. The results show that positive coverage of GMOs uses science-based arguments. In comparison, negative coverage employs emotional or ethical arguments. The findings revealed certain arguments and actors received more media attention, indicated by higher frequency of mentions in articles. The arguments, and the actors that drive them, play a vital role in forming public opinion and affect ethical, practical, political and scientific considerations of GMOs. This research provides insight into arguments influencing public opinion on genetic modification and actors with the potential to change the GMO debate.

Helicity Estimation of 2′-O-Methyl DNA/DNA Hybrid Duplex Using Two-Dimensional Arrays
Michael G. Mohsen, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

DNA nanotechnology entails the use of nucleic acids to design and fabricate constructs of structural and topological importance as well as utilie nanoscale devices. DNA is an apt candidate for this type of work because of its high level of programmability, a consequence of its base-pairing interactions and sticky ends. These properties allow us to attain a much greater level of control over the structure of matter on the nanoscale than could be attained previously. 2′-O-methyl DNA is a nucleic acid variant that assumes only the A-form and is thought to have dominant helicity when hybridized with standard DNA. This has potential use in DNA nanotechnology: DNA can assume several forms, most commonly A-DNA and B-DNA, and the ability to control the helical form would introduce another feature which can be used to build more robust structures. However, many of the properties of this nucleic acid that would make it useful to DNA nanotechnology are as of yet uncharacterized. This study used a system composed of two double crossover (DX) tiles constructed from a hybrid of 2′-O-methyl-DNA and standard DNA in order to determine the helicity of the hybrid DNA/DNA hybrid duplex has been determined to be 12.1 base pairs per turn (Winfree, Liu et al., 1998).

Hydrogen Delocalization and Vibrational States of Ni(dmg)2, by a Discrete Variable Representation Method
Ryan Chris Moreno-Vasquez, Mathematics
Sponsor: Professor Margaret Mandziuk, Chemistry

In calculations of vibrational modes, hydrogen nuclei are light enough that they must be represented by quantum mechanical wave functions rather than as classical mechanical points. The two coupled intramolecular hydrogen bonds of bis(dimethyl-glyoximato-Nickel(II)) (Ni(dmg)2) provide an interesting setting in which to study hydrogen delocalization. The experimental assignment of Ni(dmg)2’s O-H vibrational modes is still controversial. Furthermore, its abnormally short O-H-O bonds lead one to expect symmetric hydrogen bonding, while X-ray determination of the structure shows they are in fact asymmetric. In this project, a computational study is designed to predict the quantum vibrational modes of the two hydrogen in Ni(dmg)2, which should help explain the asymmetry in hydrogen bonding. The potential energy surface for the two-hydrogen system was mapped by electronic structure methods to generate a spline potential energy function. The potential energy barrier for O-H-O proton transfer in Ni(dmg)2 was found to be quite low. The potential energy was then used in quantum mechanical calculations of the vibrational states by a Discrete Variable Representation (DVR) method. The results of this investigation of Ni(dmg)2 may elucidate the general properties of hydrogen bonding in coupled intramolecular asymmetric hydrogen bonds with low potential energy barriers.

Toward a Climate Justice Frame: How Social Movement Organizations Articulate Climate Change
Priya Mulgaonkar, Environmental Studies
Sponsors: Professor Jennifer Jacquet, Environmental Studies; Professor Dale Jamieson, Environmental Studies

Framing, the process of constructing meaning around an issue, is a critical component of social movement building. Effective frames, like the environmental justice (EJ) paradigm, motivate and empower previously unengaged citizens in a problem like air pollution by showing how it connects to their lives. As climate change presents perhaps the greatest collective action problem in history, how the issue is framed may determine whether action is taken to reduce greenhouse gas emissions. Social movement organizations (SMOs) have begun highlighting the intersection between climate change and social inequality, calling for “climate justice” (CJ). Some
scholars suggest that CJ is simply a global iteration of EJ. However, given the unprecedented nature of this crisis and the diversity of interests advocating for CJ, a new frame may be in development. This project examines how SMOs employ the rhetoric of justice in framing climate change by conducting a close content analysis of websites from five US-based SMOs: 350.org, Indigenous Environmental Network, Friends of the Earth, Labor Network for Sustainability and the National Association for the Advancement of Colored People. The results will reveal whether the CJ frame bridges existing themes of environmental justice with other movement frames to convey a truly inclusive and mobilizing message.

A Proposed EEG Study of Anabolic Androgenic Steroid-Treated HIV Patients to Examine Dose Timing-Related Effects on Impulsivity
Andre Nakkab, Psychology
Bryan Nelson, Mathematics, Psychology
Sponsor: Professor Pascal Wallisch, Psychology

Anabolic Androgenic Steroids (AAS) have a higher dependency rate than many other drugs where impulsivity has been observed in active users as well as during and after withdrawal. The authors propose the first ever EEG study of AAS users to examine the effects of dose-timing on impulsiveness to examine potential withdrawal effects. To do this a cohort of HIV-positive men with AAS-treated wasting syndrome will be assembled. The authors will measure orbitofrontal (a region well associated with impulsivity in previous literature) activity using an EEG while participants perform an Affective Go/No-Go task at different time points relative to AAS-administration, such as immediately before a cycle starts and midway through a cycle. In this protocol, the Go/No-Go is used to measure impulsiveness while the EEG measures orbitofrontal activity and anteriorization, which can then be correlated to impulsiveness. This study will be largely exploratory and will help to expand the literature by providing EEG activity of AAS users as well as by furthering associations between impulsiveness and EEG location and activity. Participants will be analyzed in a way that pairs them against themselves (repeated measures ANOVA), allowing us to see how activity changes with recency of use, providing valuable information for future clinicians.

Gut Reaction: The Effect of Early Life Gut Microbiota Perturbation on Intestinal Inflammation and Type 1 Diabetes Development in Non-Obese Diabetic Mice
Sandy Ng, Biology
Sponsor: Professor Martin Blaser, Medicine and Microbiology, NYU School of Medicine

Microbiota modulates the gut immune system and may influence development of diseases such as type 1 diabetes (T1D). Genetic and environmental factors influence T1D development, which has progressively increased in children since the 1950s. Environmental changes include antibiotics administered early in life, a critical time for immune development. This study hypothesizes that the increased T1D incidence is due to early life antibiotic treatments altering the microbiota and subsequently affecting gut immunity. This study assessed antibiotic-mediated effects on intestinal inflammation, which is characteristic of T1D, by examining secretory IgA levels in the gastrointestinal tract of non-obese diabetic (NOD) mice. Regulation of serum amyloid A (SAA) expression was also studied, which was significantly downregulated in antibiotic-treated mice, by culturing mouse intestinal epithelial cells (CMT-93) with lipopolysaccharides. It was found that early life pulsed antibiotic treatment lowered secretory IgA levels in male NOD mice during treatment. However, IgA levels were not significantly correlated with T1D progression in NOD mice. Lipopolysaccharides increased SAA expression in CMT-93 cells. The results show that antibiotic effects on the microbiota affect secretory IgA and SAA levels, which influence intestinal inflammation. Thus, these findings provide insight into early life antibiotic effects on the immune system, which may contribute to T1D pathogenesis.

Troublesome Techniques: Determination of Factors Affecting the Stability of Ribosomal Protein Coding Transcripts in Saccharomyces cerevisae
Christina Nunez, Biology
Sponsor: Professor David Gresham, Biology

Many methods currently exist to facilitate the estimation of RNA synthesis and decay rates. Unfortunately, varying techniques have produced incongruent results. Studies that utilize global transcriptional shut off methods demonstrate that total transcriptome decay rates are equal to ribosomal protein (RP) transcript decay rates. However, studies that utilize metabolic labeling demonstrate that RP transcripts are more stable than the average transcript. It was hypothesized that the general stress response associated with global transcriptional shut off negatively affects RP transcript stability and skews decay rates. To test this, this study utilized a third technique—doxycycline-controlled transcriptional repression—that does not induce a global stress response. The degradation of five ribosomal protein-coding transcripts was studied in five strains of Saccharomyces cerevisae with tetracycline-“off” activators upstream of the start codon. Transcriptional shut off and cell collection over time was performed, followed by RNA extraction and qPCR analysis. These findings will elucidate the importance of technique selection in accurately determining transcript abundance and decay rates. Furthermore, they will contribute to the current understanding of RP transcript stability,
which has implications in protein assembly and biological process regulation. These are both important targets for therapeutic intervention in disease initiation and progression.

**Searching for Gaps in AGN Disks Using SDSS Spectra**
Ricardo dos S A Nunes, Engineering Science, Borough of Manhattan Community College, CUNY
Sponsor: Professor Kathleen E. Saavik Ford, Science, Borough of Manhattan Community College, CUNY

Almost all galaxies contain, at their centers, a supermassive black hole (SMBH; 106-1010Msun). A small fraction of these SMBHs are surrounded by a gaseous accretion disk, leading to the observational phenomenon of Active Galactic Nuclei (AGN). This study searched for evidence of gaps in AGN accretion disks by analyzing the spectra of a sample of the brightest AGN from the Sloan Digital Sky Survey (SDSS). If a gap is present in an AGN accretion disk, it is expected that a wavelength dependent flux decrement due to the missing gas would be found. Such a gap can only be formed if there is a secondary object in the disk that is at least the mass of an Intermediate Mass Black Hole (IMBH). If found, this would be the first example of such a close, massive binary black hole system. Finding such a gap would also allow limits to be set on the aspect ratio and viscosity of the disk.

**The Effects of Ocean Acidification on the Growth and Feeding Rates of Filter Feeders**
Brynn O’Donnell, Environmental Studies
Leon Yin, Biochemistry
Sponsor: Professor Mary Killilea, Biology

Anthropogenic climate change is having a growing impact on ocean chemistry, as rising atmospheric CO2 results in an influx of CO2 to the ocean that dissolves in seawater as inorganic carbon, resulting in lower chemical saturation points for calcium carbonate (CaCO3), which are the building blocks for calcifying organisms such as oysters. Bivalves such as oysters are particularly susceptible to ocean acidification for this reason. Oysters and other filter feeders eat by moving water through their gills and removing suspended plankton. Thus decreased feeding rates may result in a rise of plankton and therefore an increase in the murkiness, or turbidity, of the water. This deterred water quality could impact the biogeochemical exchanges and the productivity of a marine ecosystem. However, ocean acidification remains amongst the least funded issues pertaining to climate change. As ocean acidification threatens the health of calcifying bivalves, this study explores the possible effect acidification has on the metabolism of filter feeders, and the subsequent effect on turbidity. Oysters (C. virginica) and clams are grown under two pCO2 regimes: under current conditions and projected end of the century conditions. CO2 is manipulated for 28 days, over the course of which phytoplankton is injected for feeding, and water quality is measured daily. At the conclusion of the experiment, it was found that the oysters within the acidic conditions yielded greater average growth in terms of both length and mass, yet there were higher readings of turbidity within the acidic tanks.

**Recycling Signage and Behavior Change**
Sebastian Oja, Individualized Major
Tessa Rosenberry, Environmental Studies
Richard Davis Saltonstall, Economics, Environmental Studies
Justin Turlip, Environmental Studies
Sponsor: Professor Katie Schneider Paolantonio, Biology

Universities across the country are struggling to reduce the amount of waste they send to landfills and incinerators. Although some schools have managed to make ground-breaking improvements in waste management over the past few decades, many schools are still struggling to make ground. Schools like NYU only divert about 30% of waste away from landfills even though they have the potential to recycle as much as 90 or 100%. This study seeks to build an understanding of the sociological impact of signage updated with weekly feedback on recycling behaviors at NYU. The aim of this study is to determine the efficacy of a new recycling bin design for sorting waste and to evaluate a new signage method for its ability to increase diversion and sorting accuracy rates. The authors hypothesize that the new bin and signage design will significantly increase recycling rates 10% or more.

**Knowing Where You’re Going: Disambiguating Overlapping Routes**
Ashima Oza, Psychology
Sponsor: Professor Brice Kuhl, Psychology

Have you ever walked down the street thinking you’re going to the grocery store but ended up at the coffee shop instead? People often travel along overlapping routes that lead to different destinations; the present study focuses on discovering the point at which they can disambiguate between a pair of overlapping routes. In a behavioral study, participants \( N=19 \) viewed two pairs of overlapping routes that led to different destinations around New York City. Then, they were shown images from these routes and had to identify the destination. Participants were more accurate at identifying the destination with each successive viewing of the route and for images drawn toward the end of the route. For the majority of incorrect responses, participants selected the destination corresponding to the overlapping route, which indicates errors resulted from the inability to differentiate between overlapping routes. Participants were also
able to disambiguate between pairs of overlapping routes before the routes diverged, a fact which suggests people are able to distinguish between two perceptually similar routes and identify where they are going in the early stages of navigation. Results from a concurrent fMRI version of this study support behavioral results and reveal that patterns of activity within the hippocampus also discriminate between routes. This allows individuals to devote more attention to other tasks while navigating—talking on the phone, taking pictures or admiring the scenery.

**Mapping Odor Representations with a Novel, Photo-convertible Protein**  
Leeann Ozer, Music, Neural Science  
Sponsor: Professor Dmitry Rinberg, Neuroscience and Physiology, NYU School of Medicine

A fundamental goal of neuroscience is to reveal how the brain represents information about physical stimuli in the external world. For rodents, chemosensory cues provide critical ethologically relevant information to the animal; thus, the rodent olfactory system has emerged as a model system for studying sensory coding and dynamic sensory representations. Yet, the nature of odor representations in the olfactory system is not completely understood. This thesis aims to develop a method for tagging populations of active neurons in vivo in awake, behaving animals to enable simultaneous identification of the primary active neurons of interest as well as their post-synaptic targets in downstream cortical structures. To do this, this study used a novel fluorescent protein that changes conformation and, subsequently, emission wavelength in the combined presence of intracellular calcium and violet light. Using this novel technique, will make it possible to identify populations of olfactory neurons that are active during specific odor perceptions. Dr. Loren Looger and his colleagues at Janelia Research Campus recently developed this modified fluorescent-calmodulin protein, the Calcium Modulated Photoactivatable Ratiometric Integrator (CaMPARI). Using CaMPARI, one can take an activity “snapshot” of neuronal activity in a time window that is tightly temporally defined according to the external application of violet light while also ensuring that active neurons remain marked for post mortem whole-brain analyses. Thus, CaMPARI is a promising tool for studying the nature of olfactory representations.

**Rapid Statistical Adaptation Alters Perception in Humans without Awareness**  
Ravi Pancholi, Chemistry  
Sponsor: Professor Marisa Carrasco, Psychology

Adaptation is a biological imperative. Quick adaptation of sensory systems to subtle variations in stimulus properties confers metabolic and evolutionary advantages through the conservation of neuro-metabolic resources. This re-encoding is achieved through a reduction in neural firing rate as a result of prolonged exposure to congruent stimulus properties. Orientation-selective neurons in the primary visual cortex of anesthetized cats adapt their response properties to match a bias in the statistics of rapidly changing stimuli. This study showed that a similar change in response properties can manifest itself in human observers as a perceptual repulsive bias. It was also found that this distortion in perceptual reports occurs even when observers are unaware of the biased feature, a novel result. Given the tendency of subjects to compensate if they are aware of a biased stimulus, this mode of unconscious adaptation presents psychophysicists with the ability to probe the effects of adaptation on neural populations without the risk of potential observer bias. In addition, these findings could help elucidate the mechanism of adaptation in the brain, specifically the downstream cascade of distortions in early population responses and their possible compensation in higher cortical regions.

**A Behavioral Assessment of in utero GVG in Attenuating NAS Withdrawal Behavior**  
Krishna Patel, Biology  
Sponsor: Professor Stephen Dewey, Molecular Medicine, Hofstra North Shore-LIJ School of Medicine

The growing concern of neonatal abstinence syndrome (NAS), a drug withdrawal disorder that occurs in neonates from drug abuse during pregnancy, has called for alternative prenataily administered treatments. Current treatments for NAS involve replacement therapies using morphine and methadone to reduce NAS symptoms such as withdrawal and seizures; however, these treatments have the potential for addiction and developmental effects. This study examined gamma-vinyl GABA (GVG, Vigabatrin), an FDA approved non-addictive antiepileptic drug shown to inhibit dopamine level increases and drug-seeking behavior from drugs of abuse, as a potential NAS treatment. A reduction in withdrawal behavior was expected in neonates with NAS given GVG prenatally. Pregnant Sprague Dawley rats from gestation day 2 were administered morphine (20-60 mg/kg/day), saline, morphine + GVG (25 mg/kg/day) or morphine + GVG (50 mg/kg/day). Withdrawal behavior in neonates on postnatal day 1 was measured by scoring time sampled videos at 15 minute intervals and assigning a Gross Behavior Score (GBS) based on locomotion, rolling, curling and stretching. Results showed that morphine + GVG (50 mg/kg/day) pups had similar behavior scores to saline and significantly lower scores compared to morphine (p<0.05). Therefore, GVG may have potential uses for reducing withdrawal in neonates with neonatal abstinence syndrome.
Caffeic acid phenethyl ester (CAPE), the active component of the natural honeybee product, propolis, has been known to exhibit anti-inflammatory, antioxidant, and antitumor effects on cancer stem cells (Wu, Omene et al., 2011; Omene et al., 2012). Thus, it was hypothesized that CAPE would inhibit mammary stem cells (MaSC). Single primary mouse mammary epithelial cells (MEC) and antitumor effects on cancer stem cells (Wu, Omene et al., 2011; Omene et al., 2012). Thus, it was hypothesized that CAPE would inhibit mammary stem cells (MaSC). Single primary mouse mammary epithelial cells (MEC) were isolated from Balb/c mice and cultured for 8 days in Ultra Low Attachment 96 well plates using mammosphere media (Guo et al., 2013). Mammospheres (MMS) formed were dissociated and recultured with or without CAPE for 8 days. MMS were stained with luminal marker K18, PR and myoepithelial marker K14 and examined using immunofluorescent microscopy. Results show a dose-dependent decrease in mammosphere forming efficiency (MFE) with CAPE treatment. Furthermore, it was found that MMS showed an increase in immunofluorescence expression of the luminal markers PR and K18. These effects were seen up to the tertiary generation. Estrogen receptor (ER)-negative breast cancer, a biologically aggressive subtype of breast cancer, is thought to arise from MaSC (Visvader and Lindeman, 2011). The results indicate that CAPE inhibits MaSC self-renewal possibly via differentiation to a less aggressive and more favorable ER+ luminal phenotype. Thus, CAPE may potentially serve as a novel, chemo-preventive agent for women who are at high risk for ER Negative Breast Cancer.

Specificity of Fragile-X Mental Retardation Protein-RNA Complex
Shivangi Patel, Biochemistry
Sponsor: Professor Alexander Serganov, Biochemistry and Molecular Pharmacology, NYU School of Medicine

Fragile X Syndrome is the most common heritable form of mental retardation and a known genetic form of autism. The disease is caused by the absence of functional Fragile X Mental Retardation Protein (FMRP). In cells, FMRP interacts with many nucleic acids and proteins and is involved in various cellular processes. One of the major functions of FMRP is to repress translation of a subset of neuronal messenger RNAs until a specific signal is received. The loss of this translational repression is likely the underlying cause of the syndrome. How FMRP selects its mRNA targets for inhibition remains unclear. This study sought to reveal the molecular basis for the binding of FMRP to its mRNA targets through X-ray crystallography and biochemical assays. We have crystallized and determined the three-dimensional structure of an RNA-binding fragment of FMRP bound to RNA. The data suggests that FMRP can bind RNA specifically and not promiscuously as previously thought. These results will help define the RNA recognition pattern of FMRP, identify mRNAs bound by this protein and suggest novel targets for treatment options of the currently incurable Fragile X Syndrome.

Learning-Induced Long-Term Changes Measured by Cytochrome Oxidase Activity
Maria Perica, Neural Science
Sponsor: Professor André Fenton, Neural Science; Dr. Kally O’Reilly, Neural Science

It is commonly assumed that learning persistently changes brain function. This study tested that hypothesis by measuring learning-induced changes in cytochrome Oxidase (CO) activity. CO is a metabolic marker of neuronal activity for measuring steady-state brain function. Rats learned to avoid a shock zone in a rotating arena, measured by the reduction in number of shocks the animals received. Yoked animals received the same physical experience as a trained counterpart but could not avoid shocks. One week later, the brains were processed for CO activity. It was found that functional connectivity (measured as interregional correlation of CO activity) was different between trained and yoked animals. Specifically, significant differences were found between dorsal CA1 (dCA1) of the hippocampus and the cingulate (CgG) region of the prefrontal cortex, two regions thought to be involved in learning and decision-making. In trained animals, CO activity of CgG and dCA1 correlated to number of shocks on days one and two respectively. These correlations were not observed in yoked animals, a finding which indicates activity in dCA1 and CgG correlates to learning rather than shock itself. It is concluded that learning can change steady-state brain function and that CO activity provides a novel platform for investigating functional alterations due to experience.

Hybrid Decoding for Brain Machine Interfaces
Hanza Pervaiz, Neural Science
Sponsor: Professor Bijan Pesaran, Neural Science

Brain machine interfaces (BMI) allow for a decoding of the neural signal in order to control an external machine such as a prosthetic limb. Previous research has indicated that there is no significant difference in decoder performance for two areas in the brain. This research is contingent upon using a reductive measurement for movement: aperture of the handgrip. This research creates a novel paradigm for measuring movement. These new measurements encompass a larger portion of the information encoded in the hand, based on type of grip and joint angles. With this novel method we find a decoder performance preference for one area over the
other. We now create a hybrid decoder that decodes based on area in the brain for optimal decoder performance. Brain machine interfaces allow for patients who are paraplegic or locked-in to use prosthetic limbs by using only their minds to control the machinery. It is essential that the decoding algorithms involved in converting the signals read from the brain into commands for machinery are accurate and precise.

**Analysis of Novel Binding Groups for Incorporation in Magnesium Sensors**  
**Sebastian Piombo, Chemistry**  
**Sponsor: Professor Daniela Buccella, Chemistry**

Recent studies have suggested that magnesium dysregulation plays a role in the development of several human diseases including, but not limited to, hypertension, diabetes, osteoporosis and features of cardiac and neurological health. That magnesium is relevant to human health is undeniable, yet current technologies for the measurement of in vivo free magnesium concentrations have several significant flaws. Fluorescent sensors offer an opportunity to refine the study of this critically important divalent cation in vivo. However, the specificity of magnesium sensing hinders this field as the most commonly used binding group, o-aminophenol-N,N,N,O-triacetic acid (APTRA), has a significantly higher binding affinity for calcium ions. This high affinity for calcium can lead to artifact in certain dynamic systems, which interferes with the measurements of what should be solely free magnesium. In this work, novel binding groups are both synthesized and analyzed in hopes of finding an alternative to APTRA for use in magnesium sensing. Through the use of a novel binding group, fluorescent sensor specificity might be altered such that the artifact due to calcium binding in vivo is minimized or eliminated altogether. This refinement would allow fluorescent sensors to play a critical role in illuminating the intricacies of magnesium’s role in human health.

**Diversity and Profiling of Clostridium difficile Isolates Identified by Whole Genome Sequencing**  
**Tanni Rahman, Biochemistry**  
**Sponsor: Professor Harm van Bakel, Genetics and Genomic Sciences, Mt. Sinai Hospital**

*Clostridium difficile* is a gram-positive, anaerobic, multi-drug resistant bacterium that grows in spores. It is often acquired in healthcare facilities while receiving treatment for other conditions. After exposure to *C. difficile* spores, the risk of infection in healthy individuals is low as its growth is kept in check by other gut bacteria. However, disruption of the microbial balance (e.g., due to prolonged antibiotics treatment) may result in its proliferation. Pathogenic strains produce enterotoxins that attack the mucosal lining of the gut, which causes inflammation, pain and diarrhea. In severe cases, patients may develop pseudomembranous colitis. From 2001-2010 in the United States and internationally, *C. difficile* infections increased significantly in frequency and severity due to the emergence of a new hyper-virulent strain. Its transmission continues to afflict healthcare settings and compromise the quality of patient care. Therefore, it is necessary to identify proper areas of intervention. In this study, next generation whole-genome sequencing is applied to *C. difficile* isolates that were obtained from a US hospital and an abroad site to assess the diversity of strains and to generate toxin and antibiotic resistance profiles. The degree of *C. difficile* transmission is determined and potential areas for improvement of infection control are identified.

**Categorical Object Representations in the Primate Brain**  
**Priyanka V. Ramesh, Neural Science**  
**Sponsor: Professor Lynne Kiorpes, Neural Science**

Does the primate brain have “innate” representations of certain objects? This experiment sought to understand the origins of object representation in the brain. This study examined whether object recognition performance differed for biologically-relevant and non-biologically relevant stimuli and the influence of familiarity of objects in young non-human primates. It was hypothesized that if there are “innate” object representations they will exist for biologically relevant, familiar stimuli and that these stimuli will be processed preferentially to non-relevant, unfamiliar stimuli. An Odd-Man-Out Task was used in which the subjects chose which of three stimuli was different (target) from the other two. Performance was assessed by accuracy and reaction time. If biologically relevant, familiar stimuli were processed faster or more accurately than the non-biologically relevant, unfamiliar stimuli, it would indicate the brain might be hard-wired to process such biologically relevant objects. The results showed subjects’ best performance was with simpler, more basic objects regardless of biological relevance and similarity while more complex objects were harder to differentiate from one another. These results show that representations that are more salient, and perhaps preferentially processed, are simpler objects over complex ones.

**Laser-Scribed Graphene—Characterization of Structural and Vibrational Properties**  
**Dave Rivkin, Chemical Engineering, Borough of Manhattan Community College, CUNY**  
**Jophsio Lorenzo, Chemical Engineering, Borough of Manhattan Community College, CUNY**  
**Sponsor: Professor Friedrich Hoffman, Science, Borough of Manhattan Community College, CUNY**

Graphene, a sp²-hybridized form of 2-dimensional carbon, exhibits unique electronic, optical, mechanical and thermal properties. It is one of the strongest materials known, with a breaking strength over 100 times greater than
a hypothetical steel film of comparable thickness. Graphene also has excellent electronic properties. Theoretically, the extremely high electron mobility could result in electronic devices, which could work at almost 200 times the speed of conventional silicon based devices. Potentially, graphene could find a wide array of applications: e.g., ultra-long-life batteries, supercapacitors for energy storage, bendable computer screens, desalination of water, improved solar cells, superfast microcomputers. However, in spite of the great promise of graphene, the development of commercial applications has been slow due to the difficulty to manufacture this nano-material economically in large quantities and sizes. Two basic approaches to producing graphene in the lab use the “top-down” methods of either cleaving multi-layer graphite into single layers or conversion and exfoliation of a graphite based precursor material. The current project used graphite oxide (GO) as a precursor for the generation of large-scale graphene-based materials. Utilizing a LightScribe DVD writer, the red laser of this device is used both for the conversion of graphite oxide to graphene and for exfoliation of the multilayer. The DVD writer can also be programmed to pattern graphene structures at very high resolution and precision. Graphene/graphite layers produced with this method are characterized with Raman Microscopy and Atomic Force Microscopy to determine vibrational and structural properties.

Regulation of GOT1 in a Non-canonical Metabolism Pathway in Pancreatic Cancer
Michelle Rudshteyn, Global Public Health/Chemistry
Sponsors: Professor Lewis Cantley, Department of Medicine, Weill Cornell Medical College; Dr. Costas Lyssiotis, Weill Cornell Medical College

Unlike healthy, normal cells, pancreatic cancer cells exist in a harsh tumor environment and are under increased oxidative stress. To survive under these conditions, cell metabolism is rewired to support the generation of pro-survival anti-oxidants. The Cantley lab previously described the non-canonical, transaminase-mediated pathway by which glutamine is metabolized to enable tumor growth. This research investigates regulation of aspartate transaminase (GOT1), a critical enzyme in the pathway, by tyrosine phosphorylation and other post-translational modifications. Seven potential modification sites were identified based on an analysis of GOT1 sequence and structure, which showed strong evolutionary conservation at the sites and that the enzyme is heavily phosphorylated in cancers. Immunoprecipitation of GOT1 followed by immunoblotting provided evidence that GOT1 is tyrosine phosphorylated. To study the potential phosphorylation sites, site-directed mutagenesis was conducted to create mutant DNA constructs lacking one of the certain sites (e.g., tyrosine to phenylalanine). These were used to generate GOT1-mutant-expressing pancreatic and colon cancer cell lines, which will elucidate the dependence of cell growth and metabolism on tyrosine phosphorylation. Importantly, this glutamine-supported metabolic pathway is unique to pancreatic cancer. Determining the mechanisms of GOT1 regulation and expression can, therefore, provide a much-needed therapeutic target for this disease.

Structure Function Analysis of the Zelda Protein in Caenorhabditis elegans
Hadeel Sadek, Biology
Sponsor: Professor Christine Rushlow, Biology

At a certain point during early embryogenesis in all organisms, a process called the maternal-to-zygotic transition occurs whereby the embryo comes to rely on its own gene products rather than those deposited into the egg by the mother. Maternal RNA degradation and zygotic genomic activation are hallmark events of this transition. The transcription factor Zelda has been shown to play a significant role in genome activation in the fruit fly Drosophila melanogaster. Zelda binds to CAGGTAG sites found in the enhancer regions of the early acting genes. This project performs a structure function analysis of the Zelda protein and looks specifically at the importance of certain regions of Zelda in activating genes. The project aims to explore the function of a highly conserved region surrounding an N-terminal zinc finger and several other domains of the protein that have yet to be tested. This will be achieved by comparing expression patterns of early zygotic genes in wild-type embryos and embryos carrying Zelda-protein mutations. The results may provide insight into the basic mechanisms of gene regulation and activation during early development. By further understanding these processes, the errors that occur in these processes can also be better understood, which could lead to human disease such as cancer.

Dosage Compensation Complex Spreading in Caenorhabditis elegans
Mohammad Sadic, Biology
Sponsor: Professor Sevinc Ercan, Biology

Condensins are evolutionarily conserved protein complexes that regulate chromosome condensation in eukaryotes. However, the mechanisms of condensin binding remain unknown. In Caenorhabditis elegans, a condensin complex known as the dosage compensation complex (DCC) specifically binds to both X chromosomes in hermaphrodites and represses transcription by half to equalize hermaphrodite (XX) and male (XO) X-expression. The DCC serves as a clear paradigm to study the mechanisms of condensin binding because two modes of binding can be distinguished: recruitment and spreading. Recruitment
is fairly well understood, but spreading is not. Based on the structural features of the DCC, it is hypothesized that the DCC could spread linearly, sliding like a ring along thread. Alternatively, the DCC may “hop” from one site to another using chromatin loops. To distinguish these two types of spreading, a catalytically inactive Cas9 protein (dCas9) will be targeted to one side of a recruitment site to block spreading. DCC ChIP-seq experiments will be used to see how blocking affects DCC spreading. Decreased DCC spreading across the dCas9 block suggests linear spreading, but no effect on DCC spreading suggests spreading using chromatin loops. Determining the mechanisms of condensin spreading is important for understanding how condensins regulate chromosome structure.

**Seven-Membered-Ring trans-Alkenes Reactivity**  
*John Santucci III, Chemistry*  
*Sponsor: Professor Keith Woerpel, Chemistry*

The reactivity of seven-membered-ring trans-alkenes was studied in two newly synthesized compounds. “Seven-membered” refers to the size of the ring being utilized and the term “trans-alkene” refers to a specific type of carbon-carbon double bond that adds strain to a molecule. Strain is caused by any deviation from standard geometrical predictions and can lead to increased reactivity. The first trans-alkene synthesized was composed of two seven-membered rings bonded together. The presence of a second ring induced further strain on the double bond. In another less strained system, the ring’s double bond was substituted with a CH3 group. The less strained molecule showed greater reactivity in the experiments performed: it produced new products at rates faster than dimerization, rearrangement or decomposition of the starting material. Rearrangement, dimerization, decomposition and air instability are all challenges faced when working with seven-membered-ring trans-alkenes. The difficulty in synthesizing these molecules leaves many questions about their reactivity and the potential stability of other variations containing different ring substituents. By studying the effects of varying the substitution of the double bond, a better understanding of these molecules viability as synthetic targets can be ascertained.

**The Need for Numbers: Unrecognized Impact of Four Environmental Education Organizations**  
*Hannah Saunders, Environmental Studies*  
*Sponsor: Professor Jennifer Jacquet, Environmental Studies*

Evaluating the success of experience-based and non-formal environmental education can be difficult. In their 2010 article, Carleton-Hug and Hug identify eight categories of evaluation-related challenges for environmental education programs such as institutional resistance and lack of clear program objectives. If they want to sustain, improve and grow in a society that increasingly bases its environmental decisions in quantifiable data, environmental education organizations (EEOs) may have to adapt how they self-evaluate. This study seeks to find the middle ground between the necessity of measurement and the nature of EEOs’ impacts to be unquantifiable. The program directors of six EEOs were interviewed to pinpoint challenges that were then compared across funding and organization type. From this, existing non-formal structures of impact measurement were identified that could be translated to a format accessible to decision-makers and funding sources. Drawing from the assessment tools of Harder et al. (2014) newly created values-based evaluation framework, this study analyzed its compatibility with each of the EEOs studied. This application in six new cases of Harder et al.’s alternative framework and the identification of further challenges and structures of impact measurement works toward the accurate recognition and funding of environmental education.

**How Price and Carbon Footprint Labels Affect Consumer Preference to Purchase Used Goods, Barter or Buy Them New**  
*Royal Sayewitz, Environmental Studies*  
*Sponsor: Professor Anne Rademacher, Anthropology*

We live in an era of unprecedented material abundance and waste: in North America only one percent of material goods are still in use just six months after their sale. However, second-hand markets are gaining traction as a preferred mode of procuring goods. Such markets inherently maximize the use phase of material goods and reduce the environmental costs associated with the production of new material goods. This work investigates the effect of carbon labeling on consumer preference to 1) purchase goods used, 2) barter for them or 3) buy them new in order to better understand whether such a tool can be used to promote less environmentally burdensome modes of material consumption. This study presents the results of a survey and answers three main questions: 1) Does price affect preference to buy new, buy second-hand or barter for material goods? 2) Are individuals more willing to barter/buy used material goods when carbon footprint information is provided? 3) How does a person’s ecological worldview correlate with procurement preference, both with and without carbon footprint information? These results illuminate ways to enhance collaborative consumption.

**Autism Spectrum Disorder-Like Phenotypes Accompanied with Learning Impairments in the eIF4E/Fmr1 Double Mutant Mice**  
*Manan N. Shah, Neural Science, Psychology*  
*Sponsor: Professor Eric Klann, Neural Science*

Autism spectrum disorders (ASDs) are classified by repetitive and perseverative behaviors, anxiety-like...
behaviors, deficits in social interaction skills and, often, cognitive dysfunction. To date, no specific cause of ASDs has been found. However, previous research indicates that various mutations lead to ASD-like behaviors in rodent models. This study examined the effect of crossing eIF4E transgenic mice, which have been shown to demonstrate ASD-like behavior due to exaggerated translation, with Fmr1 knockout mice, which is a well-established mouse model of fragile X syndrome (FXS). This study hypothesized that because the two mice models exaggerate protein synthesis at different stages of translation, crossing them would generate an exaggerated phenotype. In the marble burying task, the single and double mutants demonstrated repetitive/perseverative behaviors compared to wild type. In the social interaction task, the single and double mutants demonstrated deficits in social behavior compared to wild type. In the novel object recognition task and Morris water maze, double mutants demonstrated an impairment in learning. Therefore, consistent with this study’s hypothesis, the double mutant exhibits ASD-like phenotypes in addition to cognitive dysfunction, a symptom not observed in either single mutant. These results will aid in the ongoing attempts to understand the molecular and genetic mechanisms of ASDs.

**Using FIREWACh as a New Tool for Identifying Key Transcription Factors Mediating the Direct Programming of Embryonic Stem Cells to Spinal Motor Neurons**

*Doaa Shalabi, Economics*

*Sponsor: Professor Lisa Dailey, Microbiology, NYU School of Medicine*

Spinal cord injury results in the loss of sensory and motor neuron function and can lead to partial or total paralysis. Emerging technologies in stem cell biology generate specific cell types in vitro for replacement of diseased or damaged cells and tissues. Traditional approaches entail a determination of optimal combinations of growth factors or other signaling molecules that will cause embryonic stem cells (ESCs) to differentiate into the desired specialized cell type. However, the generally low efficiency and lengthy duration associated with these protocols represent major challenges to clinical application. More recently, direct programming, which utilizes the forced expression of key transcription factors in a cell type, has been successful in redirecting cell identity to that of a desired target cell type. Its success requires there be a means for identifying relevant key TFs that can effectively redirect cell fate. To address this challenge, the Dailey Lab utilizes a new approach, named FIREWACh, that has been developed for directly identifying functional transcriptional regulatory enhancers that are uniquely utilized for activating sMN gene expression. It requires the transduction of cells with viruses containing nucleosome-free region DNA cloned into lentiviral reporter plasmids. Motif analyses of the sMN- enhancer sequences will identify key TFs driving sMN fate and define TFs required for efficient programming of fibroblasts to sMNs, providing a new strategy for use in replacement therapy.

**Investigating Medial Temporal Lobe Contributions to Temporal Perception and Memory**

*Brynn Sherman, Politics*

*Sponsor: Professor Lila Davachi, Psychology*

Our continuous stream of cognitive and perceptual input is parsed into discrete events at “boundaries” or contextual changes. Recent behavioral work has shown that event boundaries reduce associative memory for information occurring across a boundary, and this can be manifested in a distortion of the perceived temporal order or distance between items across a boundary. Neuroimaging data have suggested that activity in the hippocampus contributes to successful bridging of these boundaries and formation of associative memories across multiple events. To examine the contributions of the medial temporal lobe to bridging and keeping time across boundaries at different time scales, patients with unilateral or bilateral medial temporal lobe damage completed two temporal estimation tasks. Bilateral medial temporal lobe and left temporal lobectomy patients showed an impaired ability to bridge across contextual boundaries at the long time scale. However, these patients show no impairments at the short-time scale, a fact which suggests that although they remain sensitive to boundaries and exhibit normal event resetting at boundaries, they fail to bridge these boundaries in memory at a delay. Together these data complement fMRI data suggesting left-lateralized hippocampal processes may be necessary to integrate information across changes and link distinct events in memory.

**Everyday Stories: How Do Changes in Time and Space Shape Memory in People with and without Schizophrenia?**

*Ilana Shiff, Psychology*

*Sponsor: Professor Lila Davachi, Psychology*

Though experiences unfold continuously, people segment incoming streams of information into events in order to process, understand and retrieve them. The current study investigates the impact of event boundaries, the points at which one event ends and another begins, on memory for naturalistic stories. In Experiment 1, healthy participants read and recalled two Curious George stories. It was found that memory for the order of sentences was enhanced within the same spatial context compared to across spatial boundaries. In fact, memory for spatial boundary sentences themselves was disrupted. Interestingly, order memory within the same temporal context compared to across time boundaries was the same. In Experiment 2, this process was explored in...
schizophrenic patients, a population typically characterized by deficits in episodic memory and disorganized thought. Unlike the healthy cohort, schizophrenic patients did not differ in their recall and order memory as a function of boundary type. Together, these data replicate and expand prior work on the effects of event boundaries on episodic memory to a naturalistic stimulus. The data also raise questions about why types of changes may differentially affect memory. Furthermore, the comparison with a patient population helps to understand the specific cognitive impairments underlying the memory deficit in schizophrenia.

A Proof of Instability for Higher-Order Sigma-Delta Quantization under the Greedy Quantization Rule
Tobias Shin, Mathematics
Sponsor: Professor C. Sinan Güntürk, Mathematics

Analog-to-digital conversion is the process of representing a continuous analog signal by a discrete, quantized set of elements (bits) from a finite alphabet. This research focuses on a particular conversion process known as sigma-delta modulation and a specific algorithm known as the greedy quantization rule. Sigma-delta modulation operates by choosing, for each given signal sample, an appropriate quantized output associated with a suitable difference equation. The greedy rule, at each time step, sets the quantized output to be the value that minimizes the next state of the solution to this difference equation. It is known that the greedy rule maintains optimal stability for first-order sigma-delta modulation (i.e., the analog signal can be represented as best as possible) and that the greedy rule maintains stability for second-order modulation (i.e., bounded, but not optimally). However, the greedy rule fails even in maintaining stability for higher-order modulation, which is needed for high accuracy approximations. This project is a proof of the aforementioned instability, which was observed through numerical simulations. A proof of instability justifies the use of alternative, non-greedy quantization rules for high accuracy applications as well as understanding when and how they become stable.

Proinflammmatory Biomarkers and Post-Breast Cancer Lymphedema
Nikita Singh, Global Public Health/Chemistry
Sponsors: Professor Daniel Malamud, Basic Science and Craniofacial Biology NYU College of Dentistry; Professor Mei R Fu, NYU College of Nursing

Breast cancer related lymphedema is the abnormal accumulation of lymph fluid in the interstitial tissue space caused by disruption in the lymphatic system associated with cancer treatment. This debilitating condition affects millions of women treated for breast cancer. Patients undergoing breast cancer treatment are at lifetime risk for lymphedema, which can cause discomfort, impaired limb mobility and impaired physical function all of which significantly decrease survivors’ quality of life. Currently, there is no cure for lymphedema. Infection and obesity are the two major risk factors for women who have developed lymphedema after breast cancer treatment. Proinflammatory and lymphogenesis biomarkers may be associated with lymphedema due to the risk factors of infection and obesity. Thirty-seven breast cancer patients were recruited and their blood and saliva samples were collected and analyzed 12 months post surgery. The biomarkers evaluated include the lymphatic specific growth factors (VEGF, VEGF-C, VEGF-D), which can act as potential prognostic markers for disease activity, and proinflammatory cytokines (IL-1β, IL-4, IL-6, IL-8, IL-10, IL-13, TNF-α), which are important in predicting inflammatory responses and immune system regulation. The goals of this study are to 1) compare proinflammatory and lymphogenesis biomarker levels in plasma and saliva samples and 2) evaluate the relationship between these biomarkers and lymphedema. Biomarker levels were analyzed using an electrochemiluminescence detection system (MesoScale Discovery (MSD)), which uses specific anti-human Sulfo-tagged antibodies for each biomarker and achieves picogram level sensitivity. Biomarker levels of a patient are usually evaluated using blood samples, which is invasive. However, the collection of saliva is non-invasive and displays biomarker levels comparable to their blood sample counterpart. Thus, saliva samples may be used as an alternative to blood samples in the future as diagnostic indicators of lymphedema.

Design of 4-Turn Tensegrity Triangles with PX Edges
Jessica Somberg, Chemistry
Sponsor: Professor Nadrian Seeman, Chemistry

It has been demonstrated previously that DNA tensegrity triangles containing 2-, 3- and 4-turns per edge can self-assemble into designed 3D crystals via sticky-ended cohesion (Liu, Wang et al., 2004; Zheng, Birktoft et al., 2009). Moreover, it was found that 2-turn DNA tensegrity squares can form designed 2D but not designed 3D lattices. Recently, it was shown that a 3-turn DNA tensegrity triangle containing DNA triplex edges can also self-assemble into designed 3D lattices. The present work expands the notion of using DNA motifs in the edge of a 4-turn tensegrity DNA triangle. This study designed both symmetric and asymmetric triangles using a panenemic crossover motif for the edges that has been programmed to associate into a 3D lattice structure (Shen, Yan et al., 2004). Preliminary gel data have shown that the designed strands assemble into a unique structure characterized by a single band formed on a non-denaturing polyacrylamide gel. Future applications include the ability to create three-dimensional structures...
that can manipulate and program protein interactions not generally found in nature.

**Design of G1 DNA Origami Toroid Surfaces via Topologically Knotted Scaffold Strands**

Jessica Somberg, Chemistry  
*Sponsor: Professor Nadrian Seeman, Chemistry*

The Color Theorem states the separation on an object into contiguous regions can be distinguished by a sufficient number of colors based on the genus of the object. G0 objects only require 4 colors, while g1 objects such as a torus require 7 colors based on the theorem’s formula (Appel and Haken, 1977; Ringel and Youngs, 1968). It has been demonstrated previously that single stranded DNA can be utilized to form a 3, (trefoil) knot with a half turn of DNA forming each node of the knot (Du and Seeman, 1994). The objective of this work is to form g1 DNA origami torus structures by design of the knot (Du and Seeman, 1994). The objective of this work is to form g1 DNA origami torus structures by design of the knot. The creation of a g1 torus DNA origami structure is designed to form via interactions between the linker sequences in the knotted scaffold and staple strands designed to interact with the linker regions and outcompete the complementary node regions of the scaffold knot.

**Regulation of Histone H4K20 Methylation by DPY-21 in Caenorhabditis elegans**

Amanda Su, Biology  
*Sponsor: Professor Sevinc Ercan, Biology*

The dosage compensation complex (DCC) is a complex of proteins that equalizes X chromosome expression between hermaphrodites (XX) and males (XO) in *Caenorhabditis elegans*. Currently the working model involves DCC binding to the X chromosome, which repels SET-4 from methylating H4K20me1 to H4K20me2/3 resulting in an enrichment of H4K20me1 on X compared to autosomes. Previous RNA-seq data in set-4 null mutant showed an increase in X chromosome expression, which could have been due to increasing X expression or decreasing autosomal expression. To resolve this issue, we spiked in a standard *Caenorhabditis briggsae*. The normalized data in set-4 mutant shows a greater decrease in expression of autosomes compared to X, which explains why in previous RNA-seq data X expression appears to have increased compared to wild type. In terms of this model, without SET-4 H4K20me1 increases across the whole genome resulting in genome-wide transcriptional repression. Since in the set-4 mutant the H4K20me1 increase is larger on autosomes, the repression is greater compared to the X resulting in a net increase in X expression. Dosage compensation enzymes like set-4 are essential for development in mammals, and the mechanisms that regulate these proteins are important for gene regulation.

**Modulation of Purkinje Cell Complex Spike Waveform by Synchrony Levels in the Olivocerebellar System**

Colleen Y. Suh, Neural Science  
Tianyu (Tina) Tang, Neural Science  
*Sponsor: Professor Eric Lang, Neuroscience and Physiology, NYU School of Medicine*

Purkinje cells (PCs) generate complex spikes (CSs) when activated by the olivocerebellar system. Unlike most spikes, the CS waveform is highly variable, with the number, amplitude and timing of the spikelets varying with each occurrence. This variability suggests CS waveform could be an important control parameter of olivocerebellar activity. The origin of this variation is not well known. Thus, the authors obtained extracellular recordings of CSs to investigate the possibility that the electrical coupling state of the inferior olive (IO) affects the CS waveform. Using multielectrode recordings from arrays of PCs the authors showed that the variance in the recording signal during the period when the spikelets occur is correlated with CS synchrony levels in local groups of PCs. The correlation was demonstrated under both ketamine and urethane, indicating that it is robust. Moreover, climbing fiber reflex evoked CSs showed an analogous positive correlation between spikelet-related variance and the number of cells that responded to a stimulus. Intra-IO injections of GABA-A receptor antagonists or the gap junction blocker carbenoxolone produced correlated changes in the variance and synchrony levels, indicating the presence of a causal relationship. Control experiments showed that changes in variance with synchrony were primarily due to changes in the CS waveform as opposed to changes in the strength of field potentials from surrounding cells. Direct counts of spikelets showed that their number increased with synchronization of CS activity. In sum, these results provide evidence of a causal link between two of the distinguishing characteristics of the olivocerebellar system: its ability to generate synchronous activity and the waveform of the CS.

**Increasing the Thermostability of Proteins by Incorporation into Sugar Crystals and Glasses**

Kelly Tripathi, Chemistry, Politics  
*Sponsor: Professor Bart Kahr, Chemistry*

Most vaccines are unstable at elevated temperatures and must be constantly refrigerated in order to maintain activity. This problem becomes especially important in developing countries where maintaining refrigeration is a costly
challenge. This project aims to store and stabilize immunogenic proteins by incorporating them into biocompatible sugar crystals and glasses. Both potential hosts have been previously considered for this purpose and showed some promising results; however, no systematic analysis has been performed in either case. The focus of this project is on the capacity of hosts to accommodate proteins and the stability of proteins inside the hosts. Lactose monohydrate crystals, the best single crystalline host known so far, is shown to be able to incorporate at least 0.5 wt.% of bovine serum albumin (BSA), a sufficient concentration to formulate some types of vaccines such as the vaccine for influenza. Results on the stability of green fluorescent protein (GFP) in lactose monohydrate crystals are irresolute as some crystals show increase of protein stability while others decrease stability. Sucrose-trehalose glasses are shown to remain stable over long time periods but only when humidity is maintained at low level. Upon recrystallization, however, proteins are damaged and lose activity.

**Biochemical and Biophysical Studies of the Staphylococcus aureus Drug Transporter NorA**

*Abhinay Tumati, Chemistry*

*Sponsor: Professor Nathaniel Traaseth, Chemistry*

There is a vast amount of structural information on soluble proteins but much remains to be discovered about membrane proteins. One of the families of membrane-bound proteins present in bacterial and eukaryotic cells are the Major Facilitator Superfamily (MFS) proteins. The MFS family contains a wide array of membrane proteins made up of 12-14 transmembrane helices. NorA, the norfloxacin efflux protein, is an MFS protein composed of 12 TM-helices and 388 amino acids with an estimated molecular weight of 42,385 Daltons. Clinically, NorA has been found to be overexpressed in methicillin-resistant *Staphylococcus aureus* (MRSA) strains, which are responsible for life-threatening infections. NorA binds and expunges certain types of antibiotics like Norfloxacin from the bacteria’s cytoplasm to its periplasm. As a result, this confers resistance to the antibiotic. In order to further understand NorA’s affinity to particular drugs, the protein was expressed and purified from BL21 *Escherichia coli* cells. Subsequently, pH dependent tryptophan fluorescence binding assays with increasing concentrations of Norfloxacin and Ciprofloxacin were performed in order to elucidate NorA’s binding affinity to the two commercial antibiotics. From these results, it is anticipated that there is a key tryptophan residue in NorA’s binding pocket that plays a crucial role in the binding of specific drugs. By analyzing how NorA recognizes and transports antibiotics, this study hopes to combat antibiotic resistance diseases by targeting specific protein residues that are integral in effluxing drugs from pathogens.

**Hippocampal NMDA Receptor and Group 1 mGluR Signaling in Phencyclidine Intoxication**

*Kayla W. Tunnell, Neural Science*

*Sponsor: Professor André Fenton, Neural Science*

N-methyl-D-aspartate receptors (NMDAR) and group 1 metabotropic glutamate receptors (mGluR) are implicated in a multitude of psychiatric disorders, including schizophrenia. Phencyclidine (PCP), an NMDAR uncompetitive antagonist and illicit narcotic, elicits schizophrenomimetic cognitive deficits and neural discoordination in rodents. However, the molecular mechanisms responsible for PCP’s pathology are unknown. Treatment with a protein synthesis inhibitor abrogates PCP-induced cognitive deficits; therefore, PCP must enhance translation signaling. Western blot results were acquired from acute, in vitro pharmacological experiments comparing PCP with NR2A- and NR2B-subunit-specific antagonists in hippocampus. PCP and the NR2A-blocker, but not the NR2B-blocker, caused significant activation of proteins responsible for translation up-regulation and synaptic plasticity, a fact which indicates PCP’s effects are predominantly mediated by hypoactivity of synaptic NR2A-containing NMDARs. To examine the effects of mGluR activity on PCP intoxication, sections were co-treated with an mGluR agonist. The mGluR agonist exacerbated PCP- and NR2A-antagonist-induced activation of translation signaling. Taken together, these results suggest PCP causes excessive mGluR-dependent protein translation mediated through hypofunction of NR2A-containing NMDAR, which may contribute to, or underlie, PCP-induced neural discoordination and cognitive control impairment. These experiments describe a mechanism for PCP in hippocampus and suggest Group 1 mGluR neurotransmission as a novel drug target for schizophrenia’s cognitive symptoms.

**Purification of the γ-Secretase Complex from Pichia pastoris**

*Mitchell Wang, Biology*

*Sponsor: Dr. Yueming Li, Memorial Sloan Kettering Cancer Center*

Alzheimer’s disease (AD) is the world’s most common form of dementia. One of the most prominent biological targets in AD research is γ-secretase a protease complex that cleaves amyloid precursor protein (APP) into varying lengths of amyloid beta (Aβ). Mutations in γ-secretase can lead to aberrant cleavage of APP, resulting in Aβ oligomerization, plaque formation and subsequent AD pathology. Despite γ-secretase’s importance in AD, no crystal structure exists for this multi-pass transmembrane enzyme due to the inherent difficulty of crystallizing insoluble proteins. To that end, an effective purification protocol is being optimizing that will lead to obtaining pure and active samples of both the wild type and mutated γ-secretase complex. This study
used *Pichia pastoris* to overexpress γ-secretase and various methods, such as affinity chromatography (Nickel-histidine purification) and anion exchange, to purify γ-secretase. Future studies have been planned to solve the crystal structure of the active, pure γ-secretase complex and to identify possible drug interaction sites by covalently crosslinking γ-secretase with select probes, trypsinizing to ascertain interaction sites and then pulling down with streptavidin and eluting for LCMS analysis. These studies would contribute greatly towards rational drug design efforts to combat Alzheimer’s disease.

**Analysis of αβ-TCR-CD3 Interaction via ELISA and 2D Assays**

*Andrew Wasson, Economics*

*Sponsor: Professor Michelle Krosggaard, Pathology, NYU School of Medicine*

The T-cell receptor (TCR) on T-cells, a specialized immune cell type, interacts with the foreign or tumor associated peptide-major histocompatibility (pMHC) complex on antigen presenting cells (APCs) to trigger adaptive immune responses. These responses require the synchronized activity of several TCR-associated molecules, namely the CD3γ, δ and ε chains, which are non-covalently associated with the TCR. The signal transduction of TCRαβ through its CD3 molecules, after pMHC ligand binding, is unknown. The goal of this research is to study the TCR-CD3 interaction, specifically through enzyme-linked immunosorbent assays (ELISA) and two-dimensional (2D) mechanical based assays. For ELISA, double alanine mutations were introduced on previously identified interaction sites between the TCR-α subunit and CD3δε. The mutated T-cells underwent in vitro expansion and antigen presentation. Our ELISAs monitored IL-2 production, an immune marker produced by activated T-cells. Mutations resulting in low IL-2 production compared to wild type were identified as critical residues important in TCR-CD3 interaction. For 2D assays, similar double alanine mutant TCRs and CD3 proteins were expressed, purified and coated onto cells or beads. The beads were brought to contact at zero distance to allow bond formation and the strength of the interaction was measured. These experiments will be used to create a complete model of the TCR-CD3 ectodomain interaction, which will address important issues such as the precise structural arrangement and the role of each subunit in T-cell signal transduction.

**Self-Assembly of AB Systems With C:G Pairs Flanking the Sticky-Ends**

*King Fai Wong, Chemistry*

*Jacky Ng, Chemistry*

*Sponsor: Professor Nadrian Seeman, Chemistry*

Three dimensional lattices can self-assemble from single tensegrity triangles via sticky-end interactions (Zheng, Birktoft et al., 2009; Liu, Wang et al., 2004). Recent results
show that the sequences flanking the sticky-end have an impact on the resolution of the crystals: a 2-nucleotide sticky-end flanked by CG:CG base pairs diffracted to 4.07 Å compared to the previously reported CA:TG sequence (4.9 Å) at beam line NSLS-X25 (Wu, Ohayon et al., 2014). In this context, the molecules of a previously reported two-turn system (5.00 Å at NSLS-X6A) were redesigned by modifying the base pairs flanking the sticky-ends to be CG:CG. In one experiment, all the strands were mixed in one pot and slowly cooled from 65° C to 4° C while in a second experiment each triangle was first annealed separately and mixed with the complementary triangle at 4° C. Crystals grown at 20° C (200 um) were larger than the ones obtained at 4° C (50 um). X-ray experiments of two-turn systems showed that the crystals obtained via both protocols diffracted to 5.4 Å at beam line NSLS-X25 and had the same R3 space group with similar unit cells (a = 88.68 Å, α = 73.18°). It is expected that these redesigned to aid in the scaffolding of biological macromolecules for crystallographic structure determination.

**Self-Assembly of a Two-Triangle System Containing Both 3’- and 5’-Sticky Ends**

*Lisa Wu, Chemistry*

*Sponsor: Professor Nadrian Seeman, Chemistry*

Three-dimensional DNA crystals can self-assemble from single tensegrity triangles via sticky-end interactions. A similar lattice containing two different triangles (termed A and B) was also crystallized (Zheng, Birktoft et al., 2009; Liu, Wang et al., 2004; Wang, Sha et al., 2010). Both the single triangle lattice and the AB system cohered via 2 nucleotide sticky ends using 5’ overhangs and diffracted to 5.0 Å at beam line NSLS-X25. Recently, triangles with 5’ phosphate and 1 nucleotide sticky ends (C:G) have been shown to diffract to a better resolution (3.0 Å) at the same beam line (Sha, Birktoft et al., 2013; Ohayon, Chandrasekaran et al., 2013). These results suggest that the self-assembled crystals diffract at a higher resolution when the triangles form first before interacting with other triangles. However, the AB system with 1 nucleotide sticky ends diffracted to 5.1 Å at beam line NSLS-X25. In this context, the molecules of the AB system were redesigned by modifying the triangles such that each triangle would contain both 3’ and 5’ sticky-ends with phosphate groups. One triangle was modified to have a guanine overhang while the complementary triangle used a cytosine overhang. Preliminary diffraction results obtained for crystals grown at room temperature diffracted to 6.0 Å at beam line APS-19-ID. Experiments are currently being performed to grow larger crystals at 4° C.

**Investigating the Selective Intrinsic Resistance of Cranial Motor Neurons to ALS and SMA**

*Ilena Yagudayeva, Biology*

*Sponsor: Professor Esteban Mazzoni, Biology*

The nature of the intrinsic resistance of cranial motor neurons to neurodegeneration is not understood and represents an under-exploited area of Amyotrophic Lateral Sclerosis (ALS) and Spinal Muscular Atrophy (SMA) research. One of the first steps during neurodegeneration in ALS and SMA is the retraction of axons and denervation of musculature; therefore, this research sought to establish an appropriate platform to study the ability of spinal and cranial motor neurons to form neuromuscular junctions (NMJs). To generate NMJs in vitro, spinal and cranial motor neurons programmed from embryonic stem cells (ESC) were cultured with pectoral muscle dissected from Day 10-12 chick embryos. ESC was differentiated into motor neurons by the activity of three transcription factors. The expression of Ngn2-Is1-Lhx3 (NIL factors) and Ngn2-Is1-Phox2a (NIP factors) programs spinal and cranial motor neurons at >95% efficiency respectively (Mazzoni et al.). To establish the formation of NMJs, the MN-muscle co-cultures were monitored for contractions, and immunohistochemistry was analyzed for co-localization of SV2, a presynaptic marker, in motor neurons with bungarotoxin, a postsynaptic marker, in muscle. From three trials of this experiment, contractions were observed in co-culture as early as Day 5 sustained for up to 14 days with peak contractions observed around Day 10-14. No contractions were evident in control for the first two weeks of culture. Immunohistochemistry confirmed the formation of NMJs in co-culture. Immunohistochemical analysis paired with sustained contractions provides evidence that our ESC-derived motor neurons are functional and can form NMJs with muscle in vitro. However, despite optimization of the protocol in this lab, the use of muscle from chick embryos has proven to be highly inefficient: the low yield of NMJ formation and high monetary and time costs make this a less than an ideal platform for long-term research.

**L-cystine Crystal Growth Inhibition Using Molecular Analogs**

*Anthony C. Yu, Chemistry*

*Sponsor: Professor Michael Ward, Chemistry*

L-cystine, the disulfide dimer of L-cysteine, is the primary crystalline component of L-cystine kidney stone growth, a hereditary disorder that results from mutation in the SLC3A1 (2p21) or the SL7A9 (19q13) gene and is commonly known as cystinuria. Mutations in these genes disrupt the formation of dibasic transport proteins, which leads to L-cystine buildup in the urine. While current treatment options have many negative side effects, previous
studies have shown that alternative options may lie in the prevention of crystal growth at a near molecular level by introducing molecular analogs of L-cystine into the growth environment. Among previously reported L-cystine analogs, L-cystine dimethyl ester (L-CDME) and L-cysteine methyl ester (HCME) exhibited the greatest inhibitory effects in crystal growth step velocity when tested by in situ atomic force microscopy (AFM). L-cystine bismorpholide (L-CDMOR) and L-cystine bis(N'-methylpiperazide) (L-CDNMP), which were found to be effective in mice trials, were also tested and compared to the previously mentioned inhibitors. L-cystine peptides using alanine, valine and phenylalanine as perturber groups were hypothesized to be transported better in the body, but AFM results exhibited no inhibitory effects. Overall, the effective inhibitors of 0.030 mM concentration reduced the step velocities by 40-60% for all analog types. These results confirm that L-CDNMP and L-CDMOR inhibit crystal growth in a similar manner to L-CDME and may be additional candidates for preventing kidney stones at the crystal growth stage. Excitingly, this method of molecular inhibition can present a novel treatment method exclusive of negative side effects that accompany current options.

Features Most Critical to Marine Protected Area Success in a Developing versus Developed Context
Brian Yurasits, Environmental Studies
Sponsor: Professor Jennifer Jacquet, Environmental Studies

Marine Protected Areas (MPAs) are a tool used increasingly for ecological restoration and conservation of species populations and marine habitat by nations globally and have been shown to be successful in achieving their ecological and economic goals. However, not all implemented MPAs have reached their full potential due to weaknesses in their design and management. Edgar et al. (2014) showed the five factors leading to the success of MPAs (measured here through the values of 8 community metrics of biomass and species diversity) are that they must be: 1) No-Take 2) Large (>100km²) 3) Isolated 4) Well Enforced 5) Old (>10 years). Here, it was hypothesized that the roles these features play in the success of MPAs may be different for MPAs in developing countries compared to the broader population. A linear regression analysis was performed using the data collected by Edgar et al. (2014) from 87 MPAs on 8 measured community metrics (1. species richness overall 2. species richness of large fishes 3. biomass overall 4. biomass of large fishes 5. shark biomass 6. grouper biomass 7. jack biomass 8. damselfish biomass) and the presence of each of the five features to determine if there is a difference in the significance of each MPA feature in developed versus developing MPAs. The results of this study indicate that size matters to the success of MPAs in developing countries, in that large MPAs are shown to have a negative relation to both species richness and biomass. To expand on this finding, this study further shows that enforcement was the most lacking feature in developing MPAs and that in large, developing MPAs there is a negative relationship with the presence of enforcement. These findings may be used to allow management in developing nations to more efficiently invest in MPA implementation and to address the shortcomings of current protected areas.

Transient Separation-Like Airflow over Wind Waves and Its Impact on Air-sea Momentum Flux
Chengzhao (Richard) Zhang, Mathematics, Physics
Sponsor: Professor Tetsu Hara, Oceanography, University of Rhode Island

Accurate predictions of momentum exchanges between ocean and atmosphere are essential to understanding various air-sea coupled processes. It is usually assumed that when airflow separates at the wave crest, it enhances the form drag (pressure force on the wave) and increases the air-sea momentum flux and the drag coefficient. It is also assumed that airflow can separate only when waves below are breaking. However, recent laboratory observations suggest that separation like airflow patterns are ubiquitous and may occur over steep but non-breaking waves. This study investigates the airflow over a finite amplitude non-breaking wave train using a three-dimensional large eddy simulation. First, instantaneous velocity, vorticity and pressure fields were examined. The airflow sometimes exhibited separation like flow patterns, identified with thin high vorticity layers detached from the surface and separation bubbles below. At other times the airflow remained attached to the surface. The pressure acting on the windward slope of the wave varied significantly depending on the flow pattern. Next, conditional phase averaging of the airflow was performed depending on the pressure force (pressure multiplied by the wave slope) acting on each wave. It was found that smaller pressure force is associated with separated airflow, while larger pressure force is associated with attached airflow. When incoming wind speed above the wave crest is faster, the flow remains attached, whereas slower incoming wind tends to enhance detachment of the airflow. These observations question some of the traditional assumptions of airflow separations and their impact on air-sea momentum flux, which is critically important for long term climate modeling and short term weather forecast including hurricane predictions.
Characterization of Endometrial Cancer Stem Cell Niche and Radioresistance of Endometroid Adenocarcinoma

Mike Zhang, Computer Science
Talal Syed, Anthropology, The City College of New York
Sponsor: Professor Christopher Lange, Radiation Oncology and Cell Biology, SUNY Downstate Medical Center

Cancer Stem Cells (CSC) is responsible for the maintenance and growth of the tumor, making them excellent targets for cancer treatment. This new knowledge has necessitated the development of a model of the CSC microenvironment or niche. The study of the niche may help identify new treatment targets for various cancers and provide insight into tumorigenesis. To recreate an in vivo like niche, the Hybrid Spheroid Assay (HSA) was used, which is a 3D feeder based culture that does not utilize any stem cell specific growth factors to induce or maintain stemness. This study used the HSA to recreate the CSC niche of endometroid adenocarcinoma using tumor samples from patients. Immuno-cytological analysis was used to visualize the CSC architecture before and after radiation treatment. It was found that endometrial CSCs are of mesenchymal origin, contrary to the previous notion that they are of epithelial origin. This fact alone makes endometrial CSCs resistant to radiation and also calls into question whether this cancer has been wrongly classified. The HSA yields good potential for personalized medicine as each patient’s CSCs can be cultured and tested for chemotherapy or radiation sensitivity, thereby reducing side effects and improving quality of life for the patient.

Molecular Electronics: Polyaniline Nanowires in a 3D DNA Scaffold

Rebecca Zhuo, Economics
Sponsor: Professor Nadrian Seeman, Chemistry

Branched DNA motifs have been used to self-assemble two- and three-dimensional lattices. One such motif, the tensegrity triangle, has been used to create a self-assembled 3D lattice. The tensegrity triangle is a rigid motif with three helices that are connected pairwise by three four-arm junctions; their helix axes span 3-space. A similar self-assembled crystal was also constructed with two different three-fold symmetric triangle molecules (A and B) per asymmetric unit. In this study, we designed an asymmetric two-triangle system in which the A and B triangles were fused. Formation of the motif was analyzed by non-denaturing polyacrylamide gel electrophoresis. The hanging drop vapor diffusion method of crystallization yielded crystals of 100 \( \mu \text{m} \) in size that diffracted to 7.0 \( \AA \) resolution at beam line 1D-19 at the Advanced Photon Source (Argonne National Lab). These crystals can be used as scaffolds for the precise organization of functional molecules. For example, we are working to arrange a polyaniline octamer in the 3D lattice by attaching its ends to DNA strands that are complementary to DNA segments attached to the central strands of the A and B triangles. We expect the incorporation of highly conductive polymers in a 3D lattice will aid in the development of molecular electronics.

Short Term Clinical Outcomes for Locally Recurrent Breast Cancer Patients Treated with a Second Breast Conserving Treatment Including Intraoperative Radiotherapy

Rebecca Zhuo, Economics
Sponsor: Professor John Ng, Weill Cornell Medical College

A standard treatment option for early stage breast cancer patients is breast-conserving surgery (BCS), followed by whole breast radiotherapy (WBRT). For breast cancer patients who develop a local recurrence after receiving BCS with WBRT, a standard of care treatment is mastectomy. However, patients who undergo mastectomy report a significantly lower quality of life than patients who opt for breast conservation. Recent reports indicate that locally recurrent breast cancer patients treated with a second BCS of lumpectomy with intraoperative radiotherapy (IORT) have good toxicity and clinical outcomes. We report patient and tumor characteristics and clinical outcomes for 26 locally recurrent breast cancer patients treated with a second BCS with IORT at NYP/Weill Cornell Medical Center. The median follow up time was 6.5 months (range: 0.0–23.0 months), and no patients have developed a second local recurrence. There were no significant toxicities and cosmetic outcomes were excellent. Our study indicates that a repeat lumpectomy with IORT appears to be an effective, well-tolerated treatment option. Longer follow up will be necessary to study the efficacy of a second BCS with IORT.