ACKNOWLEDGMENTS

The College of Arts and Science wishes to thank the contributors to the
Dean’s Undergraduate Research Fund
for their generosity in establishing the following scholarships
to support undergraduate research projects:

Ronald Abramson Research Scholarship
Harold Akselrad Research Scholarship
Angelica Foundation Research Scholarship
Samuel E. O. Ashley Research Scholarship
Giuseppe Astorina Research Scholarship
William B. Baer Research Scholarship
Bailey Family Research Scholarship
Dr. Charles Barbieri Research Scholarship
Mary Rudie Barneby Research Scholarship
Joel and Shari Beckman Research Scholarship
Frances and Benjamin Benenson Research Scholarship
Peter Bergmann Research Scholarship
Herman Berkman Undergraduate Research Scholarship
Steffi Berne Research Scholarship
Max Bronner Research Scholarship
Roger and Beth Carlton Research Scholarship
College of Arts and Science Parents Research Scholarship
Tory Dent Research Scholarship in Creative Writing
Nathan Ende Research Scholarship
Benjamin P. B. and Fannie L. G. Feldman Research Scholarship
Norman M. and Ann C. Feldman Research Scholarship
Nicholas and Andrea Ferrara Research Scholarship
Robert A. Fowkes Research Scholarship
Sylvia Engel Friedman Research Scholarship
Samuel and Lilyan Frome Research Scholarship
Arthur Frommer Research Scholarship for Travel and Global Studies
Hugh and Geraldine Fryer Research Scholarship in Classics
Dr. Molly S. Geller Research Scholarship
Daniel Getman and Leonard Marker Memorial Research Scholarship
Joseph Gilbride Research Scholarship
Jeffrey Gould Research Scholarship in American Politics
Marion Cohen Griffel Research Scholarship
Eileen Gugenheim Research Scholarship
Heights Alumni Association Research Scholarship
Holten Family Research Scholarship
Joseph Jerome Research Scholarship
Thomas Kane Research Scholarship in English
June Schlesinger Katz International Research Scholarship
Dr. Evan and Brooke Kaye Research Scholarship
James Koch Research Scholarship
Myron Kove Research Scholarship
Joan Kupersmith Larkin Research Scholarship
Howard Levene (WSC ’41) Research Scholarship
Barnet and Phyllis Liberman Research Scholarship
John and Julia Lindsey Research Scholarship
Walter and Phyllis Loeb Research Scholarship
Philip Alfred Lotz Research Scholarship
George Maker Research Scholarship
William J. McKeon Research Scholarship
Dr. Aston McLaughlin Research Scholarship
Kurt M. Mislow Research Encouragement Scholarship
Mortimer J. Natkins Memorial Research Scholarship
The New York Community Trust Murray Hidary Research Scholarship
Arthur Noulas Research Scholarship
Susumu Okamura Research Scholarship
Wilfred L. and Ruth S. F. Peltz Research Scholarship
Sidney Probst Research Scholarship
Pudding Hill Research Scholarship
Lydia R. Reeve Research Scholarship
Joseph A. Rice Research Scholarship
Richard Robins Entrepreneurial Research Scholarship
Daniel A. and Amy L. Rock Research Scholarship
Peggy and Bernard Sakin Research Scholarship
Salant Family Research Initiative in Pre-Health Studies
Schachter Family Research Scholarship
Julie C. Schiefflin Research Scholarship
Robert Selander Research Scholarship
James A. Shea Research Scholarship
Sigal Family Research Scholarship
Seena and George Silbert Research Scholarship
Larry and Klara Silverstein Research Scholarship
J. S. Sinclair Research Scholarship
Dr. Dorothy A. Starr Research Scholarship
Drs. Aaron A. and Francine M. Stein Family Research Scholarship
Joan C. Suttles Estate Research Scholarship
Swartz Family Research Scholarship
Daniel A. Swick Research Scholarship
Varet Family Research Scholarship
Shirley Schmones Wallach Research Scholarship
Washington Square College Class of ’42 Research Scholarship in Humanities
Hereman J. Wechsler Research Scholarship in Fine Arts
William F. Weld Research Scholarship in Ancient Studies
Horace Wendt Research Scholarship
Ellie and David Werber Research Scholarship in Social Science
Arthur L. Wolf Research Scholarship

Anonymous Donors
Sidney and Judith Kraines Charitable Trust
Beta Chapter of New York, Phi Beta Kappa
INTRODUCTION
Matthew S. Santirocco, *Research as Educational Paradigm* ................................................................. 9

FACULTY PERSPECTIVE
Gloria Coruzzi, *A View from the Bench* ........................................................................................................ 11

HUMANITIES
Jennifer Alberghini, *Chaucer’s “The Knight’s Tale” and the Rhetorical Technique “Brevitas”* ......................... 13
Megan Becker, *Integration vs. Separation: Museum Access Programs for Visitors Who Are Blind or Partially Sighted* ..................................................................................................................... 14
Benjamin T. Bloxham, *Between Two Worlds: The Role of the Professional Hospital Chaplain* .................... 14
Ashley Cooke, *Ritual and Improvisation in the Catholic Homily* ...................................................................... 14
Talia Cottrell, *Decline and the Weakness of Language in Sallust* ..................................................................... 15
Ian Folkert, *Eternal Recurrence in Kundera’s Unbearable Lightness of Being* .................................................. 15
Nicholas Forster, *The Long and the Short of It: Entropy and Rebirth in Children of Men* ......................... 15
Alice Frenkel, *Between Page and Stage: The Dramatic Adaptation of The Count of Monte Cristo by Alexandre Dumas père*† .................................................................................................................. 16
Victoria Grinbaum, *Narrative Strategies for the Representation of the “Return of Hephaistos to Mount Olympus” in Greek Vase Painting* ............................................................................................... 16
Kathryn Hall, *On the Origins of sean-nós: The Global Consequences of Traditional Singing* ..................... 16
Diana Hamilton, *Borrowing Authority: Appropriated Sciences in Contemporary Poetries* ...................... 17
Adina Haramati, *Ergotism at Isenheim: An Artist’s Representation of a Plague* .......................................... 17
Destin L. Hodges, *Tongzhi Representations on the Silver Screen: Queer Identity in Contemporary Chinese Film and Video* ................................................................................................................. 17
Oki Ishikawa, *Japanese Music’s Art of Application: Hybridization Considered as a National Trait* .............. 18
Savana Kretchmar, *Magic and the Rise of Christianity in the Roman Empire: The Struggle for Legitimate Power* ........................................................................................................................................... 19
Olivia P. Lee, *Science and Pseudoscience in the Renaissance* ......................................................................... 19
Meredith Levin, *Masculine Journeys through Feminine Eyes: Grand Tour Accounts of Italy by Hester Thrale Piozzi, Anna Jameson, and Mary Shelley* ...................................................................................... 19
Tiffinie Ma, *“Reduced, with Rouge, Lip-Salve, and Pearly Grey, to ‘Make-up’ for Lost Time as Best She May!” Sexuality and Allure in Gilbert and Sullivan Operettas* .................................................................................. 19
Claudia P. Maniscalchi, *The Intersection of Innovation, Improvisation, and Tradition in Contemporary Bluegrass Music* ..................................................................................................................... 20
Jeffrey Olchovy, *The Mythology of Music* ................................................................................................................................. 20
Reena Shah, *From the Page to the Stage: Performing Spoken Word Poetry* .......................................................................................... 20
Clarissa Wallace, *Imagining Ireland: Literary Tourism in the Twenty-First Century* ............................................................ 21
Michael Waller, *Karlheinz Stockhausen: spiecherDENKMAL (storage monument)* .......................................................... 22
Elizabeth Webber, *Computing in the Humanities: NYU and the Civil War* ............................................................................. 22

**SOCIAL SCIENCES**

Konstantin Ash, *Socialism and Populism in Latin American Elections* ............................................................................................ 25
Kandy Anasha Bahadur, *Psychophysiological Evidence of Early Differentiation between Members of Novel Ingroups and Outgroups* ......................................................... 25
Mohit Bahel, *Drug Price Control Policies* ..................................................................................................................................... 26
Neaka Lynn Balloge, *The Effects of Expectations and Fantasies on Disengagement* ................................................................. 26
Sameer Birring, *The Road to Progress: Driving Congestion Pricing through the Political Process in Four Different Cities* ................. 26
Tim Bockes, *Government on the Mississippi: Unbound Limits of Human Willpower* ................................................................. 26
Lindsay Branson, *“No Revolution Without Us!” The Gay Liberation Front, the Black Panther Party, and the Complexity of Coalition Politics, 1969–1971* ...................................................... 27
Allison Casey, *Improvisatory Teaching Methods in the Education of Twenty-First-Century New York City Students* ................. 27
Roger Chao, *The Presence of Extracurricular Academic Institutions and Their Effect on College Enrollment* ........................................... 27
Matthew S. Connors, *What Would Happen If Political Parties Were Proportionally Represented in the U.S. House of Representatives?* .............................................................. 28
Brenda Delmonte, *Spontaneous Trait Inferences: Causally Linked Representations in Semantic Memory* .................................................. 28
Marisa DiLemme, *Implicit Responses to Procedural Justice* .................................................................................................................. 29
Erica Dixon, *Too Nice To Say No: The Impact of Investment in Feminine Norms on Sexual Health* ............................................. 29
Katherine A. Eiges, *Accuracy in the Presence of Bias: Can Transference Induce Accuracy in Processing?* .......................................................... 29
Nicholas Esposito, *Empathic Accuracy, Emotion Regulation, and Social Integration* ........................................................................ 30
Ariel Fredrick, *Improvising the Medical Interview: The Art of Physician-Patient Communication* .................................................. 30
Tanya Freirich and Michelle Polanco, *Culture, Development, and Education* .................................................................................. 30
Emily Genzlinger, *Biribi Wo Soro—A Symbol of Hope* .......................................................................................................................... 30
Ami A. Gokli, *Testing Demand for Medical Schools* ....................................................................................................................... 31
Kevin Gotkin, *Post-Classical Science and the Evolving Definition of Law and Justice* .............................................................. 31
Shelanthia Griffiths and Shedia Smalls, *Middle Passage Legacies: The Language of African Americans and Caribbean Americans in Contemporary New York City* .................................................. 32
Emma-Marie Hansson, *Second Life: Moving Beyond Virtual Reality* ................................................................. 32
Amy Hong, La Vida Villera de Los Niños: *Growing Up in an Argentine Shantytown* ................................................. 32
Olga Itenberg, *Analysis of the Need for Intellectual Property Protection as an Incentive for Innovation* ........ 33
Eliza Kenigsberg, *Paving Paradise, Loss of Vegetation: An Increased Threat to New York City’s Water Quality* .................................................................................................................. 33
Hanah Kim, *Game Theoretic Approach to the Korean Hostage Crisis* ................................................................. 33
Matthew Kim, *The Influence of Neighborhood Poverty and School-Level Spending Patterns on Academic Achievement: Evidence from New York City Public Schools* ........................................... 34
Aaron Lackowski, *Battling Seattle: Visionary Aims, Exclusionary Claims, and Strategic Representations of a “Global” Moment* ................................................................. 34
Rachel Laurion, *I Feel Better Now* ......................................................................................................................... 34
Emily R. Levine, “The Lowell of the South:” *Southern Cotton Mill Idealism in National and Local Perspective* ........................................................................................................................................ 35
Kari Lipschutz, *Returning Home: Revisiting the Personal Tragedies of the World Trade Center Attacks Six Years Later* ........................................................................................................ 35
Christopher Lotz, *From Pawns to Problems: The Paradox of American Policy in the Persian Gulf* ..................... 36
Samantha O. Mak, “The College Experience”: *The Effects of College Student Employment on Academic Achievement* ........................................................................................................... 36
Catherine Manfre, *Egyptian-Israeli Relations* .......................................................................................................... 36
Alexander E. Mayorga, *Drug Resistant Bacterial Infections: A Global Threat* .................................................. 36
Sharanya Mohan, *Outsourcing in Eastern Europe and Its Effects on Employment* ............................................... 37
Perri Nemiroff, *For the Past, Present, and Future of Alpha Epsilon Phi* .............................................................. 37
Hidefusa Okabe, *Insight into Masculinity of the Yakuza from Linguistic Discourse Analysis* ............................... 37
Saurabh Pant, *The Effect of the Multi-Fiber Agreement on Bangladeshi Garment Labor* ................................ 38
Darren Patrick, *On Edge: Environment and Sexuality on the West Side* ............................................................. 38
Kathleen Paul, *Comparison of Deciduous Second Molars and Permanent First Molars* ................................ 38
Michael Perino, *Implicit Biases and Their Effect on the Evaluation of Trustworthiness* ..................................... 39
Dana Perrotti, *Sharing the Beat: Reggaetón and Pan-Latino Identity in New York City* ..................................... 39
Andres Ramirez, *Comparative Urban Identities: Berlin* .......................................................................................... 39
Maurice Restrepo, *The Institutionalization of “Paying Dues”: Jazz Education* .................................................... 39
Heather Rooney, Pink Frilly Dress (PFD) and Physical Fighting Superheroes (PFS): *The Phenomena of Early Childhood Development and Their Relationship to Gender Knowledge* ............. 40
Hilary Sachar, *Emigration of Lithuanian Families: The Elazar Sachar Family Tree Project* .............................. 40
Zachary Saltzman, *Profiting from Community: A Case Study of Economic Life on a New England Family Farm* ...................................................................................................................... 40
NEW YORK UNIVERSITY • COLLEGE OF ARTS AND SCIENCE

Amanda Santacroce, Drug Safety and Test Subjects.................................................................41
Neha Sathe, Racial and Ethnic Disparities in the Utilization of Health Services across
Insurance Types*....................................................................................................................41
Juliana Schnur, Mi Samcha? Religious Identity and the Struggle of Jewish Leadership in
America to Coordinate a Holocaust Rescue Campaign*.........................................................41
Tina Hsu Schweizer, Resistance and Susceptibility to Persuasion across the Ideological Spectrum*.........41
Janki Shah, The Effect of “Explorations” on First-Year Student Academic Performance,
Attrition Rates, and Overall Satisfaction at NYU.................................................................42
Jenny Shen, The Politics of School Spending: The Effects of Judicial Ideology on
Education Finance*.................................................................................................................42
Lauren Shikowitz, Greenwich Village Gives the “New” St. Vincent’s a Poor Diagnosis..........................42
Gina Shlaferman, Jurors’ Evaluation of Hearsay and Eyewitness Credibility......................................43
Todd Sloves, A Weak Commitment: Why the Northern League Allowed Italy’s Largest Amnesty to
Come to Pass*.......................................................................................................................43
Jeremy Sorgen, Informal Settlements Policy and Practice: A Case Study from Bogotá, Colombia..............43
Emily Taylor Speer, Felt Gender Typicality, Sex-Typing, and Adjustment....................................43
Jillian Swift, Archaeology of Nuku Hiva, Marquesas Islands: A Functional and
Ecological Reevaluation of Robert Suggs’ Fishhook Assemblage*...........................................44
Annie Tang, Mental Representations of Significant Others and Ethnic Intergroup Bias..........................44
Amanda Thai, People Who Walk Slowly on New York City Streets: An Anthropological Study of
Tourism in New York City........................................................................................................44
Nicholas Theuerkauf and Dishen Yang, The First Industrial Revolution: The Role of Private Banks..............45
Tiana Thomas, Enduring Contamination at Public Place: The Shortfalls of Brownfield Reclamation..........45
Kelly Tong, Welfare Costs of Government-Sponsored Health Care: Examining Inefficiencies in
Pharmaceutical Research and Development........................................................................45
Sairina Tsui, Chinese Medicine at the Intersection of Western Biomedicine: An Anthropological Study of
Medical Pluralism in Zhuhai, China*......................................................................................46
Nicole Tung, The Threat of Re-emerging Militants in Kosovo*..................................................46
Derek William Valles, Electric Connecticut: Regulation, Deregulation, and a Partial Return .................46
Heather Verron, The Effects of Value Incongruence on Transference..........................................47
Shaleen Vira, ARV Resistance as a Bottom Line Measure for HIV Program Efficacy*............................47
Matt Weiner, Economics of Improvising with Electronics in Brooklyn..........................................47
Sara Wójcik, A Great Leap Forward: The Beijing National Grand Theater*......................................47
Julie Zide, Signal Detection Theory and Semantic Memory................................................................48

NATURAL SCIENCES

Anu Amin, Amygdala Activity Modulation via Stress Hormones*..................................................51
Elizabeth C. Arnold, Effects of a Novel Small Molecule Inhibitor of Cap-Dependent Translation on
FMRF-Mediated Synaptic Plasticity*......................................................................................51
Lauren Baideme, Does Transient Attention Affect the Location Specificity of Perceptual Learning?*.....52
Irina Bergenfeld, Control of Structure and Function in Peptides and Peptide Mimetics.....................52
Christina Bergey, An Investigation of Maternal Relatedness in Four Groups of Wild Blue Monkeys
(Cercopithecus mitis stuhlmanni)*.......................................................................................53
INQUIRY • VOLUME 12, 2008

Timothy C. Berkelbach, Proton Transport in Water: ab initio Molecular Dynamics Simulations Performed in the Complete Basis Set Limit*.................................................................53

Scott Breitinger, Margaret Beznutzczyk, and Matthew Van Auken, The Use of Immunological Techniques in the Identification of Historical and Contemporary Materials: Perfecting Techniques in Determining Protein and Carbohydrate Binders in Aged Artistic Media*.................................................................53

Scott Breitinger, Refining Immunological Identification Techniques for Casein in Art Materials*.................................................................54

Angelo Canedo, Evolution of the Interferon Regulatory Factor-7 (IRF-7) Gene in Primates*.................................................................54

Kathleen Capaccione, Visualizing the Human Visual System: A Novel Technique Using the BOLD fMRI Signal*.................................................................54

Kaitlin A. Chiocca, Teratogenic Drugs: Therapeutic but Dangerous.................................................................54

Christine Constantinople, A Quantitative Analysis of Neurons with Kv3 Potassium Channel Subunits—Kv3.1b and Kv3.2—in Macaque Primary Visual Cortex†.................................................................55

Daniel Coppeto, Sexual Dimorphism of the Sacrum and Its Relationship to Bipedalism and Obstetrics.................................................................55

Rishi Dave, Prediction of the Strength of Spontaneous Trait Inferences by Naive Causal Theories.................................................................56

Carlos Javier Del Rio Villasenor, A Comparison of Behavioral Data in Dispersing vs. Group-Living Male Woolly Monkeys (Lagothrix lagotricha) in a Western Amazonian Rain Forest.................................................................56

Carlos Javier Del Rio Villasenor, Infant Social Interaction in Wild White-Faced Capuchins (Cebus capucinus) at Estacion Biologica de La Suerte, Costa Rica.................................................................56

Aqsa Durrani, Endoscopic Resection of Posterior Third Ventricular Tumors*.................................................................56

Madelyn Eads-Dorsey, Phylogeny of Rungwecebus kipunji.................................................................57

Lindsay Erickson, “Complexers” on Star Networks.................................................................57

Yvette Fruchter, Using Implementation Intentions to Create Habitual Behavior.................................................................57

Jonathan Gill, How Spatial Resolution Limits Performance in Texture Segmentation: Evidence from Selective Adaptation to Spatial Frequency.................................................................58

Nithya Gopal, Genetic Analysis of Purkinje Cell Fate and Axon Projections in the Developing Mouse Cerebellum*.................................................................58

Evelyn Gordon, The Effect of Stress on Recovery from Fear*.................................................................58

Lee Hwang, Spatiotemporal Response Properties of Neurons in Macaque Visual Area MT.................................................................59

Tarun Jain, Hard Magnets from Soft Magnetic Materials*.................................................................59

Sachin Jhawar, Hippocampal Morphological Abnormalities in Knockout Mice Modeling Tuberous Sclerosis Complex.................................................................59

Robert G. Keller, Evolution of the Pax Gene Family in the Wasp Nasonia vitripennis*.................................................................59

Alexander Kotlyar, Thermodynamics of DNA Bending and Supercoiling†.................................................................60

David Krisiloff, Molecular Dynamics of Imidazole Based Polymers*.................................................................60

Jonathan Lai, Uncovering the Mechanism of HP1 Recognition and Binding with Methylated Lysines*.................................................................60

Olivia P. Lee, 1,2,3-Triazole-Linked Porphyrin-Fullerene C 60 Dyad.................................................................61

Rebecca Lee, Enhanced Immunogenicity of Malaria CS Peptide Vaccines Using a Topical Adjuvant Containing a Synthetic TLR 7 Ligand.................................................................61

Christen Lennon, Uncovering the Roles of XBP-1 in the DNA Damage Response and Cell Cycle Progression*.................................................................62

Valerie Lerebours, RNAi Library Representation: A Comparison of Two Different Approaches.................................................................62

Jessica Lin, Induced Dynamics for Infinite-Dimensional Systems*.................................................................62
Nicole Long, *Enhanced Episodic Encoding for Semantically Related Objects*..........................................................63

Grayson Maldonado, *An RNAi Screen for the Identification of Genes that Control Male Tail Tip Morphogenesis in Caenorhabditis elegans*.................................................................63

Manuel Montano, *A High Through-Put RNAi Screening System for Identifying Genes that Functionally Interact with the Notch Pathway in Caenorhabditis elegans*.........................................................63

Bridget Oliveri, *An MEG Study of the Neural Bases of Semantic and World Knowledge Integration*..........................64

Yunsoo Park, *Is Exogenous Attention an All-or-None Cueing Mechanism?*.................................................................64

Abhishek Patel, *Characterizing Gli1-Expressing Follicular Stem Cells in Epidermal Wound Healing*..........................64

Ankita Patel, *The Effect of Fear Memory Retrieval on Protein Expression within the Amygdala*.................................65

Song Qu, *Placebo-Controlled Studies: Scientific Rationale and Ethical Issues*............................................................65

Yeison Rodriguez, *Neuronal Changes and Serotonin Axons in Postmortem Brains from Down Syndrome Donors*........65

Adam Schwaid, *Understanding the Mechanisms of Repair of Carcinogen-DNA Lesions with Damaged Complementary Strands*.........................................................................................................66

Neel Shah, *Expanding the Structural Diversity of Biomimetic Peptoid Oligomers*.......................................................66

Kelly Siebert, *Ramming, Biting, and Cracking: The Strength of Animal and Plant Shells*...........................................66

Robert Spencer, *Manipulating the Dynamics of Photoinduced Electron Transfer*.......................................................66

Louis Tur, *Emotion’s Effect on Relational Binding*........................................................................................................67

Weicheng Wang, *Direct-to-Consumer Advertising and Informed Patients*.................................................................67

Michael R. Witten, *Targeting BCL6-SMRT Interaction with Cyclic Peptidomimetics*....................................................67

Helen Wong, *Neuronal Protein Phosphatase 2A (PP2A) Regulation via Removal of FKBP12 Inhibition of Mammalian Target of Rapamycin (mTOR)*..................................................................................68

Jithin Yohannan, *Tat-E1B-19K: A Potent Inhibitor of Apoptosis*..................................................................................68

Na-Eun C. Yoo, *The Evolution of Bicoid*....................................................................................................................68

Sarwar Zahid, *Stem Cell Biology and Cancer: Hh-Signaling in Mouse Prostate Development*.....................................69

Shali Zhang, *Elucidating the Effects of Missense Mutations in the Tafazzin Gene: Implications for Barth Syndrome*........69

Elinor Zhou, *Visualization of Actin and Tubulin in the Caenorhabditis elegans Male Tail Tip*........................................69

* supported by Dean’s Undergraduate Research Fund

† winner of Phi Beta Kappa/Albert Borgman Prize for Best Honors Thesis
INTRODUCTION:

Research as Educational Paradigm

Located at the center of a premier research institution, the College of Arts and Science at New York University has the opportunity—and the responsibility—to involve undergraduates whenever possible in the production of knowledge. We do this by putting students in direct contact with the scholars on our faculty, active researchers who routinely teach undergraduate courses. We do this also by empowering our students to conduct their own inquiries, for a liberal arts education is not only about transmitting knowledge but also about teaching our students how to learn for themselves throughout their lives.

NYU’s College of Arts and Science has long been at the forefront of promoting undergraduate research. All of our majors, for instance, offer Honors tracks in which original inquiry is central. The College’s annual Undergraduate Research Conference was established over thirty years ago and now encompasses projects in all of the humanities, natural sciences, and social sciences, as well as in creative writing. In addition, the Dean’s Undergraduate Research Fund, created through the generosity of alumni, parents, and friends, provides students in the College with the material support necessary to carry out their inquiries. (A list of the research scholarships that have been endowed in the Fund appears on page 2 of this journal.) Finally, student funding is also available, particularly in the sciences, from departmental resources as well as through external grants that the institution and individual faculty members have received to promote undergraduate research experiences.

The annual journal Inquiry showcases abstracts of selected student research. This issue contains abstracts of projects undertaken in the 2007–2008 academic year. For the most part these abstracts represent research that was presented at the College’s Undergraduate Research Conference held that spring. Some projects were supported by the Dean’s Undergraduate Research Fund, and several also took advantage of research opportunities presented to students who participated in NYU’s study abroad programs. But these abstracts represent only a small fraction of the research undertaken by College students, both as individuals and in groups, under the close mentorship of faculty.

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

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

A View from the Bench

by Professor Gloria Coruzzi

Two discoveries that transformed science—and life as we know it—happened on April 25, the date of today’s 2008 NYU CAS Undergraduate Research Conference. On April 25, 1953, Francis Crick and James D. Watson published “Molecular structure of nucleic acids: A structure for deoxyribose nucleic acid describing the double helix structure of DNA.” Eight years later, on April 25, 1961, Robert Noyce was granted a patent for inventing an integrated circuit or “microchip.” He was subsequently nicknamed the “Mayor of Silicon Valley” and co-founded Intel in 1968. These two remarkable discoveries, each made on today’s anniversary, April 25, have synergized in our current world, where computer chips are now being used to study the DNA of genomes, as undergraduates conducting research in NYU’s Center for Genomics and Systems Biology are learning as we speak.

Now to the title of my talk, “A View from the Bench.” David Scicchitano, Director of Science Initiatives at CAS, Collegiate Professor, Director of Undergraduate Studies in Biology, Principal Investigator of NIH-funded research on DNA repair, teacher extraordinaire, and Renaissance man of science and literature, said to me, “I love the title, it’s a great take off on A View from the Bridge, by Arthur Miller.” “I never read it,” I replied. I was too busy pipetting. My husband’s reaction to “A View from the Bench” was, “It sounds like you’re on a baseball team!”

My take on “A View from the Bench” is remembering the beauty and the solitude of thinking about a scientific problem and solving it with your head and your hands. I remember the first time I saw DNA spool out of solution. It is still something that moves me. I remember another defining moment in my scientific career, when I was a high school researcher working in a laboratory that studied obesity in rats: One day during a mishap, I wound up chasing a fat rat around a room hoping to anesthetize it. At that moment, I stopped and thought to myself, “This is not for me.” I subsequently went on to study the DNA and genomes of yeast and plants—non-motile organisms.

In preparation for today’s talk, I took out my own undergraduate research thesis for inspiration. The yellowed pages and typeset made it look like it was written by Darwin, but I do remember doing the research as an undergraduate as if it was yesterday. I remember spending long hours in the lab and in the darkroom, and I remember it being a pretty solitary experience. I was not expecting or wanting anyone to be watching. I was so focused on what I was doing.

To the NYU undergraduate researchers gathered here today who are about to embark on the next phase of your life, I would encourage you to focus on what you love to do, not what your career path should be. Invest your ATPs—the chemical energy of your cells—in your work and your research, and your career will happen to you. A career in research is truly a gift. As a graduate student, I was amazed and honored that I was being paid to learn, and that is a true privilege. Even now as a professor who does research and teaches, I am still learning. I am a trained molecular biologist who is now learning a computer language called “R.” It’s kind of like trying to learn Japanese when you are fifty!

I will end my thoughts on a career in research with a passage taken from Meaning Inc.: The Blueprint for Business Success in the Twenty-First Century, by Gurnek Bains et al.: “Work is more important than you think. Liebe und Arbeit, love and work, wrote Sigmund Freud, are the keys to human happiness. Both are important because they connect people with something beyond themselves. Work is one of the most important mechanisms for keeping people tied to society and reality.” A life in research indeed has a lot to offer back to society. And that is my “View from the Bench.”

These remarks were delivered to student researchers and their faculty mentors at the College’s Undergraduate Research Conference on April 25, 2008. Currently the Carroll and Milton Petrie Professor and Chair of Biology, Professor Coruzzi researches in the area of plant systems biology. Her work combines genomic, bioinformatic, and system biology approaches to identify gene networks involved in biological regulatory mechanisms controlling nitrogen use and the evolution of seeds. A native New Yorker, Professor Coruzzi received her Ph.D. in Molecular and Cell Biology from the NYU School of Medicine, where she decoded the yeast mitochondrial genome. After serving as Assistant and Associate Professor at Rockefeller University, she joined NYU’s faculty in 1993. Some of her research is being conducted in collaboration with colleagues at NYU’s Courant Institute for Mathematics, the New York Botanical Garden, the American Museum of Natural History, and Cold Spring Harbor. Her research is currently funded by the National Institutes of Health, the National Science Foundation, and the Department of Energy. Professor Coruzzi was named a Fellow of the American Association for the Advancement of Science in 2005 and currently serves on numerous scientific advisory and editorial boards.
There is today a good deal of confusion about the status of knowledge in the humanities. To some, the admission that we seek only an interpretation seems to allow all kinds of subjective opinion to count as knowledge. Or worse, it seems to endorse the principle that those with the power to impose “their” opinion define knowledge. Nothing could be further from the truth. Interpretation is a form of knowledge, not mere opinion. What distinguishes knowledge, even knowledge that makes no claim to absolute certainty, is evidence and rigorous analysis. That is the meaning of disciplined inquiry in any field.

—Thomas Bender, University Professor and Professor of History

HUMANITIES

Chaucer’s “The Knight’s Tale” and the Rhetorical Technique “Brevitas”
Jennifer Alberghini, English & American Literature
Sponsor: Dr. Martha Rust, English

In Geoffrey Chaucer’s “The Knight’s Tale,” the narrator claims to tell his story “shortly” or briefly, using a medieval rhetorical technique called “brevitas.” Since the tale is fifty pages, it seems at first glance that the Knight doesn’t practice what he preaches. Upon examining Chaucer’s sources, however, one realizes that he condensed the story significantly. His tale of two knights, Arcite and Palamon, fighting over Emelye, sister-in-law to Theseus, the Duke of Athens, comes from Boccaccio’s Teseida, a twelve-book epic. The Knight, therefore, does abbreviate his tale, mostly through summarizing parts of it. By tracing the word “shortly” throughout the tale, I discovered that the Knight uses brevitas in relation to certain characters, with the result that they lose their agency in the move from Boccaccio’s text to Chaucer’s. Emelye, the heroine, is one of those characters, and her loss is the most obvious: thirty lines of her begging to remain a virgin are resolved by three lines of accepting her fate without argument. All of these instances of brevitas and the consequent removal of agency allow the plot to move along so that Arcite, Palamon, and Theseus, who are to the Knight the most important characters, can act and the main themes can be explored.

Musical Microcosms: Using Acoustics and Psychoacoustics to Unpack the History of Parameters
Ethan Bassford, Music
Sponsor: Dr. Elizabeth Hoffman, Music

The language used to notate and talk about Western art music has often led to reductive ways of thinking about and listening to it. Discussions of this music have traditionally revolved around certain segregated parameters, such as pitch and rhythm. A parametric concept of sound emerged largely because the music of the common practice period is accessible only in the form of scores, which utilize relatively standardized notation practices. In order to study this music, it seemed natural to think of it in terms of discrete parameters, because the parameters were represented as discrete in the notation. But these parameters are arbitrary and reductive; in fact, so is the very act of conceptualizing music parametrically. Although this traditional idea has never disappeared and can still be useful for analysis, some composers in the twentieth century began to question its authority. They sought a multidimensional concept of sound that could better represent what happens when music is played, and what we truly perceive when we listen. Paradoxically, this unpacking and repackaging of parameters represents a return to more integrated ways of thinking that predated standardized musical practices.
Integration vs. Separation: Museum Access Programs for Visitors Who Are Blind or Partially Sighted

Megan Becker, Art History
Sponsor: Dr. Miriam Basilio, Art History and Museum Studies

Museum access programs that extend beyond physical accessibility are relatively rare within the United States. The programs that have been instituted at fine arts museums in New York City are often separated from mainstream programming. In light of their separation, these programs contradict the spirit of integration detailed in the Americans with Disabilities Act of 1990. To evaluate the effectiveness of inclusion for both sighted visitors and visitors with visual impairments, I participated in one of the few inclusive programs in the world, “Stimulating the Senses,” at the National Gallery of Canada.

The program invites sighted visitors to wear blindfolds and join their peers with visual impairments in examining artwork through touch. As a result, sighted visitors learn to appreciate art with their nonvisual senses, while the visually impaired visitors benefit from the discourse that is enabled through their interaction with sighted peers. In light of conservation and staffing issues, it is difficult, however, for this program to reach a larger audience. An ideal inclusive program would therefore be multisensory, with the inclusion of both verbal descriptions and high-quality replicas that could be touched by the general public, and thus benefit all parties.

Between Two Worlds: The Role of the Professional Hospital Chaplain

Benjamin T. Bloxham, Religious Studies
Sponsor: Dr. Angela Zito, Religious Studies

My research aims to explore the complex and often paradoxical role of the professional hospital chaplain in the modern hospital. As a representative of religion in the secular/scientific environment of the hospital, the chaplain lives and works among two very distinct worlds: the worlds of faith and of science. Professional hospital chaplaincy as a field is relatively new and little has been written about it compared with similar professions requiring advanced degrees and training. A main theme in the literature is questioning/justifying the existence of spiritual care offered in hospitals. I found that chaplains’ colleagues are concerned about patient privacy and autonomy while chaplains point to their ability to increase patient satisfaction and cost-effectiveness. Hospital chaplaincy is complex, full of variety that is difficult to define, in a state of evolution as a field, misunderstood by other health-care professionals and patients alike, subjective in its aims, and often at odds with the reigning ideologies of secular science and empiricism.

Wall Street Changing: The Architecture of Lower Manhattan’s Financial District and Its Converted Functions

Christopher Bush, Urban Design & Architecture and Economics
Sponsor: Dr. Mosette Broderick, Art History

This research examines the changing demographics and real estate functions of the Lower Manhattan financial district due to the process of converting office space to residential use that has taken place in the neighborhood in the last twelve years. The histories of four major commercial monuments were used as case studies to describe the area’s architectural history and establish its identity as the preeminent urban center of capitalist architectural dreams. Research on demographic and property data for the neighborhood was then conducted to examine how that financial identity has changed as a result of the 31,000 residents who have moved into 13.1 million square feet of former downtown office space since 1995. The data analysis demonstrated that public policies passed in 1995 and 2002 played a role in spurring the conversion growth. The four case studies, along with a cash flow and tax model, offered further understanding of the market forces driving the conversions and the alternative functions for which downtown’s offices could be re-used. I concluded that the area’s commercial architectural identity can and is being preserved for its original functions, even while downtown Manhattan has achieved a unique balance of mixed-uses that serves as a model for other urban centers.

Ritual and Improvisation in the Catholic Homily

Ashley Cooke, Anthropology
Sponsor: Dr. Jason Stanyek, Music

In the Catholic Church the priest’s homily, performed during the mass as a reflection of the preceding gospel reading and a source of spiritual inspiration for the week to follow, includes aspects of improvisation and is indeed a performance. Similar to a chord chart in jazz improvisation, the day’s gospel is performed by the priest and acts as a template from which the speaker can diverge, play around as he sees fit, and then return for the next “chord change.” Reacting to outside factors such as environment, audience, and the subject matter of the various days’ gospel, the priest alters his voice intonation and uses strong metaphor to relay his weekly message. He may augment the intensity of his voice to wake up the droopy eyed in the back pew, or increase the frequency
of inspiring metaphors if he feels that congregational attendance has started to drop. Through observation and interviews conducted at St. Joseph’s church in Greenwich Village, I illuminate the aspects of improvisation in the priest’s spoken homily, concentrating on issues such as temporality, space, audience, and history.

Innovation and Tradition: Orthodox Women and Prayer in the Modern Era
Talia Cottrell, Religious Studies
Sponsor: Dr. Lawrence Schiffman, Hebrew & Judaic Studies

Although there are hundreds of books and articles which deal with the topics of Orthodox Judaism, women, and prayer, there is little literature which attempts a meta-analysis of the academic and religious literature regarding these issues. In reading this literature, it is obvious that there are many views within the Orthodox Jewish community about women’s roles in Jewish prayer life. By analyzing Jewish legal articles, historical literature, feminist writings, academic literature about Jewish women, academic literature about feminism in Christianity, and more, I put the question of women’s roles in the synagogue into a broader theoretical framework and examine the different ways in which traditional religious groups negotiate the tensions between modern secular values like feminism with traditions that contradict, or seemingly contradict, these values. To conclude, I draw on survey data to briefly discuss the attitudes and practices of Orthodox female students on college campuses, locales where this tension between religion and secular values can be acutely experienced. By showing the various ways in which Orthodox Jews negotiate the ideals of feminism and Jewish law, both in theory and in practice, I demonstrate the complexities inherent in maintaining tradition while adapting to modernity.

Decline and the Weakness of Language in Sallust
Ian Folkert, Classics
Sponsor: Dr. Joy Connolly, Classics

Cultural decline is perhaps the single most pervasive theme in Roman literature. The Roman historian Sallust, writing in the late 40s B.C.E., experienced firsthand the mounting corruption, slaughter, and instability that characterized the final years of the republic. His two monographs, the Bellum Catilinae and the Bellum Jugurthinum, examine the history of this turbulent period through the lens of cultural and political decline. I conduct a narratological analysis of Sallust’s Bellum Catilinae, examining the manner in which the text presents itself to the reader. This analysis explains the various ways in which the conceptual framework established in the beginning of the text is redefined throughout its remainder. I argue that Sallust establishes his moral language throughout the Bellum Catilinae with the ostensible purpose of demonstrating a decline of Roman morality, only to have that language undermine the very opposition it attempts to create. Rather than symbolizing a fatal incapacity of language, the text informs the reader’s understanding and forces him to re-contextualize the way that it operates throughout the text. By revealing the inherent ambiguity of moral language, Sallust demonstrates the way that political persuasion and rhetoric assume fixed meanings in order to prompt physical actions and decisions. Sallust is in this sense both a historian and a social critic; he simultaneously reveals the problematic nature of public deliberation and provides an opportunity for better communication.

The Long and the Short of It: Entropy and Rebirth in Children of Men
Nicholas Forster, Undeclared Major
Sponsor: Dr. Friedrich Ulfers, German

The notion of an “endless horizon” is relatively new in scientific thinking. This idea is especially prominent in quantum theory, which entails irreducible uncertainty with regard to beginning and end states. I demonstrate how this scientific state of affairs informs Alfonso Cuarón’s Children of Men, a film about a dystopic, infertile, post-9/11 world, distraught by terrorism. This becomes apparent in that Cuarón’s film alludes to the notions of entropy and uncertainty not only in the film’s plot structure, but also in its framing and direction. Through long takes and the progression of a story dealing with the infertile nature of humankind, Cuarón gives us a vision of a universe that is continually being born, expanding, contracting, and eventually dying, only then to be born anew. With this, Cuarón puts in question an end state that is so common in film. Instead, he provides a wealth of uncertainty and ambiguity, leaving the audience to ponder the possible outcomes both for the film and for “reality.”

Eternal Recurrence in Kundera’s Unbearable Lightness of Being
Alice Frenkel, Undeclared Major
Sponsor: Dr. Friedrich Ulfers, German

Friedrich Nietzsche believed that the most terrible reality would be for all the moments of a person’s life to recur endlessly, turning each act into an ultimate and unbearably significant decision. In Milan Kundera’s novel The Unbearable Lightness of Being, which refers to Nietzsche’s theory epigrammatically, we are shown
that, though without “eternal recurrence” life loses all meaning, the alternative can be equally painful: What happens only once might as well have never happened at all because it will never affirm itself or touch us again. If we feel that any choice we make shall bear no serious consequence, thinking about and anticipating the consequences of our actions becomes “unbearable.” My analysis asserts that Kundera’s novel alludes to a “third” position between weight and lightness by showing that all opposites are interdependent and that recurrence is not an endless repetition of the “same,” but a recurrence of things “again and again, each time with a different meaning” where “all former meanings would resonate (like an echo, like a parade of echoes) together with the new one.” I will show that this “third” involves a decision-making that is never routine as it confronts us from moment to moment in the new or unpredictable.

**Between Page and Stage: The Dramatic Adaptation of The Count of Monte Cristo by Alexandre Dumas père**

*Benjamin J. Goldman, French  
Sponsor: Dr. Claudie Bernard, French*

The art of successfully adapting a novel to the stage has gone largely unexplored in comparison to the parallel and sometimes related processes of adapting a novel or play to the small or big screen. In my contribution to this underrepresented area of research, I focus on Alexandre Dumas’ 1844 serial novel, *The Count of Monte Cristo*, and the four dramas he adapted from it in collaboration with Auguste Maquet: *Monte-Cristo, Parts I & II*, *Le Comte de Morcerf*, and *Villefort*. These dramas each consisted of five acts and each required a performance time of up to six hours.

I consider physical space to be of special significance as Dumas constructed an entire theater, the *Théâtre historique*, for the express purpose of mounting such spectacular productions as his Monte-Cristo cycle. Equally impressive, Dumas leaves the story largely intact from one form to another, though his few changes do resoundingly alter the overall development of the plot. Using two iconic scenes as examples—the protagonist Dantès’ escape from the Château d’If prison during the rising action, and the scene in which he forgives his sworn enemy, the baron Danglars, at the conclusion—I explore Dumas’ method of adaptation, comparing side-by-side excerpts from the novel and their staged counterparts.

My findings point to difficulties intrinsically associated with attempts to adapt faithfully a novel of such complexity and scope. While never dismissed by critics, the plays’ short run and exorbitant costs did contribute to Dumas’ bankruptcy and the end of the *Théâtre historique*. The source material seeming perhaps better-suited to a blockbuster motion picture or serial miniseries, many film versions have attempted to accomplish what Dumas did not.

Despite Dumas’ lack of success, the serially-published *feuilleton* genre is linked very strongly to the stage: nineteenth-century melodramas, immensely popular in their era, were frequently adaptations of equally popular novels. I consider this research a potential first step towards the composition of a faithful yet accessible *The Count of Monte Cristo: The Musical*, applying this project’s academic findings to my lifelong passion for the performing arts.

**Narrative Strategies for the Representation of the “Return of Hephaistos to Mount Olympos” in Greek Vase Painting**

*Victoria Grinbaum, Art History and Linguistics  
Sponsor: Dr. Joan B. Connelly, Art History*

The interpretation of iconographic schemata on Greek vases has largely focused on imagery portrayed on individual vases. But why would a society with a rich tradition of storytelling choose to fragment a narrative through an episodic approach in its ceramic media? I propose an alternative reading: a series of images on a series of vases can be interpreted as a continuous narrative of a single story. My examination of vases produced by the Mannerist workshop in early fifth century B.C. Athens sheds new light on how narrative was constructed. The images on these vases, when analyzed in a series, show a progression of moments within the myth of the “Return of Hephaistos to Mount Olympos.” Analysis is focused on scenes depicting the gods, Dionysos and Hephaistos, and their entourage—players in the story whose portrayal is better understood if the narrative imagery in each vase is understood as a part of a larger whole. The results of this research will deepen an understanding of narrative in antiquity. We can identify in vase painting an alternative reading of pictorial representation, one which enables us to question traditional notions of viewership.

**On the Origins of sean-nós: The Global Consequences of Traditional Singing**

*Kathryn Hall, Music  
Sponsor: Dr. Michael Maloney, Music and Irish Studies*

Looking deeply into Ireland’s rich vocal music, one can see that the historical origins of sean-nós singing are a cultural mystery. I notated samples of sean nós by examining the music of Joe Heaney. I identified persuasive relations between sean nós and Gregorian chant, sacred
monophony, and other ancient modal song. I also drew connections among segments of Buddhist chant and Russian orthodox music. Despite the scholarly research that has surrounded Ireland’s vocal music history, the source of sean-nós remains unresolved to this day; an explanation holds the possibility to elucidate both the musical and non-musical connections among populations across the world.

Using conventional techniques of harmony and counterpoint, my research addressed topics such as tonality and structure with through-composed musical analyses of a wide variety of traditional unaccompanied songs. Because the music of Ireland so often flouts Western convention, I have at times depended upon other methods of written classification. I explored the methodology of its teachings through generations, investigated its performance practices, probing the tension concealed in the seisiún, and attempted to identify in a most detailed fashion the expressive components that comprise the character of Irish song. Such information may explain the successful progression of one of Ireland’s most beautiful traditions, while aiding in the preservation of such an expressive heritage. Although many consider it to be something of the past, today, sean-nós singing is being understood in more ways than ever with a variety of artistic angles.

Borrowing Authority: Appropriated Sciences in Contemporary Poetries

Diana Hamilton, Comparative Literature
Sponsor: Dr. John Chioles, Comparative Literature

Taking as its examples three works in contemporary poetry, this research examines the use of borrowed scientific language (i.e., words taken directly from another source) and the effect of such use on the poetry’s authority. Poetry often offers to open up a space for the exceptions necessarily excluded by scientific inquiry, but it also does so by borrowing the methods, logic, and language of science itself. The first book, Doppelt’s *Quelque chose cloche*, deals with pre-Socratic philosophy as an examination of the human ability to encounter the world through the senses. This book provides an example of how what might not suffice in science—empirical observation, for example—may offer an efficacy or “truthfulness” when used in poetry. The second book, Dan Farell’s *The Inkblot Record*, is compiled alphabetically from one-sentence responses to inkblot tests taken from various psychology textbooks. It provides an example of poetry that is interested in undermining or revealing the flaws in the logic of its borrowed discourse: with so many interpretations appearing side by side, this book exposes the danger of over-reading, and the potential problems with interpretation itself, despite the fact that Farell’s text also invites interpretation. The third, Kim Rosenfield’s *Re:evolution*, borrows the language of evolutionary biology and offers a polyvocality that examines that discourse’s claims. All three texts exemplify and question the stakes of poetry’s ability to open itself up to science and to the authority that science provides.

Ergotism at Isenheim: An Artist’s Representation of a Plague

Adina Haramati, Art History
Sponsor: Dr. Carol Krinsky, Art History

This research concerns the medical aspects of a painting known as the Isenheim Altar, painted in 1510–1515 by Mathis Gothard Neithart, better known as Grunewald. The research also includes relevant social references, treatments for the condition plaguing the patients in the region of Isenheim in Alsace, and visual stimuli, perhaps intended to cure the patients at the monastic hospital where the altar was displayed. It is generally accepted that the altarpiece was used in the treatment of the medical conditions, but whether the visual stimuli were meant to cure or to further the patient’s belief is unclear. I hypothesize that they were meant to induce more fervent prayer. It has been postulated that the hopeful message of the altarpiece was “dire illness and miraculous healing,” but I posit that the message was one of temporary suffering in this world with the promise of eventual salvation through Christ. The artist knew what the patients were experiencing, both physically and in their hallucinations, through direct observation, and I conclude that he harnessed their experiences by including references to the disease and its symptoms to direct the message of the altarpiece to them, the main viewers.

Tongzhi Representations on the Silver Screen: Queer Identity in Contemporary Chinese Film and Video

Destin L. Hodges, East Asian Studies and French
Sponsor: Dr. Rebecca E. Karl, East Asian Studies

The potential power of film extends beyond its capability merely to represent reality. Film’s true power rests in its ability to create discursive space wherein new identities and social structures are imagined and come into being. In the People’s Republic of China, film and digital video are increasingly being used by directors of the emerging “Urban Generation” to create such discursive space in which the identities of individual tongzhi are affirmed and asserted. *Tongzhi* refers to individuals in Chinese societies with non-normative sexualities engaged in the process of resisting heteronormative oppression.
and fighting for the tongzhi’s position in society. Through their use of alternative media, Urban Generation directors not only assert their own sexuality and identity, but they engage in the larger process of transforming society by facilitating others in awakening to their own subjectivity, fostering a sense of a public tongzhi community, and challenging the dominant social and cinematic systems. As exemplified by the cinematic corpus of director and activist Cui Zi’en, particularly his film Men and Women, tongzhi-themed films of China’s Urban Generation play a vital role in asserting tongzhi identity and “queering” the mainstream, with the future holding only more potential and possibility.

Japanese Music’s Art of Application: Hybridization Considered as a National Trait
Oki Ishikawa, Music
Sponsor: Dr. Elizabeth Hoffman, Music

Various regional musics can usually be differentiated through their respectively paired musical characteristics, although globalization is unsettling this paradigm. Still, Japanese music, as we know it today, has always been distinct in its lack of uniquely Japanese musical features. It is hard to point to any one feature that has been born and developed within the country. Nevertheless, non-Japanese musicians and composers perceive a certain stylistic trait, a certain “Japaneseness,” as the Japanese composers themselves refer to it. This predominates in musical styles that are heavily borrowed from Europe or China. What is unique about the Japanese, I suggest, is their cultivated ability to adopt and smoothly synthesize foreign concepts—to produce a new hybrid. Although their historical attempts to adopt outside styles frequently suggest mere imitations, scholarly and artistic consensus is that the Japanese do understand rather deeply each foreign style’s nature. The difference in the educational systems of the West and those of the Japanese is revealing about how this ability to apply concepts is fostered from a young age and instilled as a national sensibility.

New York’s Underground Beats: The Music and Musicians of New York’s Subways
Raghu Kanumalla, Mathematics
Sponsor: Dr. Jason Stanyek, Music

Amidst the din of screeching trains, the sounds of New York’s subway musicians filter through to the ears of travelers. These musicians are often ignored or watched as mere sideshows, worthy of a few spare coins as we go about our daily business. Occasionally people stay and listen, amazed by their talent. In the end, however, they are a mere passing fancy in our otherwise busy lives. Professionals and amateurs alike come from all over the world to perform here. For many of these musicians, it is their livelihood and represents a strategy for survival in an expensive city. All of these musicians have one thing in common: they use improvisation in their performances, not only musically, but also in the various ways they relate to the subway riders who stop and listen, the trains that transport them, and, crucially, the civic codes that govern musical performance in public spaces. My research focuses on the musicians of Union Square, the politics of the MTA, and the organizations and institutions that both support and undermine them. By speaking with the musicians and observing their performances, this study illuminates how improvisation plays a role both musically and structurally in subway performance.

Alexander B. Kauffman, Art History
Sponsor: Dr. Friedrich Ulfers, German

On his first transatlantic voyage to New York, Swiss-French artist Jean Tinguely worked out the details of a new sculpture. Ostensibly traveling to attend his solo show at New York’s Staempfli gallery, Tinguely spoke only of this new project, a large sculpture study of New York City. The relatively unknown artist persuaded administrators of New York’s Museum of Modern Art to permit the construction and performance of his mechanical sculpture in the museum’s sculpture garden. On March 17, before three hundred guests, Tinguely activated his Homage to New York. Powered for the first time, the sculpture lurched to life, swiftly disassembling and igniting itself in a grand act of self-destruction.

Magic and the Rise of Christianity in the Roman Empire: The Struggle for Legitimate Power
Savana Kretchmar, Religious Studies and Classical Civilization
Sponsor: Dr. Michael Peachin, Classics

This research examines practices attributed to early Christians that were considered “magical” by others and therefore threatening to the Romans and the Jews. Roman attitudes toward “magic” reveal a historical backdrop against which to view Jesus and the early Christians. This involves Roman statutes that legislate against magic, inquiring into who practiced magic and their place in society, as well as examining pre-Roman ideas (mainly Greek and Egyptian) about magic, which helped to shape Roman opinions. My argument revolves around the power play between the Romans/pagans, Jesus and Christians, as well as the Jews, and what labeling a group or a person with terms that amount to “magic” accomplishes in the context of legitimizing or contesting power. This is a unique view on the scene of early Christianity and the involvement of the Romans. My research shows how negotiations and manifestations of power played a big part in legitimizing or delegitimizing the place of Jesus and his followers in this society.

Science and Pseudoscience in the Renaissance
Olivia P. Lee, Chemistry
Sponsor: Dr. Jindrich Zezula, French

During the Renaissance, as art and philosophy flourished, alchemy in search of the philosopher’s stone became popular among the natural philosophers. Extending the techniques from the Middle Ages, some alchemists attempted to create a recipe that could produce the elixir of life or to extract the fifth essence from earthly material through distillation. In the late sixteenth century, Rudolf II, Holy Roman Emperor, supported occult art by commissioning alchemists such as John Dee and Edward Kelly to work in the Golden Lane of the Prague Castle. On the other hand, other alchemists including Vanoccio Biringuccio insisted that transforming gold from a base metal was impossible because humans were unable to fully imitate heaven’s creation. Although the two ideas differ, they are connected to religion, magic, and philosophy. Furthermore, theories and techniques arising from metallurgical alchemy which seem unreasonable by today’s standards, facilitated the progression of the Scientific Revolution beginning in the late sixteenth century.
demeaning attributes, such as connubial desperation or sexual aggression. Often, heroines are cut from the same passive mold, appearing unsophisticated and dull.

This research critiques the librettos of five Gilbert and Sullivan operettas (Trial by Jury, H.M.S. Pinafore, Patience, Iolanthe, and The Mikado) in light of Victorian sensibilities, by examining the portrayal of women in the text. The ultimate goal of this project is to investigate the “cultural work” (borrowing Mary Ann Smart’s term from Siren Songs) that Gilbert and Sullivan operettas have performed on the images and expected behavior of women, both Victorian and modern.

The Intersection of Innovation, Improvisation, and Tradition in Contemporary Bluegrass Music
Claudia P. Maniscalchi, Music
Sponsor: Dr. Jason Stanyek, Music

In recent years bluegrass music has witnessed an outpouring of bands and artists playing a hybridized style, one that draws on a well-established traditional repertoire, but incorporates innovative sounds, instrumentations, arrangements, and musical forms. Within this context, musicians today are faced with the decision of whether or not to stay faithful to a rigid conception of “the traditional” or to innovate and expand their ideas of what bluegrass can and should be. This research examines how New York City musicians today relate to the bluegrass tradition while living in a modern, globalized city. New York is home to a thriving bluegrass scene with an active local community while at the same time a Mecca for progressive performers. Using field recordings of both informal sessions and concerts, as well as interviews conducted with active members of the community, I examine the relationship between tradition and innovation in bluegrass music on the local level. Specifically, I consider to what degree the traditional framework of bluegrass music is present in the improvisative reworkings of the traditional repertoire that has become so relevant to contemporary musicians and listeners.

The Amanuensis and the Narrator: Free Indirect Discourse in the Dictated Works of Henry James
Alice McGrath, English & American Literature
Sponsor: Dr. Patricia Crain, English

After Henry James stopped writing his novels manually and began dictating to a typist, his style gradually changed to what is known as his “late style,” characterized in part by an increasingly idiosyncratic use of free indirect discourse, a narration device in which characters’ thoughts and speech elements occur in narration without quotation marks. My thesis examines the relationship between oral composition and James’ use of free indirect discourse, focusing on two novels written at this pivotal time: What Maisie Knew and The Ambassadors. James’ dictated letters, many unpublished, and the work of inscription technology theorists inform my exploration of dictation dynamics; I suggest that the removal of the individual’s handwriting from the writing process encourages a less authorial style.

The sentiment, expressed in James’ letters, that personality gets in the way of a mediumistic function, is echoed in each protagonist’s development: Maisie Farange and Lambert Strether initially act as messengers for other characters but ultimately dictate their own terms to the narrator. Seeing the narrator as a secretary rather than an authorial figure helps to understand James’ idiosyncratic narration. I argue that James’ ability to thrive on dictation indicates his belief that impersonality is more effective for art. The amanuensis and the narrator, I conclude, are both mediators who serve their author best when most transparent.

The Mythology of Music
Jeffrey Olchovy, Anthropology
Sponsor: Ms. Deena Engel, Computer Science

By treating popular music from the 1950s to the present not as a structured form of music composition, but rather as a form of lyrical poetics, I propose that one can create a framework for the mythos that appears and recurs within these modern day “folktales.” I test this theory by transcribing the lyrics to popular songs and then categorizing them with XML markup, following a form similar to the Text Encoding Initiative. I attempt to cross-reference and schematize recurring “characters,” “settings,” and any other similar trends seen across the seventeen-song selection.

I provide for the user a catalogue of music that has an epic narrative within its collective lyric. While I believe that there is an infinite number of permutations for the possible stories that one can generate from a catalogue of music, my research provides access to one such mythology, detailed with song clips, album covers, encoded lyrics, and the many stories behind the songs themselves.

Reality in Borges’ Labyrinthine World
Jon Reitzel, Gallatin School of Individualized Study
Sponsor: Dr. Friedrich Ulfers, German

Jorge Luis Borges is one of the most prolific writers of Spanish fiction of his generation. The worlds
Borges creates in his writing contain both fantastic elements seemingly outside the realm of “the real” and an attention to detail that mirrors the sensory experience of everyday. Borges does not, however, offer simply escapist narratives. Borges’ stories reflect reality as it stands—not imagined or hypothetical, but real. In two of Borges’ stories, “Pierre Menard, Author of the Quixote” and “Story of the Warrior and the Captive,” I examine the reality Borges documents in his work. Both stories, like many of Borges others, explicitly reference actual places, people, and historical events, while intertwining them with what appears to be a fictional narrative. I argue that this “fiction” is actually Borges putting into practice theories propagated by both post-classical philosophers and scientists (for example, those theories outlined in Stephen Hawking’s *A Brief History of Time*) concerning the fundamental nature of our universe. Borges documents events in which identity, origin, and time are variable; we call this fiction when, as Borges shows, believing these to be reliable constants is actually our most widely accepted fantasy, as I interpret it.

**From the Page to the Stage: Performing Spoken Word Poetry**

*Reena Shah, Gallatin School of Individualized Study*  
*Sponsor: Dr. Jason Stanyek, Music*

Poets often do with words what painters do with brushes. With language as their canvas, they etch the shades, figures, and tonalities of thought. But poetry, similar to painting, is a prisoner to the page—confined to a flat, second-hand reality. How does poetic discourse change when it is freed from the page and becomes a first-hand, interactive experience for both the poet and audience? Through an ethnographic study conducted in New York City’s Nuyorican Poets Café, this paper explores the use of improvisation and performance in spoken word and beat poetry. By emphasizing the use of language, tone, and movement, this project critically examines how improvised expression and emotion have become essential tools for local poets wishing to paint their words into reality through a series of responsive performer/audience interactions.

**Through Their Own Eyes: Puritan and Indian Worldviews in Seventeenth-Century Southern New England**

*Michael Stein, History*  
*Sponsor: Dr. Karen Ordahl Kupperman, History*

Religious and political worldviews played a key role in Puritan-American Indian relations in Southern New England between 1620 and 1650. In order to understand English religious and political dissidents like Roger Williams, John Winthrop Jr., and John Mason and their unconventional acceptance of Indians, one must look at how and why each saw the world in a different way than most Puritans. Many underestimate the role of worldviews in Puritan-American Indian relations, but the fact that Puritan dissenters looked at the world differently, and thus viewed and interacted with Indians differently than they did with their co-religionists, demonstrates that Puritans and Indians were motivated not only by economic concerns in their interactions.

The 1630s was an especially tumultuous time period for both Indians and Puritans, as the Free Grace controversy, also known as the antinomian crisis, shook the Massachusetts Bay Colony and as the Pequot War helped completely to change the power structure in Southern New England. Only through an examination of Puritan and Indian worldviews can we truly hope to understand Anglo-Indian relations in the early seventeenth century. After all, in just under thirty years the English managed to become the dominant force in Southern New England, overtaking the Dutch, the Pokanokets, the Narragansetts, the Mohegans, and the Pequots. Many have studied the effects of trade and disease on these interactions, but in order to fully understand Puritan-American Indian relations, we must first remove our modern lenses and look at the tumultuous world of seventeenth-century New England through the eyes of those who experienced it.

**Imagining Ireland: Literary Tourism in the Twenty-First Century**

*Clarissa Wallace, Comparative Literature*  
*Sponsor: Dr. Samuel Slote, Trinity College, Dublin*

The past fifteen years have been crucial to Ireland in terms of its image as a tourist destination. The year 1991 saw Dublin named as a “European Capital of Culture,” a title previously given to Athens, Florence, and Paris, among other cities. Nineteen ninety-nine was also the year that the Dublin Writers’ Museum and Union found a permanent home in numbers 18 and 19 Parnell Square; in 1996 the James Joyce Center was established in another restored Georgian house. Currently, there are twelve other attractions in Dublin, including a pub-crawl, designed to draw tourists interested in Dublin’s literary history. What does it mean for a nation to capitalize on its literary production, and how does it go about achieving this? The new strategy of “selling” Ireland’s “niche products”—among them its literature—arises from a long history of problematic tourist representations of Ireland. There is a sense that the tourist industry has
manufactured its own Ireland, one that tourists have declined to consider critically. Superimposed upon the discourses about tourist practices are moral frameworks that create an ever-accruing set of “bad” and “good” types of tourism, and these are framed within issues of “authenticity” and “artifice.” Failté Ireland, responsible for marketing Ireland as a tourist destination since 2004, essentially seeks not to create the artifice of an “authentic” Ireland, but to allow the tourist to experience on a more personal level what Ireland has produced. The increasing emphasis on cultural production over cultural difference belies the extent to which contemporary tourists struggle with the issue of authenticity. As Erik Cohen shows, the desire for authenticity forms a central part of the tourist experience, and comes from a feeling of distance from an emotional center. My project looks at literary tourism within Cohen’s phenomenology of tourism, locating it within the existential category. Considering the tourist through this lens, my project analyzes tourist sites related to literary figures in Ireland in an attempt to understand how the tourist experience is formed through the reciprocity between tourist, curators, and guidebooks and what the consequences of this interaction are. I consider how Ireland has appropriated its own authorial production as a tourist attraction. Finally, exploring tourism as a model for life in general, I argue that Ireland’s strategy for portraying itself to the tourist, to a large extent through tourism, can work against the larger process of “spatial homogenization” endemic in the postmodern era.

Karlheinz Stockhausen: spielerDENKMAL
(storage monument)

Michael Waller, Finance, Stern School of Business
Sponsor: Dr. Stanley Boorman, Music

In an effort to study the work of composer Karlheinz Stockhausen and to memorialize his death, my research aims to present a consummation—his musical digestion—a synthesis of being in the world. The discussion begins with the ethnomusicological context surrounding Stockhausen’s exposure to Goeyvaerts, Adorno, and Messiaen prior and during the summer of 1951 at Darmstadt. This first sign of emergence, specifically KRUEZPIEL, outlines a schematic to examine his philosophical timeline, and perhaps foresight of self-belief. His pre-1960 serial experimentations provided a method for approaching overall form: abstracting dimensionality in terms of the point, group, and mass (moment). During this period, his work managed to offer a course to grapple with the paradigm of electronic and instrumental music.

The crux of the research examines involution in consciousness, specifically surrounding KONTATKE and HYMNEN. Extended considerations of “Intuitive Music” and the Zen influence in Japan give breath to bold assumptions about his development in delusion. This later discussion focuses on moments of opening, trying to embrace Stockhausen’s fractured megalomania and esoteric-isms. I create a supra-personal composition of aggregated sound samples from his seven most notable works as a physical storage monument.

Computing in the Humanities: NYU and the Civil War
Elizabeth Webber, Journalism and History
Sponsor: Ms. Deena Engel, Computer Science

In an increasingly digital age, advances in Web-based technologies are being applied not only to the fields of mathematics and the sciences, but also to the humanities. Thus, the purpose of my research was twofold: to explore the various ways Web-based technologies can be employed for history studies and to utilize those technologies to present a specific project of historical inquiry.

I investigated the role played by New York University students during the Civil War based on materials found in the University Archives. Specifically, I researched a handful of students from the graduating classes of 1862 and 1863 who served as doctors and nurses in the Union Army. After creating digital copies of photographs, letters and other documents from the archives, I produced an on-line catalogue and accompanying Web site of my findings. The Web site uses technologies such as XML, HTML, and advanced Web design to present the historical documents in formats suitable both for fellow researchers and the general public.
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

Socialism and Populism in Latin American Elections
Konstantin Ash, Politics
Sponsor: Dr. Anna Harvey, Politics

There exists little conventional wisdom concerning how to define and measure populism in Latin America. I defined populism and socialism and created two separate scales, one measuring populism/institutionalism and the other measuring socialism/neoliberalism, to determine the positions of elected Latin American presidents. I then coded the speeches of all presidents elected since 1982 and used the results as dependent variables in regression analyses to determine what factors are significant in the elections of leaders that represent a certain ideology. I find that my two policy position scales correlate to one another and that this correlation is significant. I also find that there is no interactive relationship between inflation and inequality in causing the election of socialist leaders. I do determine, however, that lower political and civil freedoms and lower murder rates result in a significant increase in the chances that a populist leader will be elected.

Psychophysiological Evidence of Early Differentiation between Members of Novel Ingroups and Outgroups
Kandy Anasha Bahadur, Psychology
Sponsor: Dr. Dave Amodio, Psychology

Behavioral and neuroscience research suggests that social categorization occurs automatically and sets the stage for subsequent judgments. This study examined the timecourse of social categorization processes in the absence of prior beliefs about the groups being evaluated. Participants were arbitrarily assigned to a novel group. Participants then categorized faces as members of their ingroup or outgroup while electroencephalography was recorded, to examine event-related potentials (ERP) associated with categorization. I hypothesized that group membership would be differentiated very early in information processing, as in past research on racial biases. Consistent with my hypothesis, differences in processing faces of ingroups and outgroups were apparent as early as 142 milliseconds.
Drug Price Control Policies
Mohit Bahel, Undeclared Major
Sponsor: Dr. David A. Seicchitano, Biology

The rising cost of prescription drugs is currently a major concern in the United States. Even with new technology, prices continue to skyrocket. Canada and some EU member countries claim to have dealt with this problem by implementing drug price control policies. My research examined why the United States cannot simply enforce similar policies to control drug prices. I determined that U.S. drug prices are so high due to the drug control policies of other nations. By implementing pricing controls, governments limit the amount of money that pharmaceutical companies have available to spend on research and development. Consequently, companies shift their business to other nations where their R&D budgets are not so stretched. While the United States has investigated the possibility of implementing price controls which would help decrease drug prices initially, the repercussions caused by such policies would be very harmful to the economy, if, as a result, pharmaceutical companies moved their research to locations with more accommodating pricing policies.

The Effects of Expectations and Fantasies on Disengagement
Neaka Lynn Balloge, Psychology
Sponsor: Dr. Gabriele Oettingen, Psychology

Smart disengagement has been identified as a component of self-regulation that allows one to curb effort on tasks that are unsolvable. Oettingen, Pak, and Schnetter (2001) differentiate fantasy indulging and mental contrasting as two styles of self-regulatory thought that relate to different ways of envisioning future outcomes. The former involves solely fantasizing about a positive future, while the latter involves mentally contrasting fantasies about a desired future with obstacles in the present reality that impede the desired outcome. In the present study, we manipulated self-regulatory thought style and one’s expectations for future success to see how these components interacted to produce effects in an unrelated domain. Participants in the high expectation, mental contrasting condition showed the earliest disengagement from unsolvable puzzles, therefore suggesting that it is possible to create smart disengagement on behalf of participants through manipulating their expectations and self-regulatory thought style. These results additionally suggest that mental contrasting can produce goal commitment that is expectancy dependent, and the effects may be transferable across domains.

The Road to Progress: Driving Congestion Pricing through the Political Process in Four Different Cities
Sameer Birring, Metropolitan Studies
Sponsor: Dr. Harvey Molotch, Metropolitan Studies and Sociology

In cities around the world, awareness of the productivity and environmental costs of traffic congestion is growing. To address the problem, Singapore, Stockholm, and London have implemented congestion pricing plans that charge motorists to drive into the city or within certain areas of the city at certain high-traffic times of the day. In New York, Mayor Michael Bloomberg proposed a congestion pricing plan that, despite its popularity in the City Council, could not be implemented because it did not receive the necessary approval from the state legislature.

Congestion pricing has been a difficult political maneuver to achieve in democratic cities. The path to successful implementation of pricing often relates less to the will of mayors, planners, and the public, and more to the unique natures of local transportation governance and the relationships among city, state, and national governments.

In this study, I compared the trajectory of congestion pricing in each city, studying the coalition building and political compromises that accompanied successes and failures to drive it through. I used congestion pricing as a lens through which to compare how the structure of government in each of these cities either aids or hampers the introduction of progressive, car-restricting transportation policy.

Government on the Mississippi: Unbound Limits of Human Willpower
Tim Bockes, Philosophy
Sponsor: Dr. Rodney Smith, University of Dubuque

Does government involvement in the economy cause a market failure that limits innovation in the transportation market? This research demonstrates how government applies coercion in the marketplace to bypass voluntary exchange as a way to preserve certain industries deemed politically important regardless of their economic value. I conclude that the government’s disregard for economically derived market principles (e.g., voluntary exchange) produces inefficiencies that lead to market failure.

To illustrate how government ownership might cause market failure, I reviewed events in twentieth-century
America that led to government claiming ownership of the transportation industry. I contrasted the relationship between waterway and railways to exemplify how government ownership preserved waterway transport at the price of railroad bankruptcy. Overall there are four main points I cover to justify that government has caused the market to fail and distort development: 1) steady decline of river traffic up to World War I; 2) regulation of the profits of transportation companies, making it difficult to maintain and expand infrastructure to satisfy demand; 3) with profit reduced by government decree, profits could no longer signal to entrepreneurs when and where to invest; and 4) instead of allowing the market to furnish a competitive form of transportation (pipe line, air transport), the government-launched enterprises were regressions as they created incentives to use the least efficient forms of river transportation.

Lindsay Branson, History
Sponsor: Dr. Linda Gordon, History

Many histories of the New Left depict the late 1960s as a time of political factionalization and subsequent deterioration. This research challenges these representations of late 1960s political activism by looking at the relationship between the Black Panther Party (BPP) and the Gay Liberation Front (GLF) in New York City between 1969 and 1971. The groups’ alliance demonstrates that rather than disintegrating into fragmented pieces, late 1960s movements attempted to forge a new kind of unity around a mutual commitment to overturning “the system” and liberating all oppressed people. No two groups might seem further apart than these. They had different structures (the BPP was national, hierarchical, and highly disciplined, and GLF was radically decentralized, unstructured, and largely consensus-based) and different constituencies (GLF was primarily white and the Panthers all black). Where the Panthers’ rhetoric was hypermasculine and often homophobic, GLF celebrated gay identity. Yet despite these differences, they attempted to forge cooperation. This alliance was, however, tenuous and contentious. The BPP’s homophobia was not just rhetorical, and it proved unwilling actually to extend support to GLF. At the same time, the white guilt that had influenced GLF’s support of the BPP prevented many GLFers from criticizing the Panthers’ sexual politics. Additionally, backing the Black Panther Party was GLF’s primary means of confronting racial injustice, and GLF was never able to include many nonwhite people. In the end, not only did GLF and the BPP fail to develop a lasting coalition, but the heated conflicts inside GLF that arose from its support of the BPP weakened the group and contributed to its demise. Despite this failure, this effort at coalition building is worth studying because of what it reveals about the forces that prevented the whole New Left from forging lasting coalitions.

Improvisatory Teaching Methods in the Education of Twenty-First-Century New York City Students
Allison Casey, Music
Sponsor: Dr. Jason Stanyek, Music

Standards for achievement in classrooms in the United States today are increasingly number-oriented. In order to gauge the academic progress of millions of students from diverse backgrounds in a vast number of environments, standardized tests, curricula, and methods of assessing effective teaching and learning are imposed on the classroom setting. What are the implications of emphasizing unwavering, quantitative standards? Is it possible to teach and learn effectively without them? Is it possible to teach and learn effectively with them? Through the observation of classes in a New York City high school and interviews with teachers of various levels of experience, I explored the efficaciousness of the standardized approach to education and examined its relationship to alternate, non-quantitative pedagogical approaches. In particular, I focused on the role of improvisation as a tactic for navigating teacher-student transactions effectively. I concluded that a creative, accommodating method of teaching can benefit students by ensuring not only short-term results, but also by developing the higher-order knowledge that will be increasingly necessary as we move into the globalized world of the twenty-first century.

The Presence of Extracurricular Academic Institutions and Their Effect on College Enrollment
Roger Chao, Economics
Sponsors: Dr. Leanna Stiefel, Robert F. Wagner Graduate School of Public Service

Economists have dedicated much research to determining what variables influence an individual’s decision to enroll in college. The literature examines parental income, parental educational attainment, costs, ability, and average household size as potential factors. I add
Parents’ Goals for Children: An Analysis of Urban African American, Dominican, and Mexican Mothers of Twenty-Four-Month-Olds
Sabrina Cheng, Psychology
Sponsor: Dr. Catherine S. Tamis-LeMonda, Steinhardt School of Culture, Education, and Human Development

Parents’ goals for their children vary across culture and motivate parents’ daily childrearing practices. Some past research has indicated that ethnic minorities in the United States prefer collectivism goals such as interdependence, family cohesion, and conformity, while European-Americans prefer individualistic goals such as independence and autonomy. In addition, education has always been associated with increases in independence, benevolence, connectedness, and decency. Overall, mothers’ ethnicity, and mothers’ years of schooling were found to be important factors that determined their goals for their children.
tic memory. A relation recognition paradigm, in which participants saw trait and behavior word pairs, was used to measure causality. The temporal order of the word pairs was manipulated so that participants saw half of the word pairs in the predictive (cause-effect) direction and half of the word pairs in the diagnostic (effect-cause) direction. Specifically, participants saw a trait followed by a behavior (e.g., happy-sing) or a behavior followed by a trait (e.g., sing-happy). Their task was to determine if a causal relationship existed between the trait and the behavior. Reaction times measured the amount of time participants needed to determine a causal relationship between the word pairs. A faster reaction time in the predictive direction for trait and behavior word pairs indicated a causal relationship (Fenker, Waldmann, and Holyoak, 2005). The results revealed that participants were faster in making causal judgments when presented with the traits and behaviors in the predictive direction. The study suggests that traits and behaviors are causally related in semantic memory, providing evidence that spontaneous trait inferences have a causal basis and aid in explaining a person’s behavior.

Implicit Responses to Procedural Justice
Marisa DiLemme, Psychology
Sponsor: Dr. Tom Tyler, Psychology

This research examines the effect of the interaction between procedural justice information and implicit group identification on a more implicit measure of cooperation than used in past procedural justice research. Participants received one of two versions of information about their group’s procedures. Group identification was measured implicitly through a reaction time task, and cooperation was measured relatively implicitly through a pen-dropping task. Relatively unjust procedures led to greater cooperation as group identification increased. Just procedures, however, led to less cooperation as group identification increased. No correlation was found between explicit cooperation and the relatively implicit measure of cooperation. The importance of looking at implicit effects of procedural justice is discussed with relevance to understanding group behavior. As shown by this study, when faced with unjust information about one’s group, the greater a person’s implicit identification with the group, the more likely he or she is to spontaneously cooperate with the group. This has many implications for the workplace, as it may lead to a better understanding of employer-employee relationships.

Too Nice To Say No: The Impact of Investment in Feminine Norms on Sexual Health
Erica Dixon, Psychology
Sponsor: Dr. Diane Hughes, Steinhardt School of Culture, Education, and Human Development

While the link between investment in feminine norms and sexual health has been explored, it has not been investigated using a multi-dimensional measure of investment. This study uses Mahalik’s (2005) multi-dimensional Conformity to Feminine Norms Inventory (CFNI) to examine the correlation of eight individual scales of investment in relation to sexual health outcomes as measured by Levenson’s (1998) Contraceptive Self-Efficacy Scale (CSES). I predicted that certain scales (“Being Modest,” “Being in a Romantic Relationship”) would have a higher correlation with negative sexual health outcomes than others (“Being Domestic,” “Being Nice”). Students participated by anonymously responding to an Internet survey containing both the CFNI and the CSES. I examined the correlation between each individual subscale and its relationship to sexual health factors. I found a negative correlation between an increased investment in “Being Modest” and a decrease in sexual self-efficacy, as well as a negative correlation between increased investment in “Being in a Romantic Relationship” and contraceptive use. These findings suggest specific norms to target in adolescent females in order to improve sexual health practices.

Accuracy in the Presence of Bias: Can Transference Induce Accuracy in Processing?
Katherine A. Eiges, Psychology
Sponsor: Dr. Susan Andersen, Psychology

Transference is defined as the process by which a significant other (SO) representation is activated and applied to a new person resembling that significant other. Prior research has shown that transference leads people to make assumptions about others based on SO resemblance, thus indicating that biases occur in transference. The aim of this study was to show that although bias exists, transference can actually facilitate interpersonal accuracy with a new person. In addition, we intended to show that attention mediates the relationship between transference and accuracy.

Information about the SOs of forty-two participants was collected. In a purportedly unrelated session, information was presented to participants in relation to a new person, derived either from their own SO information or a
Effective communication between physician and patient is an essential part of diagnosing and treating diseases and illnesses. During a medical interview, the physician must establish a level of trust with the patient in order for the patient to better express symptoms, fears, and uncertainties. As has been reported in recent articles published in major medical journals, physician-patient communication is often highly improvisatory. The physician responds to a specific complaint from the patient with a question that leads the patient to give specific information. The questions asked by the physician can be based on test results, epidemiology, time constraints, another patient seen recently, or other factors not directly related to the encounter of the interview. Are diagnosis and treatment based on objective or subjective factors? How much of an effect does what the patient describes during the interview have on the response of the physician? Based on observations and interviews conducted at a New York City hospital, this study examines improvisation in the physician-patient relationship during the medical interview and how this improvisation leads to specific diagnoses and treatments.

**Empathic Accuracy, Emotion Regulation, and Social Integration**

*Nicholas Esposito, Social Work and Psychology, Silver School of Social Work*

*Sponsors: Dr. Doris Aaronson, Psychology*

This study analyzed the components that allow one to form a supportive social network. We hypothesized that traits of empathic accuracy and emotion regulation would influence the types of social networks that people develop everyday. By having many social networks, people increase their ability to socially integrate and buffer stress. We attempted to analyze the interconnections of social integration by hypothesizing that emotion regulation and empathic accuracy would contribute to one’s ability to be socially integrated. Subsequently, we suggested that there is an independent relationship between emotion regulation and empathic accuracy, and that those variables would positively correlate to social integration. Preliminary results suggested strong correlations between empathic accuracy and emotion regulation. Further analysis will correlate empathic accuracy and emotion regulation with social integration. Finally, we will analyze the empathic accuracy and emotion regulation tasks.

**Improvising the Medical Interview: The Art of Physician-Patient Communication**

*Ariel Fredrick, Music*

*Sponsor: Dr. Jason Stanyek, Music*

I traveled to Ghana to research special education, and focused on a school called New Horizon. Executive Director Salome François founded the school in 1972 because there were no suitable schools for her intellectually disabled daughter, Helen. In 2006, Ghana passed the Disabilities Act. My research aimed to focus on the benefits of the act in moving the country toward more effectiveness in managing special education for those...
with learning and mental disabilities. I discovered that this act covers general disabilities, but many people in Ghana do not consider mental and intellectual disabilities to be part of that category. There is still a stigma surrounding these people, especially those who do not have the ability to communicate through speech or sign language. There are only two schools in Ghana that educate those with intellectual disabilities, and the only training facility in Ghana for special education focuses on physical therapies and sign language. I used my research to create a short documentary, which focuses mainly on why New Horizon continues to be important in Ghana, even though the Disabilities Act should establish free special education schools.

**African-American Friendship Groups: How University Structures Affect Friendship Network Development**
*Tamara Gilkes, Sociology*
*Sponsor: Dr. Ruth Horowitz, Sociology*

As universities work to recruit minority students, the integration and general welfare of the minority students on these campuses are becoming more of a concern with each passing year. While most efforts to diversify campuses include the recruitment of African-American students, more needs to be done to ensure that these students are integrating and benefiting from their education and the networks that tend to develop as a result of attaining a college degree. To determine integration, I studied the racial makeup of student friendship networks. Much of the literature focusing on African-American friendship group formation focuses on student choice in forming homogeneous groups, but my research challenges this notion of choice. Through twenty in-depth interviews with African-American juniors and seniors at an elite university, it has become apparent that there are two major university structures that greatly affect the racial makeup of African-American student friendship groups: campus residency status and participation in a college opportunity program. Students who lived on campus during at least part of their education tended to attribute their non-black friends to this experience in university housing; full-time commuters were the only group of students who had only predominantly black friendship networks. Similarly, students who participated in the opportunity program tended to have at least one predominantly black friendship network as opposed to their peers who were not in the program. This study demonstrates that there are clear correlations with commuting and participating in a college opportunity program and attaining predominantly black friendship groups.

**Testing Demand for Medical Schools**
*Ami A. Gokli, Economics*
*Sponsor: Dr. Ahu Gemici, Economics*

The demand for medical school in the United States has fluctuated greatly over the years. A student’s decision to attend graduate school depends on many factors, including the student’s financial situation, academic costs, and state of the economy. This study examines the appeal of medical school, using AMCAS application numbers as a proxy for demand. The goal of this research is threefold: to define a model for the demand for medical school, to determine what factors influence medical school demand, and to establish what factors influence physician earnings. A model of medical school demand is derived and tested using time series data. A cobweb model is used to estimate expected future earnings, and cyclical demand is tested. Results show that medical school demand is strongly countercyclical and suggest that opportunity costs drive medical school demand. It was found that age has a positive relationship with physician earnings and being female reduces physician earnings.

**Post-Classical Science and the Evolving Definition of Law and Justice**
*Kevin Gotkin, Media, Culture, and Communication, Steinhardt School of Culture, Education, and Human Development*
*Sponsor: Dr. Friedrich Ulfers, German*

This project explores the relationship between science and the humanities, specifically how the paradigm shift from classical to post-classical physics has affected the American judicial system. Drawing upon semi-constructed interviews with experts in the history of science and language, as well as persons with no technical knowledge of the fields, the project finds that the shift from the determinist worldview of Newton to the probabilistic perspective of quantum theory is causing our current judicial system to become increasingly incompatible with the evolving collective understanding of reality. The project’s analysis of current literature on the subject and consideration of the origins of language and science yields a deeper relationship between the arts and sciences, one that recognizes that the two fields are inherently interrelated.

Currently, the idea of the “long arm of the law,” an idea rooted in a classical view of reality, dominates the American legal system. But by first considering how Einstein’s macroscopic view of the world as harmonious relates to his theories, and then considering the way prevailing early education about the sciences affects our
Representing Indian Womanhood: Nationalist and Cinematic Discourse in India, 1860–1970
Nandini Govil, Biochemistry and History
Sponsor: Dr. Manu Goswami, History

At midnight on August 15, 1947, as the Indian nation awakened to its nationhood, so did its citizens to their new role as Indian nationals. For women, this role was encapsulated in a symbol that had been articulated during the Indian nationalist movement of the late nineteenth and twentieth century: Bharat Mata (Mother India). This symbol, which started as a literary metaphor in 1873, rapidly became a widely recognized nationalist and cultural symbol defining the ideal Indian woman as a cultural progenitor. Unlike the Indian woman of the past who was relegated to the domestic realm, the “new” Indian woman was independent and educated, but solely within a nationalist framework. Thus, in a paradoxical fashion, Indian women’s roles were greatly expanded with Bharat Mata, but limited in purpose and agency.

My research explores how Bharat Mata developed from an obscure symbol to an archetypal image of Indian womanhood; first, I trace the debates between Indian men and women about this particular concept of nationalistic womanhood; second, I sketch the progression of Bharat Mata as a contested cultural symbol in the post-independence Indian cinema of the 1950s and 1960s.

Middle Passage Legacies: The Language of African Americans and Caribbean Americans in Contemporary New York City
Shelanthia Griffths and Shedia Smalls, Sociology
Sponsor: Dr. Renee Blake, Linguistics and Africana Studies

Spears (1988) notes that the linguistic heterogeneity of black people in the United States is sorely underestimated. In this light, Winer and Jack’s (1997) work on the use of Caribbean English in New York City broadens our notions of the Englishes spoken in the United States by black people, particularly first generation immigrants. As an extension of this work, we performed qualitative and quantitative analysis of language used by second-generation Caribbean Americans and African Americans in contact with one another in the greater New York area. Our informants are from several boroughs of New York including Brooklyn, the Bronx, and Manhattan. We found that race, particularly ethnicity (or the cultural construction of race), as a social variable within black New York communities, affects notions of language, its use and issues of identity. This study confirms earlier qualitative work (Blake, 1999) that argues that “many...West Indians in New York are adept at switching their black identity between that couched within American society and that within the West Indian societies from which their parents arrived.” We go a step further and show that blacks in New York use language to demonstrate multiple identities, including African American, New Yorker, and Caribbean American, and their social class.

Second Life: Moving Beyond Virtual Reality
Emma-Marie Hansson, Gallatin School of Individualized Study
Sponsor: Dr. Jan Plass, Steinhardt School of Culture, Education, and Human Development

We move within a technologically advanced society where the step from visualization to realization can be infinitesimal. In recent years virtual worlds, such as Second Life, have grown in popularity. I investigated the phenomenon of Second Life and its role in modern human experience. The methods of this study are highly characteristic of our time and the future we are creating.

The experience of “living” in Second Life coupled with readings from postmodern literature generated my insights. Interdisciplinary reasoning was fundamental for comprehending the motivations behind the virtual reality’s various segments and their connections to physical reality. Observing Second Life through a psychological, sociological, and philosophical lens, I discovered how the virtual environment is used as a canvas for painting multifaceted dilemmas out of unleashed creativity. Virtual realities stimulate a meta-cognitive discussion about the limitations of non-virtual life while illuminating issues ranging from the perception of personal identity to the simulation of political theories. Rather than forecasting the future, Second Life teaches us how to fashion the future. New communication technologies may transform us, but it is more urgent to consider how we transform ourselves through these tools.
working with teenagers in a community center at the edge of Ciudad Oculta, one of Buenos Aires’ largest and most dangerous shantytowns. Through various activities, discussions, and interviews with the teenagers, I concluded that while their socioeconomic status does not stop them from valuing their way of life, they all, nevertheless, bemoan the environment of extreme street violence, drugs, and social pressure in which they have been forced to grow up. Furthermore, I discovered that for them in particular, this hostile environment has produced even more structural obstructions to upward social mobility and to getting out of the shantytown.

Analysis of the Need for Intellectual Property Protection as an Incentive for Innovation
Olga Ilenberg, Economics
Sponsor: Dr. Boyan Jovanovic, Economics

My research examines the factors that affect a firm’s decision to invest in an innovation; to do so, I constructed a model representing strategic behavior. My primary focus was whether—or more precisely, in which situations—the innovating firm can enjoy significant first-mover advantages and thus avoid using intellectual property as the main means to maintain a monopoly over the invention. (I limit consideration of intellectual property to patents for the purposes of this study.) Since patents force the early disclosure of an invention and only have value if they are defended in court, firms are sometimes hesitant to apply for and invest in the time-consuming process of receiving a patent. I investigated specific cases in which, even despite the possibility of imitation, the optimal decision, according to my model, is for an innovating firm to invest in an innovation and not to apply for a patent.

Building Competence and Capacity in a Nascent Democracy: An Examination of State-Building and Decentralization in the Democratic Republic of the Congo
Benjamin Katz, Politics
Sponsor: Dr. Catherine Hafer, Politics

The primary aim of this project was to gain a better understanding of governmental decentralization programs the world over, and particularly in the Democratic Republic of the Congo (DRC) in the midst of an ongoing process of refining the constitution and developing legal mechanisms for its application. The focus on decentralization stems from its variable meanings and practical iterations ranging from education reform in the developed world to lending renewed credibility to democracies in the developing world. The rush to implement decentralization in order to be more inclusive of local actors, however, can also deprive sub-national entities of needed funds and thereby subvert the redistributive prerogative of national government. The DRC is facing exactly this quandary. Emerging from decades of autocratic rule in a diverse country the size of Western Europe, Congolese provinces are eager to exercise some degree of autonomy. Only three out of twenty-six provinces have sufficient tax revenue to execute the responsibilities granted them by the constitution and they are wary of redistributing such income to help other provinces do the same. My field research in the DRC looked specifically at the compromise funding mechanism to overcome this political obstacle currently in discussion in the National Assembly, while illuminating an array of other difficulties that threaten the future of decentralization.

Paving Paradise, Loss of Vegetation: An Increased Threat to New York City’s Water Quality
Eliza Kenigsberg, Environmental Studies
Sponsor: Mr. Christopher Schlottmann, Environmental Studies

In their scholarly work on the importance of sustainable development, Getter and Rowe note, “as forests, agriculture fields, and suburban and urban islands are replaced with impervious surfaces resulting from development, the necessity to recover green space is becoming increasingly critical to maintain environmental quality.” In New York City’s push to create a “Greener, Greater New York City” the need for vegetated space is a crucial part of the plan to create a more environmentally healthy urban setting. According to plaNYC, “the greatest obstacle to enhanced water quality is the overflow of untreated sewage into our waterways during rain storms.” Today, this is directly related to the shrinking acreage of vegetative cover in New York City and the inability of the City’s combined sewage system to cope with increasing amounts of sewage and stormwater. Without these natural areas—which provide permeable surfaces for the absorption of storm water, and minimize sewage overflow—the city’s water quality, ecology, and potential for recreation are under threat.

Game Theoretic Approach to the Korean Hostage Crisis
Hanah Kim, Undeclared Major
Sponsor: Dr. Shanker Satyanath, Politics

In July 2007, the Taliban abducted Korean hostages and made demands to the Korean government in return
for the release of the hostages. Given these circumstances, a simple game theoretic model is used to represent the negotiation process that took place between the Korean government and the Taliban. A sequential game form with a sub-game perfect equilibrium is constructed under imperfect information. Under such uncertainty, Nature chooses the type of Taliban, negotiable or aggressive. The Korean government only forms a probabilistic belief about which type the Taliban is.

In this model, the Korean government makes the first move, choosing either to negotiate with a counter-offer or to comply with the Taliban demand, without knowing which type the Taliban is. If negotiation is chosen, the Taliban either accepts or rejects; if comply is chosen, the game ends. To solve the sequential equilibrium, backward induction is used, starting from the payoffs of each outcome and working back to each player’s decision nodes to determine their strategies. Upon obtaining a threshold probability value for the Korean government to be indifferent whether the Taliban is negotiable or aggressive, it is possible to anticipate the Korean government’s strategy. As the Taliban may respond by rejection to the counter-offer of the Korean government, the game can be extended to a repeated game. This repetitive form would require a Bayesian update of the probabilistic belief concerning the Taliban’s type, which is beyond the scope of this research.

The Influence of Neighborhood Poverty and School-Level Spending Patterns on Academic Achievement: Evidence from New York City Public Schools
Matthew Kim, Economics and Psychology
Sponsor: Dr. J. Lawrence Aber, Steinhardt School of Culture, Education, and Human Development

Socioeconomic contexts influence various outcomes across the lifespan and have magnified effects on younger children. The relationship between broader indicators of socioeconomic status and student outcomes has not been adequately addressed. Across-school differences in spending on classroom instruction and instructional support may be associated with variations in academic outcomes. Budget constraints faced by urban school districts have made it more imperative for schools to develop and implement policies that improve student outcomes through efficient allocation of resources. This study explored the joint effects of school-level funding patterns and school neighborhood socioeconomic status (SES) on academic achievement in New York City public elementary schools. Results showed that SES had a significant and large effect on outcomes, while both classroom instruction funding levels and instructional support funding levels were not significantly associated with academic achievement. Surprisingly, low levels of classroom instruction spending were associated with higher outcomes compared to high levels of classroom spending. Replacing classroom spending with a teacher spending measure, however, yielded a pattern of results that was consistent with the original hypothesis. Exploring the funding patterns of specific components of classroom instruction may yield more interesting and policy-relevant results than analyzing general funding categories.

Battling Seattle: Visionary Aims, Exclusionary Claims, and Strategic Representations of a “Global” Moment
Aaron Lackowski, Metropolitan Studies
Sponsor: Dr. Anne Rademacher, Social and Cultural Analysis

The 1999 protests against the World Trade Organization in Seattle have been most visibly represented through the mass-mediated formation of a dissenting subject, cast as white, young, privileged, and reactionary. This representation, paired with an influential body of liberal-economic literature, has anchored the post-Seattle defense of the WTO and capitalist globalization. The dominant circles of the North American left have countered this defense with a political-economic narrative of their own. Here, Seattle plays the role of a “carnival against capitalism,” in which protestors descended upon the WTO in harmonious unison for countless causes, heralding the beginning of a global, decentralized anti-capitalist movement. This is a false representation of Seattle; the protests were organized hierarchically and exclusively, and the dominant appeals reflected many of the identity-based injustices that marginalized protestors saw as pivotal points on which the WTO’s agenda hinged. Continued representations of Seattle as a universal moment of solidarity against capitalist globalization run the risk of further marginalizing Third World struggles against imperialism, as well as mobilizations which substantially confront the identity politics of social dominance in its myriad forms.

I Feel Better Now
Rachel Laurion, Sociology
Sponsor: Dr. Lynne Haney, Sociology

Stories of the underdog are always held dear to people’s hearts. What is most intriguing about an
underdog’s triumphant story is the fact that he or she was able to succeed while others were not. To better understand the tale of the underdog, this study focuses on how someone who has overcome an obstacle narrates his or her success. Based on four autobiographies of recovering alcoholics which I treated as life history interviews, I conclude that the narrations do not focus on the success of overcoming alcoholism, but instead focus on the destructive deeds committed while under the influence of alcohol. Ultimately, the focalization on these destructive deeds serves as a tool of confession and a means of absolution.

Lean on Me: Support with Balance and Locomotion in Twelve-Month-Old Infants
Julia K. Leibowich, Psychology
Sponsor: Dr. Karen E. Adolph, Psychology

This research examined infants’ use of assistance during balance and locomotion. We focused on the effects of locomotor method and experience, testing twelve-month-old experienced crawlers (N = 12) and novice walkers (N = 11). Infants were videotaped during a twenty-minute play session in an indoor playroom. First, we tagged the transitions between infants’ various posturo-motor activities (e.g., sitting to crawling). Next, we identified periods when infants’ posturo-motor activities were supported by furniture and/or a parent.

Infants transition from crawling to walking with little added cost as novice walkers spend as much time supported as experienced crawlers. Surprisingly, experienced crawlers used support (even while crawling) and were assisted for just as long as novice walkers. Novice walkers used assistance more often, however, than experienced crawlers and were supported most during upright locomotion. By using furniture, crawlers and walkers self-initiated support more than they received support from a caregiver, suggesting that infants recognize the limits of their abilities and take action to overcome them.

“The Lowell of the South:” Southern Cotton Mill Idealism in National and Local Perspective
Emily R. Levine, History
Sponsor: Dr. Martha Hodes, History

The cotton textile industry that developed throughout the final two decades of the nineteenth century did not, as many historians have unwittingly implied through their exclusively regional focus, develop in a geographical or historical vacuum. Much of the public discourse developed by industry advocates to promote the proliferation of textile factories in the southern states during this time drew upon a discourse developed half a century earlier in New England. The textile factories of earlier New England had risen to prominence surrounded by a public language of justification that focused on the moral, socially stabilizing influence of the mills; filtered through the specific historical circumstance of the “New South,” this existing rhetoric took on a strongly racialized and anti-immigrant cast that emphasized cotton mill development as a means toward white unity across classes and wholesale African-American exclusion. Aspiring white southern capitalists justified their enterprise as one that would mirror what they interpreted as New England’s past social harmony between socially marginal and elite classes. Calling for investment in textile factories as a means toward white southern social and economic progress after the “humiliations” of the Civil War and Reconstruction, the public language of cotton mill boosterism in the late nineteenth-century South paradoxically found itself deeply intertwined with the moralistic, paternalistic, and artificially harmonious rhetoric of its New England predecessor.

Returning Home: Revisiting the Personal Tragedies of the World Trade Center Attacks Six Years Later
Kari Lipschutz, Journalism and Anthropology
Sponsors: Ms. Darragh Worland and Ms. Yvonne Latty, Journalism

September 11, 2001, is a date that still resonates in the minds of Americans. There is an aspect, however, of that fateful day that has faded to the recesses of national consciousness—the victims. Over 2,500 people died at the World Trade Center (WTC) and 40 percent of those victims’ families were left with nothing but empty coffins.

This study analyzes the grieving process that followed the catastrophic disaster that occurred at the WTC. I spoke with victims’ families, experts involved in the remains recovery process, and mental health professionals. Remains from the site are still being returned to families, and my research shows that this aspect can play a large role in the trajectory of the grieving process and the much discussed idea of closure. The significance of this work lies in its application to other situations in which there has been an unexpected loss of human life (such as other mass fatalities, e.g., natural disasters, airplane crashes, etc.). In similar situations, I hope my research will give involved parties a sense of what to expect in the years following disaster. This research, in its final form, is an eleven-minute documentary focusing on interviews with families.
From Pawns to Problems: The Paradox of American Policy in the Persian Gulf  
Christopher Lotz, International Relations  
Sponsor: Dr. David Denoon, Politics

Throughout the latter half of the twentieth century, America has focused on maintaining oil access and containing foreign enemies in the Persian Gulf. In order to achieve these strategic objectives, American policy supported regional pawns to deal with international problems. Administrations abstained from direct involvement and only committed forces when there was no strongman left to use as a proxy. Critical mistakes, however, were made in decisions that were secondary to primary strategic objectives. As a result, American support had a hand in turning our previous pawn into our next strategic problem in the Gulf. This research examines American policy towards Iran, Iraq, and the Afghan Mujahideen to uncover those mistakes and show how they turned some of our strongest allies in the region into our strongest, and most dangerous, enemies.

“The College Experience”: The Effects of College Student Employment on Academic Achievement  
Samantha O. Mak, Economics  
Sponsor: Dr. Matthew Wiswall, Economics

As college costs continue to increase, employment hours among college students continue to increase as well. Existing studies show contrasting effects of paid college employment on academic achievement, suggesting a significant relationship. What implications does this relationship have on the decision to work and the subsequent effects on academic achievement? I use a theoretical utility maximization function to demonstrate a student’s current and future utility given certain constraints. Using data from the National Longitudinal Survey of Youth 1997 (NLSY97), I then present semi-log econometrics models and linear probability models to estimate the relationship between a number of financially motivating variables and hours worked, hours worked and hours spent in school or studying, and employment during college and academic achievement.

My results indicate that working during college negatively affects the number of hours spent in class or studying. Since the results also indicate that hours spent in class or studying correlate positively with academic achievement, college employment has an indirect negative effect on academic achievement. Also, an increase in federal grants or scholarships is related to a decrease in the number of hours worked per week. The results of this research have serious policy implications and attest to the need for greater federal financial aid available to current and potential college students.

Egyptian-Israeli Relations  
Catherine Manfre, Middle Eastern & Islamic Studies  
Sponsor: Dr. Zachary Lockman, Middle Eastern & Islamic Studies and History

In 1979 Egypt became the first Arab country to sign a peace treaty with Israel, ending thirty years of war, and opening official diplomatic relations. Although peace has endured since, the relationship is often termed a “cold peace” with normalization of relations frozen. Egypt has recalled its ambassador from Tel Aviv twice in response to Israeli action against Palestinians, and furthering of academic, economic, and political relations has been stalled.

This research analyzes changes in the relationship, factors that influenced times of increased and decreased affairs between the two countries, and current Egyptian opinions of the relationship. These factors are important in a broader context because they shed insight on obstacles that will be faced by Israel in future relations with other Arab countries. While in Egypt, I interviewed Egyptians in various fields and examined primary sources and journalistic articles. I conclude that Israel’s turbulent relationship with the Palestinians directed Egypt’s relationship with Israel on an official diplomatic level. Current opinion suggests that many Egyptians want at least increased economic relations with Israel, but the continuation of the Israeli-Palestinian conflict prevents this from occurring.

Drug Resistant Bacterial Infections: A Global Threat  
Alexander E. Mayorga, Mathematics and Mechanical Engineering  
Sponsor: Dr. David A. Scicchitano, Biology

The recent outbreak of Methicillin-Resistant Staphylococcus Aureus (MRSA) in the United States and the steady emergence of drug resistant strains of tuberculosis in Europe and Africa have raised concern over the issue of drug resistance. The steady emergence of drug resistant bacterial infections over recent decades indicates a trend that threatens to render current treatment methods useless, subsequently endangering public health. This research aimed to identify the causes contributing to the rise of drug resistant bacterial infections and the coinciding impact that this rise has on public health. Studies attribute the increase in bacterial drug resistance to inadequate hygienic practices in hospitals, misuse and over prescrip-
tion of antibiotics, and the continued use of ineffective or counterfeit drugs in poor rural communities. Local communities have witnessed increased morbidity rates, increased health-care costs, increased mortality rates, and a decrease in efficacy of current treatments. Currently, the FDA, pharmaceutical companies, and international health organizations have addressed this issue through educational campaigns, the production of drugs that counteract resistance, and the distribution of effective treatments in poor rural communities. Future measures to address this issue, however, should also incorporate a campaign to research new antibiotics to replace outdated ones, stricter regulations regarding the distribution and usage of antibiotic medications, and more rigorous guidelines regarding hygienic practices at hospitals.

**Outsourcing in Eastern Europe and Its Effects on Employment**
*Sharanya Mohan, Economics and Politics*
*Sponsor: Dr. Vivian Yue, Economics*

The nations of Central and Eastern Europe transitioned from a planned economy to the free market system during the 1990s, opening their doors to international trade. More recently, this bloc of nations has become a new center for world outsourcing. This research provides a historical framework for the concept of outsourcing and the context for a discussion of the economic phenomenon in the transition nations of Eastern Europe. It provides an empirical analysis of the effects of outsourcing on overall employment and on skilled and unskilled employment in the Czech Republic, Hungary, and Poland. These three nations have experienced dramatic increases in intermediate goods exports during the recent years, and the empirical data show that increases in outsourcing to these nations have had a significant negative impact on changes in employment of total and unskilled labor. Ultimately, this research attempts to add to the understanding of the effects of the phenomenon of outsourcing on key labor indicators in the recently freed markets of Eastern Europe.

**Military Success: The Necessary Cause for the United States to Win Twenty-First-Century Conflicts**
*Christian Moree, International Relations and English & American Literature*
*Sponsor: Dr. David Denoon, Politics*

To maximize its national security, the United States must strive to ensure that its national security strategy and force structure decisions operate in tandem. To best achieve this goal over the next ten years, the United States needs to invest a larger share of GDP in military spending than current levels. If these decisions operate in tandem, the United States will best be able to accomplish the necessary cause for winning twenty-first-century conflicts: military success. As a result of this decision, I find that the United States must pursue the strategic endpoint of deterrence to avoid pressing terrorism threats against the homeland. I also find that the United States must maintain a balanced strategy of selective engagement, as a viable midpoint between strategies of isolationism or unilateralism.

**For the Past, Present, and Future of Alpha Epsilon Phi**
*Perri Nemiroff, Journalism and Jewish History & Civilization*
*Sponsor: Ms. Deena Engel, Computer Science*

By creating a catalogue of old yearbook photographs as well as more recent personal photographs, I have created a resource that will help the future members of the sorority Alpha Epsilon Phi learn about what the organization was like before they were a part of it. I present this element of my Web site using Extensible Markup Language (XML), in order to make this resource easy to peruse. In addition, my Web site displays past Washington Square News articles in the form of PDF files, which will teach viewers about the development of fraternity and sorority life overall at NYU. One may also view a section that displays a small library of podcasts, detailing AEPhi’s most important events. Each is narrated by a current member of the organization and is accompanied by several relevant photographs.

**Insight into Masculinity of the Yakuza from Linguistic Discourse Analysis**
*Hidefusa Okabe, Psychology*
*Sponsor: Dr. Louise O. Vasvari, Linguistics*

Composed entirely of men, the yakuza, an organized Japanese mafia, demands strict deference to traditional Japanese masculinity, and as such, represents a rich research opportunity that elucidates the linguistic communicative practices employed to assert masculinity. This research conducts metalinguistic and intertextual discourse analysis of interviews with board members of the gang groups featured in the documentary *The Unknown Infrastructure of the Yamaguchi Mafia*, aired by Japan Broadcasting Corporation in 1984. Results reveal a profound linguistic dissonance: the majority of the male yakuza members do not employ salient linguistic tools to
assert masculinity, yet consider their own language and way of life masculine. In fact, many linguistic devices employed were found to be derived from “Japanese women’s language.” This finding parallels other research related to middle-aged Japanese males, who need not assert their masculinity through male language because they are already aware of their authority.

The Effect of the Multi-Fiber Agreement on Bangladeshi Garment Labor
Saurabh Pant, Economics
Sponsor: Dr. Jonathan Eaton, Economics

The Multi-Fiber Agreement (MFA) came into effect in 1974 and resulted in industrialized nations imposing quota restraints on developing countries’ exports of textiles and clothing products. As foreign investors became attracted to Bangladesh’s abundant supply of cheap labor and preferential treatment within the MFA, Bangladesh’s garment industry grew, with garment exports rising from US$31 million in 1983 to US$7900 million in 2005. At the end of the Uruguay Round of trade talks (1994), the MFA became the Agreement on Textiles and Clothing (ATC), calling for the phasing out and an eventual end of the previous stated quota restraints by 2005. The Financial Times considered Bangladesh’s garment industry to be less competitive than China’s, but predicted that China would take the lead after 2005.

The garment industry is the single largest source of formal employment in Bangladesh and the growth of the garment industry has been significant in reducing poverty in the country. My research examined the impact of the phasing out of the MFA quotas on Bangladeshi garment labor, exploring how the value of Bangladesh’s garment exports changed during key years when the MFA structure changed. I also proposed a second model to determine the demand for labor in the Bangladeshi garment industry and whether the demand for garment labor was adversely affected during the key years when the MFA structure changed. My research reveals that the phasing out of the MFA quotas had no significant impact on the value of Bangladesh’s garment exports. I find, however, that the developed country participants in the MFA are important importers for Bangladesh’s garment industry. I conclude by stating that even though these results are promising for Bangladesh only a few years have passed since the expiration of the MFA quotas; the garment industry still has significant constraints that need to be addressed.

On Edge: Environment and Sexuality on the West Side
Darren Patrick, Metropolitan Studies
Sponsors: Dr. Harvey Molotch and Dr. Anne Rademacher, Social and Cultural Analysis

This project employs an ethnographic approach to explore the diverse forces driving the transformation of the West Side waterfront of Manhattan, especially adjacent to Greenwich Village. It focuses in particular on the role that sexual and environmental politics have played in forming constituencies that continue to be influential in contesting the future of the space. Through interviews with stakeholders, the project aims to establish the importance of the waterfront as both a place of nature and a place of culture and to complicate the relationship between the two visions in a development context. While city planners and politicians struggled to define the future of the materially derelict waterfront following the collapse of portions of the elevated West Side Highway in 1973, an emergent community of gay men was appropriating the space as a sexual playscape. Simultaneously, environmental activists were fighting to control development along the Upper Hudson River. While these movements did not explicitly connect, their intersection along the waterfront in the past three decades exposes the complexities of developing nature in the city. The result—the Hudson River Park—remains a contentious scheme which folds seemingly disparate interests into a convoluted development debate.

Comparison of Deciduous Second Molars and Permanent First Molars
Kathleen Paul, Anthropology
Sponsor: Dr. Shara Bailey, Anthropology

Data obtained from the upper first permanent molar (UM1) have played a key role in determining the taxonomic status of Pleistocene humans. Because of the fragmentary nature of the fossil record, sample sizes of complete and unworn UM1s are often limited. Previous research indicates a high degree of similarity between the UM1 and the upper second deciduous molar (udm2) in morphological and metric features, including Carabelli’s cusp presence, intercusp angles, and crown shape. A pilot study comparing the UM1 and udm2 based on dental stone casts was complicated by poor preservation that obscured fissures, making it impossible to obtain cusp area measurements. This study extends this research of the UM1 and udm2 to skeletal collections of various modern human populations. Digital photographs were taken of...
the occlusal surface of udm2 and UM1 in order to obtain measurements of cusp areas and angles. Teeth were also scored for Carabelli’s cusp. The goals were to compare results obtained from the dental casts with those from the skeletal collections; to investigate the similarity of cusp areas between the udm2 and the UM1; and to determine whether or not data from udm2 and UM1 could be combined, thereby expanding sample sizes, for statistical analyses. Results show similarities in cusp angles and cusp arrangement between the dm2 and UM1 were statistically significant, suggesting that in lieu of UM1, the dm2 can be used for morphometric analyses. The results confirm previous suggestions that the UM1 retains the primitive dm2 condition, although the dm2 may be more conservative for expression of Carabelli’s cusp.

Implicit Biases and Their Effect on the Evaluation of Trustworthiness
Michael Perino, Psychology
Sponsors: Dr. Elizabeth Phelps, Psychology

The aim of this research was to establish a link between implicit biases and an individual’s evaluations of trustworthiness. We hypothesized that individuals’ differences in trustworthiness evaluations for black and white faces would be significantly correlated with an individual’s level of bias, but literature had not previously examined this tie between implicit bias and trust. We recruited twenty-three members of the NYU population to participate in a trustworthiness evaluation task, an evaluative race Implicit Association Test (IAT), and a battery of explicit measures assessing race. The participants’ average differences of trustworthiness evaluation were averaged by racial group (e.g., white faces and black faces) and correlated with IAT scores. Explicit measures were then scored and correlated with the average differences of trustworthiness evaluation across racial groups to determine which measures had the most predictive validity. The results of the experiment support the hypothesis put forward, and further avenues of application are in development.

Sharing the Beat: Reggaetón and Pan-Latino Identity in New York City
Dana Perrotti, Spanish
Sponsor: Dr. Jill Lane, Spanish

Reggaetón, a blend of Reggae dancehall beats and Spanish rap, made an unexpectedly major impact on the charts after its stateside debut less than four years ago. Since its fast commercial success, the music has become known as a “Pan-Latino” phenomenon, despite its origins in the Caribbean, and its marketing and distribution has been driven by this pan-ethnic image. New York City experienced the full effect of Reggaetón’s arrival, as new national and local means of distribution were created. The bombardment of visual and aural media surrounding the Reggaetón craze proposed a commercial identity that claimed to represent all Latinos. This research examines how the arrival of Reggaetón shaped the visual and aural representation of Latinos in New York City, and how members of the Latino community within New York City have adapted or rejected this “pan” identity to define their own space within the music and the city.

Comparative Urban Identities: Berlin
Andres Ramirez, Sociology and Urban Design & Architecture
Sponsor: Dr. Thomas Ertman, Sociology

This research began as an exploration of negotiated politics within historical spaces. It was an examination of the authenticity of the multiple realities being constructed to operate simultaneously as one city. Berlin is exceptional in its active system of urban referencing. The changing cityscape has been an agent for the constant transformation of collective memory. Evaluating the symbolic power of spatial forms became fundamental in understanding the meaning of the city. I began by reviewing urban identities that have defined the cityscape throughout the twentieth century and their role in constructing the Berlin of today. My findings highlight a new type of urban and architectural tendency that contributes to the formation of Berlin as a creative capital. It is manifested in structures that I have termed “Memory Machines,” which combine rehabilitated historical structures with high-tech elements to produce a unique hybrid. They are mechanisms that enable the development of a creative urban identity. I identified places that are invisibly acting as memory machines—old places that merge with new technical infrastructure to create a specific cityscape with which individuals are in constant and inevitable interaction.

The Institutionalization of “Paying Dues”: Jazz Education
Maurice Restrepo, Music
Sponsor: Dr. Jason Stanyek, Music

Formal jazz education is a recent phenomenon. The past few decades have seen a significant rise in the number of institutions providing conservatory-style jazz education.
A sample of sixty-three ethnically diverse children and their mothers participated in this longitudinal study. Analyses of mothers’ responses to an open-ended question about their children’s feminine/masculine attributes revealed that 40 percent of the girls exhibited PFD and 6 percent of the boys exhibited PFS. Overall, this study indicated the existence of PFD/PFS among three-year-old children, but failed to find evidence for a relation between PFD/PFS and children’s gender knowledge, as measured through their attainment of stages of gender constancy.

Emigration of Lithuanian Families: The Elazar Sachar Family Tree Project

Hilary Sachar, Sociology

Sponsor: Ms. Deena Engel, Computer Science

The Elazar Sachar Family Tree Project is an online exhibit dedicated to the preservation of the Sachar Family history. The exhibit features a comprehensive archival Web site of primary and secondary source materials, including over 1,000 searchable family member names, as well as an image gallery of private photographs and documents, multimedia interviews, town profiles, narratives, and biographies. The image gallery hosts individual and family portraits, passport pictures, Lithuanian townscapes, and wedding photographs dating back to the 1860s. Archival documents include wedding and bar mitzvah invitations, newspaper articles, letters, birth certificates, census reports, and stock certificates. The project traces migrations of the Sachar family from small towns in Lithuania across the globe to cities in England, Israel, South Africa, and the United States. The on-line presentation is an accessible and dynamic tool, with which family members can share a collective history. The project and on-line exhibit are also intended to serve as a model for other researchers interested in digital projects on genealogy, immigration, and historical studies.

Profting from Community: A Case Study of Economic Life on a New England Family Farm

Zachary Saltzman, Economics

Sponsor: Dr. Matthew Wiswall, Economics

This paper describes the hiring practices of Joshua Hempstead, a New London farmer living in the first half of the eighteenth century. It demonstrates the role of community in an individual’s efforts to acquire labor and maximize profit. The New London farming community was a tight-knit community in which farmers had extensive economic interactions with one another. While the communal nature of this economy might suggest that New London farmers were not interested in profit-maximization, in truth, strong communal relations and interactions need not be seen as antithetical to the attainment of profit. This paper demonstrates that in the case of New London, the fact that the economy operated within a strong communal framework actually allowed
for a harmonized and symbiotic relationship between profit maximization and community.

**Drug Safety and Test Subjects**  
*Amanda Santacroce, Biochemistry*  
*Sponsor: Dr. David A. Scicchitano, Biology*

Pharmaceutical drug companies should strive for the highest levels of safety for their consumers. The main goals of these companies, however, seem to be getting their drugs to the market as quickly, and for as little money, as possible. Guidelines have been put into place to help protect the test subjects of these companies. The pharmaceutical companies do not always follow these guidelines though, and this leads to unsafe conditions for test subjects and future consumers. Companies often take drug testing to third-world countries to obtain subjects, often without the informed consent of these subjects. Also, in order to produce drugs more quickly, companies have thrown out negative results from these tests. Such a practice could alter conclusions and result in future harm to the general public once the drug is released. The International Conference on Harmonization of Technical Requirements has composed a set of suggestions to help solidify the standards that have been put into place for pharmaceutical companies. Adherence to these standards would greatly increase the safety of test subjects and consumers of new drugs.

**Racial and Ethnic Disparities in the Utilization of Health Services across Insurance Types**  
*Neha Sathe, Economics*  
*Sponsor: Dr. Brian D. Elbel, NYU Langone Medical Center and Robert F. Wagner Graduate School of Public Service*

Expansion of public health insurance has been viewed as a way to reduce the persistent racial and ethnic disparities in quality and access to health care, as health insurance coverage has been shown to increase the likelihood that individuals receive needed care. Although public health insurance has substantial minority enrollment, the majority of low-income minority populations are covered by private health insurance. Nonetheless, there is a surprising dearth of evidence on how public health insurance affects racial and ethnic disparities relative to private insurance. Because public health insurance beneficiaries generally spend less on health care than private insurance enrollees but experience greater indirect costs such as office wait times, lack of provider choice, and travel times, the effect of insurance type is unclear.

I investigate the effect of Medicaid versus private health insurance on racial and ethnic disparities in the utilization of health-care services. I use National Health Interview Survey Data from 2004 to 2006 to examine a sample of 4,313 low-income adults and 28,936 low-income children with health insurance coverage. First I analyze the benefits of public insurance to minority groups using a model based on choice. Then I use logistic regressions to model the probability of which groups do well across several measures of health-care access. The results show that racial/ethnic minorities are significantly more likely than whites to choose Medicaid. Overall, minority groups are less likely to delay care, but are more likely to have an overnight hospital stay or a visit to the emergency room, and less likely to see a health professional in an office. Amongst children, minorities in public health insurance are less likely to delay care due to cost, but more likely to delay care for reasons unrelated to cost, relative to white children enrolled in private health insurance. Further research is needed to identify the factors that allow public insurance to benefit minority groups.

**Mi Samcha? Religious Identity and the Struggle of Jewish Leadership in America to Coordinate a Holocaust Rescue Campaign**  
*Juliana Schnur, Spanish and Jewish History & Civilization*  
*Sponsor: Dr. David Engel, Hebrew & Judaic Studies*

The failure of the United States to organize a cohesive rescue campaign of Jewish victims during the Holocaust has often been attributed to a hegemonic struggle among Zionist leadership. Rabbi Stephen S. Wise, widely regarded as the spokesman for American Zionism and Reform Jewry, was irreconcilably opposed to the militant Zionism of British Mandate Palestinian Jew Peter H. Bergson. In July 1943 as the urgency of Jewish rescue grew increasingly desperate, and the antagonism of Zionist groups more hostile, Wise confronted Bergson demanding, *Mi Samcha* (Who appointed you)? Though this clash between these Zionist camps caused a fatal rift in American Jewish popular response to the Holocaust, further scrutiny reveals not merely a dipolar, but a tripartite Jewish struggle. Through an examination of such primary resources as newspaper articles, advertisements, letters, interviews, and memoirs, as well as numerous secondary resources, I discovered that the anti-Zionist Jewish faction, led by *New York Times* publisher, Arthur H. Sulzberger, played a key role in frustrating a unified
Jewish rescue campaign. What emerges from these resources is more profound than merely a conflicting political agenda. I conclude that a fundamental clash in the conception of Jewish identity lies at the heart of this American Jewish discord. The question of a Jewish state in Palestine produced a contentious debate among these three leaders and largely informed their positions on the rescue campaign. In studying how religious identity divided these factions, we can better understand the failure of American Jewry to unite behind a common initiative to save their European brethren.

**Resistance and Susceptibility to Persuasion across the Ideological Spectrum**  
*Tina Hsu Schweizer, Psychology*  
*Sponsor: Dr. John Jost, Psychology*

This research investigated how the psychological needs that underlie political orientation differentially predict resistance to different types of persuasion among liberals and conservatives. Whereas conservatism is thought to be motivated by needs for closure and stability, liberalism is thought to be motivated by needs for deliberation, change, and complexity. Given these psychological differences, we predicted that liberals and conservatives would differentially resist persuasion in a non-political context, and that this difference would vary as a function of the type of persuasion.

Sixty-three New York University students were persuaded to adopt new explicit attitudes about tea and coffee at either an implicit level (i.e., outside of awareness) or explicit level. Implicit persuasion, or a modified evaluative conditioning procedure, attempted to change participants’ explicit attitudes indirectly via their implicit attitudes or “gut feelings,” whereas explicit persuasion, or strong arguments, attempted to change participants’ explicit attitudes or “actual feelings” directly. As predicted, liberals were more susceptible to explicit persuasion than conservatives because liberals were more motivated to scrutinize the strong arguments. Conservatives, however, were more susceptible to implicit persuasion than liberals because conservatives were more motivated to use their “gut feelings” as mental shortcuts for their explicit attitudes.

**The Effect of “Explorations” on First-Year Student Academic Performance, Attrition Rates, and Overall Satisfaction at NYU**  
*Janki Shah, Economics*  
*Sponsor: Dr. James Ramsey, Economics*

“Explorations,” a general term for numerous uniquely themed residential learning communities at NYU, has been growing rapidly at the University for the past five years. This research examines the results of a study on the effect of these communities on academic performance, satisfaction, and intent to return of first-year students in the Explorations program after five years of program growth and expansion. Explorations students are compared to non-Explorations students, with specific attention paid to overall satisfaction at NYU and in residence halls, academic performance, and attrition rates. Findings suggest that Explorations does seem to have a positive effect on overall satisfaction at the university, intent to return, and connectedness to academic professors and TAs. Explorations does not seem to have much of an effect on college GPA, however.

**The Politics of School Spending: The Effects of Judicial Ideology on Education Finance**  
*Jenny Shen, Economics*  
*Sponsor: Dr. Sean Corcoran, Steinhardt School of Culture, Education, and Human Development*

This research exploits a unique dataset of state supreme court justices to examine the relationship between judicial ideology and high court rulings pertaining to state school finance system constitutionality. Specifically, I matched judicial ideology measures constructed by Brace, Langer, and Hall (2000) to a comprehensive database of public school finance equity and adequacy cases decided in forty-two states from 1973 to 2005. Controlling for a set of political and financial variables, I used this database to estimate whether and how judicial ideology relates to courts’ final decisions on these cases. While I do not find these relationships to be statistically significant (perhaps due to the small sample size), controlling for citizen and government ideology and existing school finance system characteristics, I do find a consistently positive relationship between liberal courts and more liberal judgments in school finance cases.

**Greenwich Village Gives the “New” St. Vincent’s a Poor Diagnosis**  
*Lauren Shikowitz, Metropolitan Studies*  
*Sponsor: Dr. Barbara Hooper, Social and Cultural Analysis*

Greenwich Village residents are currently protesting the proposal for a “new” St. Vincent’s Hospital. One might wonder why a neighborhood would oppose the creation/construction of a new state-of-the-art hospital in their community. On the surface, the debate is straightforward. Greenwich Village is unique in that it is a historic district, and many of the aesthetic and historic qualities of the Village will be disrupted by the
bulky tower St. Vincent’s plans to build. I argue that there is more to this controversy than the repetitive cries of excessive bulk and mass. Underneath the surface are paramount issues festering in the relationship between the hospital and its neighbors. This ethnographic study identifies and analyzes these issues. My main methods for analysis were interviews, field-notes, and observations from community meetings, public hearings, volunteer experience, and census research. I predict that much of the underlying tensions surrounding the debate stem from the fact that the demography in Greenwich Village has changed. Greenwich Village is no longer the large immigrant community that welcomed the hospital in 1856. Ultimately, St. Vincent’s does not treat nearly the same number of neighbors that it used to treat.

Jurors’ Evaluation of Hearsay and Eyewitness Credibility
Gina Shlaferman, Psychology
Sponsor: Dr. Margaret Bull Kovera, John Jay College of Criminal Justice

This research examines whether jurors use information about witnessing conditions and witness trustworthiness when evaluating the testimony of hearsay (secondhand evidence) and eyewitnesses. Past research on jurors’ evaluations of witness credibility has suggested that jurors are not able to distinguish between good and poor eyewitness testimony, whereas they are sensitive to the quality of hearsay testimonies. The Internet-based study included participants from New York University and John Jay College of Criminal Justice. The study was a 2 (witness type: hearsay witness or eyewitness) × 2 (trustworthiness: high or low) × 2 (cognitive ability: intoxicated or sober) factorial design. We hypothesized that jurors would not be sensitive to variable manipulations in rating the credibility of eyewitness testimony. On the other hand, we presumed that jurors would be more sensitive to manipulations of the variables of the hearsay witnesses. Results suggest that witness type determined mock jurors’ perceptions of witness cognitive ability, as well as mock jurors’ ratings of witness trustworthiness. We observed few interactions between witness type and manipulations of memory (alcohol consumption) and motivation to lie (relationship to the victim).

A Weak Commitment: Why the Northern League Allowed Italy’s Largest Amnesty to Come to Pass
Todd Sloves, Italian
Sponsor: Dr. Stefano Albertini, Italian

Since the 1990s, the Italian Northern League party has identified itself through its harsh stance against immigration. In 2002, however, while part of a center-right-wing coalition government, it allowed an amnesty law to be passed with minimal opposition. Using both primary and secondary sources, I begin with a look at the recent history of Italian immigration law, followed by an in-depth analysis of the Northern League and its role in the immigration debate. I argue that according to the prevailing theories on the party’s categorization and stance on immigration, as well as its behavior and declarations made in parliamentary debate sessions and media, it should not have allowed for any sort of amnesty. Furthermore, I show that the party’s failure to prevent the amnesty is due to a decrease in economic anxiety, changes in party organization, and inter-party relations and bargaining.

Informal Settlements Policy and Practice: A Case Study from Bogotá, Colombia
Jeremy Sorgen, Metropolitan Studies
Sponsor: Dr. Anne Rademacher, Metropolitan Studies

Slums are the home for an increasing percentage of this world’s population: currently, over a billion people—one-sixth of the global population—live in a slum (by UN standards), a number which is expected to double by 2030. The world’s slums have garnered much attention and are now the major project for the UN as well as an ever-growing mass of NGOs, social critics, and multi-national organizations. But efforts to remediate highly complex issues that pertain to slums have been largely unsuccessful or ineffective. Part of this lack of success is due to the disconnect between the “global” and the “local,” theory and practice, policy and implementation, narratives and actuality. I explore points of disjunction, such as terminology that contributes to global discourse, meta-narratives about the origins of informality, as well as policy recommendations that are useless for and often inhibit “on the ground” work. I use field research that I conducted in Bogotá, Colombia, to further support my assertions.

Felt Gender Typicality, Sex-Typing, and Adjustment
Emily Taylor Speer, Psychology
Sponsor: Dr. Diane Ruble, Psychology

Much remains unexplored and misunderstood about how different measures of gender typicality relate to measures of psychosocial adjustment. Also, while the relationship between feelings of gender typicality and psychosocial adjustment has been measured in adolescents, this research seeks to extend these findings to an adult population sample (Egan and Perry, 2001). This research also examines the relationship between the
and temporal adaptations within hook-and-line fishing technology. The project has implications for broader discussions of prehistoric hunter-gatherers and their impact on freshwater and marine environments. The research at the AMNH involved the re-examination of his collection of fish hooks on a site-by-site basis using a functional and ecological framework which emphasizes differences in specific morphological traits and their relationship to particular fishing techniques and habitats. It has also involved updating the materials based on the forty-seven years of research following Suggs’ work, which has indicated that Nuku Hiva was first occupied approximately 1,000 years later than he originally established. In addition, further excavations have led to a reinterpretation of subsistence strategies and fishing technology throughout the archipelago. Comparisons between Marquesan sites suggest that variations in fishhook form are partially dependent on geographic and environmental factors which vary widely within the islands.

Archaeology of Nuku Hiva, Marquesas Islands: A Functional and Ecological Reevaluation of Robert Suggs’ Fishhook Assemblage
Jillian Swift, Anthropology
Sponsor: Dr. Rita Wright, Anthropology

In 1961 Robert Suggs conducted one of the first archaeological expeditions and regional surveys on the island of Nuku Hiva in the Marquesas archipelago at sites occupied from roughly 1000 A.D. to the present. My research, based on a study of his collections at the American Museum of Natural History, provides new insight towards an understanding of the significance of fishing in the Marquesas and the nature of both regional and temporal adaptations within hook-and-line fishing technology. The project has implications for broader discussions of prehistoric hunter-gatherers and their impact on freshwater and marine environments. The research at the AMNH involved the re-examination of his collection of fish hooks on a site-by-site basis using a functional and ecological framework which emphasizes differences in specific morphological traits and their relationship to particular fishing techniques and habitats. It has also involved updating the materials based on the forty-seven years of research following Suggs’ work, which has indicated that Nuku Hiva was first occupied approximately 1,000 years later than he originally established. In addition, further excavations have led to a reinterpretation of subsistence strategies and fishing technology throughout the archipelago. Comparisons between Marquesan sites suggest that variations in fishhook form are partially dependent on geographic and environmental factors which vary widely within the islands.

Mental Representations of Significant Others and Ethnic Intergroup Bias
Annie Tang, Psychology
Sponsor: Dr. Susan M. Andersen, Psychology

When mental representations of significant others are activated, so are the concepts associated with this significant other and the version of ourselves with this significant other (Andersen and Chen, 2002). Based on a recent model (Saribay and Andersen, 2007), we proposed that the activation of a significant other representation would also activate one’s ethnic identity when the significant other shared this ethnic background, and that this would also result in increased intergroup bias. This should only be the case, however, when the significant other is known to have an ethnically narrow (vs. diverse) social network. Participants were primed with a significant other who they previously indicated had an ethnically narrow or diverse social network. Subsequently, they formed impressions of a target person who was either their ethnic in-group or out-group. The results supported our predictions in that participants formed significantly more negative impressions of the ethnic out-group than the in-group person. This only occurred, however, when the primed significant other had an ethnically narrow social network. We also consider the implications for our model and the links between relational and collective identities.

People Who Walk Slowly on New York City Streets: An Anthropological Study of Tourism in New York City
Amanda Thai, Anthropology
Sponsor: Dr. Bruce Grant, Anthropology

A quick walk down a block in Manhattan will most likely yield a few tourist sightings. There are roughly forty million domestic and international visitors to the city each year, with that number rising annually and resulting in a multi-billion-dollar tourism industry. While the weakness of the dollar against foreign currencies plays a significant role in this figure, there is undeniably something about New York City itself that draws so many people each year. In addition, the presence of so many out-of-town guests raises the issue of whether or how these visitors affect the city around them from a sociocultural level. I examined the multilayered experience of tourists in Manhattan as a smaller representation of the whole of New York City. I wanted to understand the appeal of NYC that attracts so many visitors each year. Grasping what tourists consider “important” or “essential” to their NYC visit, as well as why they think so, was helpful in comprehending their fascination with the city. I was also interested in the effect of these visitors on the city, especially its inhabitants.

What I found was a deep, complex relationship between tourism and the city itself. I found that a large component of tourism is visual confirmation. Merely seeing the Statue of Liberty is sufficient, as conciliation between reality with preconceived notions. The notion of authenticity was most salient throughout my research as a contested, much desired quality for both New Yorkers and tourists. The World Trade Center helped provide a focus to this subject, through the site’s presentation of labor as a cultural production.
As to my original question of what draws tourists to NYC, as well as what these tourists hope to gain from the experience, it became clear that tourists, armed with guidebooks, television shows, and movies, come to the city with a clear idea of their expectations. Visitors know what sites they “must” see, what they would actually see upon arriving at those sites, and how they should react to these sites. It may be more accurate to describe a tourist visit as a confirmation of pre-generated opinions. As interviews indicated, however, the reality of New York City is completely different. There is an essentialist and inherent quality to the city, yet the vague indescribability of this very quality is what is so appealing about NYC. Media representations cannot fully capture the overwhelming complexity of reality, just as one cannot place one’s finger on the exact nature of NYC. The allure of NYC lies within the atmosphere of the city itself—always alluding capture but remaining a constant presence.

The First Industrial Revolution: The Role of Private Banks
Nicholas Theuerkauf, Economics, and Dishen Yang, Economics
Sponsor: Dr. Harry Kitsikopolous, Economics

Our research aims to characterize the importance of finance during the industrial revolution. A prominent feature of the British Industrial Revolution was the “substitution of capital for labor,” according to Flinn. By examining the capital structure in Britain before and during the time of the industrial revolution, we found that a significant amount of capital was channeled from previously unproductive investment vehicles, such as real estate, to more profitable investments in textiles, steam power, and iron smelting. At the beginning of the eighteenth century, private bankers of London, such as Hoare and Child, concerned themselves primarily with the aristocracy and paid little attention to the emerging merchants, business owners, and entrepreneurs who were driving economic growth. The landscape changed in the second half of the eighteenth century, with the burgeoning of a different breed of private banks which financed trade as a “general rule rather than long-term investments like buildings, machinery or land improvements,” according to Mathias. As a result, it became easier for the developing merchant class to obtain the funds necessary to grow their businesses. The liberation of capital for scaleable industries also provided funds for the improvement and expansion of existing infrastructures as seen in the construction of canals and roads—a critical asset to the industrializing economy. We conclude that the shift in bank policy and increased number of British banks after 1750 resulted in both the reallocation of capital from unproductive investments to productive investments and the creation of new industry-minded wealth, thereby stimulating the economic growth necessary for industrialization.

Enduring Contamination at Public Place: The Shortfalls of Brownfield Reclamation
Tiana Thomas, Metropolitan Studies
Sponsor: Dr. Anne Rademacher, Social and Cultural Analysis

The remediation and redevelopment of industrial brownfields is a highly contentious process that involves local community members and organizations, state and local government agencies, private developers, and parties liable for cleanup. It is also a process through which different environmentalisms can be enacted. Remediation and redevelopment, therefore, present an opportunity to implement cleanup and planning strategies that undermine the standard environmental approach, which posits that end-of-pipe solutions will always exist to reverse environmental damage. This view is a function of the relationship between capitalist democracy and nature, and it is the relations therein—of production, consumption, and power—that must be challenged before ecologically responsible politics can be enacted. The current approach to remediation and redevelopment at Public Place in Brooklyn incorporates progressive environmental planning principles, including community participation and sustainable design elements. But with a focus on the short-term benefits of redevelopment (fundamental to a capitalist democracy), stakeholders are taking inadequate measures against off-site pollutants that could migrate and re-contaminate the land in the future. Until there is enough political organization around adopting a proactive rather than a reactive stance to pollution (which entails altering systems of power, production, and consumption), the problem of brownfields will endure.

Welfare Costs of Government-Sponsored Health Care: Examining Inefficiencies in Pharmaceutical Research and Development
Kelly Tong, Economics
Sponsor: Dr. Daniel Xu, Economics

Medicare might offer benefits beyond providing senior citizens with health-care services. It has been predicted that the implementation of Medicare programs has increased demand for health services and consequently increased demand for prescription drugs. In turn, the pharmaceutical industry could respond to this increased
The Threat of Re-emerging Militants in Kosovo
Nicole Tung, Journalism and History
Sponsor: Mr. Mohamad Bazzi, Journalism

This research explores whether militant activity in Kosovo would play a significant role in destabilizing the former province. Although militancy remained relatively dormant after the war, there were, and still are, armed rebel groups such as the Albanian National Army (ANA), an offshoot of the wartime Kosovo Liberation Army, operating quietly. Supported by the DURF grant, I traveled to Kosovo to conduct interviews with the ANA and to inquire about a known Serb paramilitary group, the Guard of Czar Lazar, in order to balance my research. Based on interviews with members of both groups, I concluded that neither poses a real threat to the stability of Kosovo. Their elusive nature and lack of cohesion gives them less credibility as an organized force. Now that Kosovo is independent, it is difficult to foresee the role the ANA will play in its future. For Serbia, however, the loss of Kosovo re-opened many wounds. Heightened Serb nationalism and recent riots in Belgrade have perhaps enabled the Guard to increase their activity. Despite all this, the predominant feeling is that most will be moving on with their lives now that the situation has returned to a relative calm. The judgments I have made are profoundly affected by the widespread attitude that violence is not something the majority of Serbs or Albanians want to see reignited. The militant groups, however, cannot be dismissed or ignored, as they are armed and supported by various sources.

Chinese Medicine at the Intersection of Western Biomedicine: An Anthropological Study of Medical Pluralism in Zhuhai, China
Sa'irini Tsui, Anthropology
Sponsor: Dr. Rayna Rapp, Anthropology

With the opening of China to Western trade during the post-Cultural Revolution era, an influx of Western ideas has imbued the economy and culture of the country. Such ideas have led to an overhaul of the preexisting Chinese health-care system, and have created a system in which the practice of Western biomedicine and TCM is more commonly viewed as a supplement to Western diagnoses. I ascertained that the pharmaceutical industry has nearly quintupled the amount of R&D funding since the introduction of Part C. While the net benefit of post-Part C research could not be accurately calculated, I developed a theoretical model to illustrate the methodology of the calculation.

Electric Connecticut: Regulation, Deregulation, and a Partial Return
Derek William Valles, Gallatin School of Individualized Study
Sponsor: Dr. Howard Rosenthal, Politics

The classical theory of electricity delivery supported single, vertically integrated firms that provide generation, transmission, distribution, and retail services. These firms, with exclusive rights in defined geographic areas, could centralize their sources of power with efficient, low-cost generation. The structure of transmission and distribution systems qualify the electric industry as a natural monopoly, in which heavy technologies; substantial, durable, and immobile network investments; and necessary economies of scale serve as high barriers to market entry. An emerging electricity industry in the United States found itself subject to systemic market failures as transmission volumes increased and geographic delivery areas expanded. Systemic failures have traditionally called for government regulation because electricity was and continues to be essential to modern life. In recent years, however, regulatory frameworks have proved insufficient in securing stability within the industry.
This research explores Connecticut’s electricity market—one of the most expensive in the United States for all consumer types—in light of the current debate over regulatory and deregulatory policies. In assessing attempts to combat the high and rising costs of electricity, market infrastructure and recently proposed and passed legislation were evaluated. In addition, connections were drawn between market players and recently adopted initiatives to account for the related political and economic landscapes.

The Effects of Value Incongruence on Transference
Heather Verron, Psychology
Sponsor: Dr. Susan Andersen, Psychology

Transference is the process by which a significant-other representation is used to interpret a new individual who resembles the significant other. In this study we hypothesized that learning of an incongruence in values would diminish transference. Through an idiographic nomothetic experimental design, fifty-six participants learned about three fictional characters, one of whom resembled a significant other. Then subjects were assigned to one of three conditions: they learned that this character possessed a value either congruent or incongruent to their significant other, or they received no information regarding the character’s values. Results did not confirm our hypothesis and instead showed that transference continued to occur for the significant other character across all value conditions. Suggestions for future research are discussed.

ARV Resistance as a Bottom Line Measure for HIV Program Efficacy
Shaleen Vira, Economics and Biology
Sponsor: Dr. James Ramsey, Economics

Worldwide, over forty-two million people are infected with HIV, yet fewer than 5 percent of those infected have access to Highly Active Antiretroviral Therapies (HAART), the standard of HIV/AIDS care. Amidst current efforts to alleviate the disease burden, patient adherence to the HAART regimen has emerged as a significant obstacle to effective treatment from an organizational design perspective. Low levels of adherence result in high incidence of antiretroviral resistance. The medications can become ineffective and lead to clinical failure requiring treatment switch to secondary or tertiary HAART, which are an order of magnitude more expensive than primary HAART. Thus, organizations that provide HIV care face an incentive to avoid these additional drug costs but face higher organizational costs in order to provide the infrastructure to increase adherence rates.

This study calculates whether the accrued benefits of avoiding secondary and tertiary drug costs offsets the increased programmatic costs of implementing more sophisticated models. Data from Partners in Health’s Haiti site are used in this analysis. I find that such a model more than pays for itself. In light of recent policy proposals by the economic development community to extend free HIV access to all developing nations, this study recommends policy makers to adopt Partners in Health’s model in new proposals to scale HIV care in low resource settings around the world.

Economics of Improvising with Electronics in Brooklyn
Matt Weiner, Music and Film & Television, Tisch School of the Arts
Sponsor: Dr. Jason Stanyek, Music

This research examines how improvising electronic musicians living in New York City function in such an expensive, compressed environment that keeps people perpetually busy. They make music with a very narrow appeal, and the gear that is necessary to make and record electronic music is usually extremely expensive. Most (if not all) of these musicians are in some way subjected to the unnecessary price mark-ups symptomatic of the commodification of audio equipment, thus spawning a booming secondhand market. It is not always possible to have a home studio in an expensive city, and a decent rehearsal space is not cheap. Finding time to get together to practice can present further problems. As always, working on the fringe of a medium requires constant improvisation and an open-minded approach. By drawing from a collection of interviews, readings by musicians, philosophers, and economists, and concert experiences from diverse electronic sound artists, I attempt to understand what is keeping these artists devoted to their craft and what that means they have to do to stay afloat.

A Great Leap Forward: The Beijing National Grand Theater
Sara Wójcik, Urban Design & Architecture
Sponsor: Ms. Mosette Broderick, Urban Design & Architecture and Art History

The Beijing National Grand Theater sits on the very site on which it was originally proposed in 1958 as part
of Mao Zedong’s “Ten Great Buildings” Campaign to celebrate the tenth anniversary of the People’s Republic of China: just east of the Great Hall of the People and not 500 meters from the Forbidden City. It faces Chang’An Avenue, set back roughly 200 meters from Beijing’s main West-East axis. The French architect Paul Andreu has given the building an ellipsoidal titanium shell that, when reflected in the large water basin that surrounds it, majestically completes itself in the familiar shape of an egg.

Initial plans for the theater were announced just months after the implementation of the Great Leap Forward, an economic and social plan aimed to rapidly industrialize and modernize the communist society with “revolutionary enthusiasm.” Re-proposed in 1999, the building finally opened on December 22, 2007, over forty years after its intended completion date. Given the present day context of Beijing’s massive urban renewal in light of the fast encroaching Olympics, the completed project’s design is being asked to reinvent and solidify the New China as it would have in 1959. This research examines the connection between its modern design and the national identity and political agenda of twenty-first-century China.

Signal Detection Theory and Semantic Memory

Julie Zide, Psychology

Sponsor: Dr. Andy Hilford, Psychology

This study attempted to extend the application of signal detection theory (SDT) to decisions of semantic memory. Lexical decision tasks, using low- and medium-frequency words and nonwords, were used to obtain accuracy data from twenty undergraduate students. The data were analyzed for three regularities of item recognition memory: convex curvilinear receiver operating characteristic (ROC) curves, normalized ROC curves (z-ROCs), and the mirror pattern. The results showed full curvilinear ROC curves. In addition, the mirror pattern was present but attained marginal statistical significance. Support for extending SDT to semantic memory decisions is only partial.
Inquiry XII.

#19 Lebowich

Lean on Me: Support with Balance and Locomotion in 12-Month-Old Infants
Julia K. Lebowich

Introduction

- Infants learn to walk and maintain balance by leaning on caregivers.
- Two groups of infants: walkers and crawlers.
- Crawlers are less likely to lean on caregivers.

Video Tracking Method

- A new system: "Virtual-Reality Video Tracking System" (V-RTVS).
- Tracks infants and caregivers in different environments.

Context of Support

- Crawlers: support less frequent and shorter duration.
- Walkers: support more frequent and longer duration.

Frequency and Duration of Support

- Frequency of support per minute.
- Duration of support per minute.

Summary

- Infants who walk independently lean less than crawlers.
- walkers spend more time supported by caregivers.
- Crawlers learn to walk independently by exploring their environment.
- walkers learn to walk by exploring their environment.

- walkers engage in more unsupported standing and walking.
- walkers are more likely to lean on caregivers.
Given finite resources, should we fund more research into the cause—and possibly, cure—of cancer, or build a space station? Can weather be predicted much more accurately than it is now? Is your water supply safe to drink? Is the human population changing the world climate? We all tend to take it for granted that science and technology increasingly play a role in our livelihood, our recreation, and our economic and even our physical survival. As in the humanities, many problems in applied science are so complex that they require collaborative research by scientists with diverse backgrounds and training. The purpose of education in our “postmodern” world is to allow one to navigate with insight and comfort in an increasingly math- and science-driven environment, to distinguish what is sense from what is nonsense, and to form a basis for sound decision-making.

—Neville Kallenbach, Professor of Chemistry

NATURAL SCIENCES

Amygdala Activity Modulation via Stress Hormones
Anu Amin, Neural Science
Sponsors: Dr. Joseph LeDoux, Neural Science, and Dr. Luke Johnson, Uniformed Services University of the Health Sciences

Fear is an emotion that is essential to evolution because it improves a species’ ability to survive. Evidence shows that emotional arousal activates the amygdala, a brain region in the limbic system. Furthermore, the amygdala acts as the center for the formation and processing of emotional memories. Research in understanding fear behavior has become increasingly important, as many people in today’s society suffer from emotional and stress-related disorders such as specific phobias, anxiety, panic attacks, and post-traumatic stress disorder. These disorders are often debilitating, so finding ways to alleviate this distress is of utmost importance. Because stressful situations tend to induce emotional arousal, understanding the interaction between stress hormones and amygdala neurons may lead to a possible treatment. Norepinephrine, the catecholamine stress hormone that underlies the fight-or-flight response, has been implicated in the consolidation and extinction of fear memories. In this study, I determined the modulatory effects of the stress hormone norepinephrine upon the amygdalar networks in order to further clarify the relationship between stress and fear behavior. The application of norepinephrine to rat amygdala slices resulted in transient inhibition of evoked field potentials within the amygdala. Thus, my research shows that norepinephrine may function in a feedback mechanism, in which norepinephrine regulates amygdala activation in a stressful or emotional situation by returning it to a homeostatic state.

Effects of a Novel Small Molecule Inhibitor of Cap-Dependent Translation on FMRP-Mediated Synaptic Plasticity
Elizabeth C. Arnold, Neural Science and Journalism
Sponsor: Dr. Eric Klann, Neural Science

Long-term memory and persistent forms of synaptic plasticity require protein synthesis known as translation. Translation may be divided into two categories, cap-dependent and non-cap-dependent forms. Numerous studies examining the role of translation in synaptic
plasticity have utilized protein synthesis inhibitors such as anisomycin and cyclohexamide; unfortunately, these drugs generate side effects such as the disruption of some intracellular signaling cascades and the inhibition of monoamine synthesis. These non-specific effects potentially limit the synaptic plasticity experiments in which these drugs are used. 4EGI is novel inhibitor of translation that selectively inhibits cap-dependent translation without these potentially confounding side effects. In this study, we characterized the use of 4EGI in studies of synaptic plasticity deficits found in Fragile X Syndrome.

Fragile X Syndrome can cause severe mental retardation and results from the silencing of the Fmr1 gene. In Fmr1 knockout mice, metabotropic glutamate receptor dependent long-term depression (mGluR-LTD), a form of protein synthesis-dependent synaptic plasticity, is enhanced. We examined the role of cap-dependent translation in mGluR-LTD via 4EGI with biochemical analyses and ex vivo electrophysiological recordings from hippocampal slices from Fmr1-deficient mice. We found that this form of LTD is partially supported by cap-dependent translation during the early phase of plasticity, and following washout of 4EGI the synapic strength depresses further to vehicle levels. These data suggest there is a persistent mechanism that is activated even in the presence of 4EGI during mGluR-LTD induction.

**Does Transient Attention Affect the Location Specificity of Perceptual Learning?**
Lauren Baideme, Psychology  
Sponsor: Dr. Marisa Carrasco, Psychology

Perceptual learning is the improvement in performance that results from practice with simple visual tasks. Such learning is highly specific to basic stimulus attributes, including spatial frequency, orientation, and spatial location. Exogenous attention can speed and strengthen learning, as well as help it transfer to different target-stimuli. In this study, we ask whether transient attention would also help learning to transfer to different spatial locations. In this study, we trained observers with an orientation discrimination task using two Gabor stimuli on the horizontal meridian. For four observers each trial began with a spatially neutral cue. For four other observers an uninformative spatial cue (50% valid) precede each stimulus. We then assigned them a transfer task, which was identical to the training except that the Gabors were shifted slightly above or below their original locations. When observers began the transfer task at the new stimulus locations, nearly all learning was lost for the neutral and invalid cue conditions, and observers’ performance levels dropped back to threshold level. When valid cues were used, however, the performance decrement was much less pronounced. These results indicate that transient attention may help learning to transfer to new stimuli locations; they also reinforce the finding that attention strengthens perceptual learning for simple visual stimuli.

**Control of Structure and Function in Peptides and Peptide Mimetics**
Irina Bergenfeld, Biochemistry  
Sponsor: Dr. Paramjit Arora, Chemistry

The ability to manipulate peptide secondary structure is critical for understanding protein conformational changes in vivo. Alpha-helix to beta-sheet conformational changes are involved in the pathology of many disease states, including Alzheimer’s and prion diseases, but the mechanisms by which these changes occur are poorly understood. We designed and synthesized a 17-residue switchable peptide that exists as a random coil in aqueous buffer but switches to an alpha-helical state in the presence of copper (II) ions to a beta-sheet state in the presence of copper (I). We included methionine residues to bind copper (I) in the beta-sheet isof orm and glutamic acid residue at the e position in the coiled-coiled heptad to bind copper (II) ions. We characterized two conformational changes by circular dichroism: random coil to alpha-helical in the presence of stoichiometric amounts of copper (II), and random coil to beta-sheet with five equivalents of copper (I).

BCL6 is a transcriptional factor that silences genes involved in cell growth and differentiation in B lymphocytes which has been implicated in the pathology of diffuse large B cell lymphomas. In order to form an active complex, BCL6 forms a homodimer that binds stoichiometrically to two molecules of a peptide corepressor such as SMRT, NCoR, or BCoR. We are designing and synthesizing a library of small, conformationally defined molecules to mimic a wide, 5-residue turn region of SMRT and an analogous region in BCoR that has been demonstrated to be crucial for binding to BCL6. Because of their structural rigidity, short, cyclic peptides are ideal candidates to form a potent binding interaction with BTB and block its interaction with corepressors. Moreover, the stable conformation of peptide macrocycles makes them resistant to intracellular degradation and may improve cellular uptake. We have synthesized two such mimics of SMRT, IB79H and IB79E. Both compounds have demonstrated activity against BCL6-positive cell lines at concentrations in the high micromolar range, despite poor
binding affinities. We are currently focused on optimizing the ring size and sequence for stronger binding to BCL6 and for greater efficacy at lower doses.

**An Investigation of Maternal Relatedness in Four Groups of Wild Blue Monkeys (Cercopithecus mitis stuhlmanni)**

Christina Bergey, Anthropology  
Sponsor: Dr. Todd Disotell, Anthropology

Blue monkeys (Cercopithecus mitis stuhlmanni) have been studied continuously for over twenty-five years as part of long-term research at Kakamega Forest in Kenya. Despite the fact that these monkeys are well known from behavioral and ecological points of view, my study is the first to use mitochondrial DNA to explore relatedness in the four groups of this population. I investigated the mitochondrial d-loop, or control region, of group females and their offspring (N > 48), because this highly variable region is prone to mutations and is often used in population genetics to determine matrilines. Surprisingly, I found no variation in the d-loop of these animals. This d-loop fixity suggests that the four groups are very closely related, likely all originating from one founding group that expanded and fissured. This study confirms the field observation that no new out-group females have ever entered the population and achieved mating success. It also serves as a caveat to those who would use the d-loop to explore relatedness in a female-philopatric population, because it can take many decades for any variation to appear in this region. Often, fieldwork is begun without knowing inter- and intra-group relatedness. This study confirms that you can reconstruct group events that occurred before observation using phylogenetic trees based on mitochondrial data.

**Proton Transport in Water: ab initio Molecular Dynamics Simulations Performed in the Complete Basis Set Limit**

Timothy C. Berkelbach, Chemistry  
Sponsor: Dr. Mark E. Tuckerman, Chemistry

Proton transport processes are ubiquitous in the sciences and may be found, for example, in biological signal transduction, acid-base chemistry, and the design of proton exchange membranes for hydrogen fuel cells. Thus, a precise understanding of this fundamental process in bulk water is essential for the future analysis of more complex systems. Here, I studied the structural and dynamical properties of an excess proton in liquid water via Car-Parrinello ab initio molecular dynamics. We have expanded the Kohn-Sham orbitals using a discrete variable representation (DVR), to be contrasted with prior studies which employed a plane-wave (PW) basis set expansion. The use of DVRs has been shown to yield properties very close to the complete basis set limit, allowing for the systematic elimination of errors arising from improper convergence. Utilized here, this methodology yields structural and dynamical properties of bulk water in much better agreement with experiment than did previous PW studies. Our simulation exhibited a diffusion constant of 0.80 Å²/ps, in unprecedented agreement with the experimental value of 0.67 Å²/ps. This value is to be contrasted with previous studies, which yielded a far lower diffusion constant of 0.31 Å²/ps. Additionally, we present hydrogen-bond statistics and correlation functions in support of a proposed mechanism and rate-limiting step for the process of proton transport through hydrogen-bonded networks in water.

**The Use of Immunological Techniques in the Identification of Historical and Contemporary Materials: Perfecting Techniques in Determining Protein and Carbohydrate Binders in Aged Artistic Media**

Scott Breitinger, Biology and Sociology, Margaret Bezrutczyk, Neural Science, and Matthew Van Auken, Biology  
Sponsor: Dr. David Scicchitano, Biology

Organic materials, including mammalian and fish collagens, caseins, ovalbumin, and polysaccharide plant gums, have historically been used for assorted artistic purposes. For example, many of these compounds have often been used as binders for pigments in paints and inks. Traditional chemical techniques (such as gas chromatography-mass spectrometry) can be used to identify such compounds, but they often require relatively large quantities of intact proteins and glycoproteins because they rely on the distribution of amino acids for accurate identification. In artistic media, natural aging and other biologically degradative processes (including fungal and insect infestations) can alter this distribution.

Our studies indicate that the Enzyme-Linked Immunosorbent Assay (ELISA) can more accurately identify specific compounds from a much smaller sample than is usually required for conclusive identification by traditional analytical techniques. Additionally, our research suggests that there is minimal cross-reactivity among our antibodies and non-target compounds. It is thus possible to distinguish among a number of proteinaceous and
polysaccharide compounds in a single sample. Using the appropriate antibodies, our group has developed a unified ELISA protocol that makes possible the identification of trace amounts of the above proteins and polysaccharides in artistic media, including naturally and artificially degraded samples.

Refining Immunological Identification Techniques for Casein in Art Materials
Scott Breitinger, Biology and Sociology
Sponsor: Dr. David Scicchitano, Biology

In the field of art conservation there is a prominent interest in improving the accuracy and precision of techniques used to determine historical and contemporary art materials. Increasingly, immunological techniques are being employed to identify organic binders and glues in artistic media samples. Immunological methods employed for sample identification, specifically the Enzyme-Linked Immunosorbent Assay (ELISA), use antibodies formed in reaction to specific proteins found in the art material. The ELISA method improves upon previous techniques in its efficacy for measuring minute samples and differentiating multiple types of proteins in a given sample.

My research here focused on the optimization of an ELISA procedure for casein—a protein common in Western art both in the manufacture of glues and as a paint binder. My comprehensive empirical analysis of elements of the ELISA procedure—such as antibody concentration; protein concentration; methods of protein extraction from the art media sample; incubation times for antibodies, proteins, and blocking agents; and reactivity analysis of casein subunit structures—has resulted in the development of an improved protocol which greatly reduces nonspecific reactivity, and thus increases the ability to distinguish positive reactions in the presence of more minute samples.

Evolution of the Interferon Regulatory Factor-7 (IRF-7) Gene in Primates
Angelo Canedo, Anthropology
Sponsor: Dr. Todd R. Disotell, Anthropology

In order to investigate the co-evolution of the immune system and SIV/HIV, I sequenced the coding regions of the IRF-7 gene across a large cross-section of primate species. The IRF-7 gene codes for a transcription factor regulating the production and expression of Type I Interferon in organisms infected with SIV/HIV. IRF-7 belongs to the Toll-like receptor 7 signal transduction pathway, implicated in the innate immune response to HIV infection being studied by Sterner. We applied phylogenetic analysis utilizing parsimony, likelihood, and Bayesian approaches to the IRF-7 sequence in order to identify differences among the genetic coding regions within functional protein domains across the various primate species. We carried out selection analyses to detect any positive selection operating on the IRF-7 gene. We mapped significant non-synonymous substitutions to the translated protein structure. Examining variation in the evolution of this gene across primate species may help to explain the disparate susceptibility of humans and African non-human primates to AIDS following SIV/HIV infection. The existence of a sequence similarity that is found only in natural non-human primate host species that do not develop AIDS following infection with SIV/HIV suggests a genetic adaptation to coexist with the virus.

Visualizing the Human Visual System: A Novel Technique Using the BOLD fMRI Signal
Kathleen Capaccione, Biology
Sponsor: Dr. Susan Feldman, NYU Langone Medical Center

Blood Oxygen Level Dependent (BOLD) fMRI is a method for detecting hemodynamic changes in the brain which correlate with neural activity. Standard BOLD fMRI, which identifies activity in discrete brain areas while the subject is performing a task, has been used to assess visual function. We have developed a new approach to understanding the organization of the visual system using the BOLD fMRI signal itself. We assessed the relatedness of BOLD signals from “seed points” in parts of the visual system using the program AFNI (Analysis of Functional Neural Images). Our results demonstrate that the occipital cortex and the optic radiations show strong correlation ($r_{avg} = 0.617$), as opposed to points outside of the cortex, ($r_{avg} = 0.326$). There was also a strong correlation with the contralateral occipital cortex ($r_{avg} = 0.697$). We are presently using this approach to assess changes in visual system function in several patients. This approach is interesting because the signal from a particular “seed point” appears to be unique and independent of activity. In conclusion, we have demonstrated that parts of the visual system can be identified by their BOLD signal alone. We suggest that this type of analysis can be applied to other brain systems.

Teratogenic Drugs: Therapeutic but Dangerous
Kaitlin A. Chiocca, Undeclared Major
Sponsor: Dr. David Scicchitano, Biology

Despite profound advancements in pharmaceutical drug research and development, many of the risks associated with potent pharmaceuticals have not altogether
diminished. I researched the teratogenic drugs isoretinoin and thalidomide to weigh the known risks against the potential benefits in treating severe acne and Hansen’s disease, respectively. I studied both drugs to determine how easily and under what authority these drugs reach the public, what effects they have on pregnant mothers and their unborn children, and what is being done to minimize the teratogenic risks associated with their use, specifically within the S.T.E.P.S, and iPledge programs. I also looked at these drugs from an international perspective to determine how global availability and regulation affects American markets. Despite the disturbing results of fetal exposure, thalidomide and isoretinoin treat conditions which would otherwise go untreated, and are thus obligatory for the FS phenotype, then PV may not be an appropriate marker for FS interneurons in macaque V1. They also suggest that a broader range of neuronal types may be capable of sustaining high-frequency firing in macaque V1 than would be predicted from data obtained in other model systems.

Sexual Dimorphism of the Sacrum and Its Relationship to Bipedalism and Obstetrics
Daniel Coppeto, Anthropology
Sponsor: Dr. Shara Bailey, Anthropology

Sexual dimorphism refers to differences in body shape and size between males and females. In humans, skeletal sexual dimorphism is most apparent in the pelvis. The differences result primarily from obstetric and bipedal selective pressures on the female pelvis. As a constituent of the pelvis, the sacrum holds a key position in the hominin skeleton: it supports the weight of the upper body and joins the two os coxae to form the birth canal. As such, it is affected by a number of selective pressures. While selection acts to increase the size of the birth canal in humans to accommodate the fetus’ large brain size, it also must balance this with the locomotive demands of bipedalism. The degree of curvature of the sacrum directly affects the shape and size of the birth canal.

I hypothesized that in contemporary humans the curvature in males exceeds that of females, due to selection favoring a large birth canal in females. I further hypothesized that in apes and early hominins this dimorphism will be less, if present at all, due to the lack of selection for a large birth canal and the lack of bipedal constraints in apes.

I investigated dimorphism in sacrum curvature of contemporary humans and compared it to that of apes (who show less dimorphism in the os coxae) and early hominins. I used 3-D morphometrics to establish the degree of dimorphism in sacrum curvature. The results of my analysis confirmed these hypotheses. Modern human males did have significantly greater curvature than modern human females. Both male and female fossil hominin sacra generally displayed curvature within the range of modern human females. Contrary to predictions, there was some evidence for dimorphism in chimpanzees.
This result is highly provocative and will require further research.

**Prediction of the Strength of Spontaneous Trait Inferences by Naïve Causal Theories**
*Rishi Dave, Psychology*
*Sponsor: Dr. James S. Uleman, Psychology*

This study aimed to determine the role of causality in Spontaneous Trait Inferences (STIs). It was hypothesized that people’s causal theories would best predict STIs by accounting for the most variance, as opposed to typicality of a behavior for a trait, or behavior or trait likelihood. Seventy-nine undergraduates filled out four ratings on the questionnaires, producing data that we compared with a Uleman and Blader study (2001) which used the same picture-behavior-trait pairings to produce STIs. The four trait ratings were used as predictor variables for the STIs in a multiple regression. Trait likelihood was found to explain the most variance in STIs ($R = .50, p < .05$), with other ratings being insignificant. Hence STIs are best described as inferences or judgments of traits based on behaviors, or diagnostic judgments in causal terms.

**A Comparison of Behavioral Data in Dispersing vs. Group-Living Male Woolly Monkeys (Lagothrix lagotricha) in a Western Amazonian Rain Forest**
*Carlos Javier Del Rio Villaseñor, Anthropology*
*Sponsor: Dr. Anthony Di Fiore, Anthropology*

It is fairly well-known that, in many species of birds and mammals, the members of one sex disperse from their natal groups at sexual maturity and transfer into different neighboring groups. Primates are no exception to this rule, with male dispersal predominating in almost every species, including woolly monkeys (*Lagothrix lagotricha*). I investigated behavioral data on one such dispersing male woolly monkey between June and July 2007 at the Tiputini Biodiversity Station, Yasuni National Park, Ecuador. I then analyzed and compared this data to group-living adult males. Furthermore, I noted interaction differences between the alpha male and several juvenile and subadult males. Moreover, I observed interaction differences according to the infant’s gender, where the male infant interacted more with the alpha male than did either of the two female infants.

**Endoscopic Resection of Posterior Third Ventricular Tumors**
*Agsa Durrani, Middle Eastern & Islamic Studies*
*Sponsor: Dr. Jeffrey H. Wisoff, NYU Langone Medical Center*

The most common pediatric tumors occurring within the posterior third ventricle are glial tumors and ependymomas. One-third of these gliomas are low-grade. Fifteen percent of supratentorial ependymomas in children occur primarily in the third ventricle. The most significant predictor of long-term survival for children with a supratentorial ependymoma is complete resection, with reported overall survival of approximately 80 percent. The role of adjuvant therapy in completely resected tumors is controversial; surgical morbidity, however, in this region is high, and endoscopic biopsy combined with third ventriculostomy and adjuvant therapy is the most common approach. Total resection using neuroendoscopy may significantly decrease surgical morbidity for select posterior third ventricle tumors.
In this study, we reviewed the clinical data, surgical technique, pathology, adjuvant treatment, and neurologic outcome for four patients, aged six to thirty-one years, who underwent surgical management of a posterior third ventricle tumor. Three patients underwent endoscopic third ventriculostomy and endoscopic tumor resection. Pathology revealed two ependymomas and one atypical mixed glioma (WHO II). One of the ependymomas was anaplastic; this patient received adjuvant proton-beam radiotherapy. There was no neurologic morbidity in this group. One patient underwent endoscopic third ventriculostomy and tumor biopsy, followed by open transcallosal resection. This patient suffers from persistent, mild short-term memory loss. All patients remain disease-free, with follow-up of three to thirty months. The results of our small-n study show that select patients may be successfully managed by endoscopic resection and third ventriculostomy alone.

**Phylogeny of Rungwecebus kipunji**

Madelyn Eads-Dorsey, Anthropology
Sponsors: Dr. Todd Disotell, Anthropology

Both the rapid destruction of forests and political conflicts throughout Africa greatly affect primates, and some species may not survive the irreversible damage humans have created. One group of primates that is at the top of the list of endangered primates in Africa is the mangabey (Lophocebus and Cercocebus). These two genera of Old World Monkeys have puzzled phylogeneticists for many years because mangabeys share distinct craniofacial features lacking in other Old World Monkeys, yet the two strands appear to be genetically divergent. Consequently, these important primates’ evolutionary tree remains unresolved. Greater phylogenetic analysis would not only help scientists understand the evolution of monkeys but would also call attention to an important group of primates that need help. Molecular laboratory procedures such as fecal extraction, PCR, ExoSAP, and cycle sequencing, combined with the analysis of previously gathered DNA sequences (GenBank), enabled me to collect data and further the study of mangabey evolution. Our results indicate that these two genera have a deep evolutionary divergence. Moreover, analysis of the newly discovered taxon, Lophocebus (Rungwecebus) kipunji, suggests that its mitochondrial lineages are more closely related to baboons, rather than to other mangabey species. This may reflect recent hybridization and introgression between mangabeys and baboons.

“**Complexers**” on Star Networks

Lindsay Erickson, Mathematics
Sponsor: Dr. James A. Morrow, University of Washington

An n-star network is a model of an electrical network that resembles the spokes of a wheel: it is a connected graph with one interior vertex, n boundary vertices, and no edges between boundary vertices. A complex number with positive real part is assigned to each edge; these numbers represent the admittance on each edge and determine the current flow in the network for a given electric potential. The problem I investigated is as follows: given only information about the current response in a star network, is it possible to determine the admittance values on its edges? A star network satisfying the following property is what I call a “complexer”: the boundary vertices on the network may be partitioned into two nonempty sets (called the “known set” and the “unknown set”) such that, for a given current response in the network and given only the admittances on the edges connected to “known” vertices, it is impossible to determine any of the admittances on “unknown” edges. Moreover, given all the “known” information and just one “unknown” piece of information, it is possible to determine the entire network’s admittances. Not all n-star networks are complexers. I found simple algebraic constraints on the admittances that are a necessary and sufficient condition for a star network to be a complexer.

**Using Implementation Intentions to Create Habitual Behavior**

Yvette Fruchter, Psychology
Sponsor: Dr. Gabriele Oettingen, Psychology

This experiment investigated whether habits could be made strategic and purposeful through the use of implementation intentions (Imps). Imps allow people to plan ahead of time where, when, and how to achieve a goal and therefore should allow people to make a conscious decision about the types of habits they would like to form. I was interested in whether Imps could be used to improve habitual behavior as well as to create repetitive continuous behaviors. I taught eighty-five NYU students in “Introduction to Psychology” a study strategy known as PQ4R (Thomas and Robinson, 1972) and asked them to use this study strategy when preparing for their upcoming exam. Participants recorded their study behavior in a journal for nine days. Each day, some participants formed an Imp to use PQ4R, some rehearsed PQ4R four times,
and some did both. I expected that participants who used Imps would have higher PQ4R use and higher grades compared to participants who did not use Imps. I further expected that participants who rehearsed PQ4R would have similar PQ4R use and similar grades as compared with participants who used Imps. Finally, I predicted that participants who did both would have the highest PQ4R use as well as the highest grades. The results of the experiment do not support my hypotheses. It is possible that the experiment’s results were affected by certain limitations, such as the complexity of the PQ4R study strategy.

How Spatial Resolution Limits Performance in Texture Segmentation: Evidence from Selective Adaptation to Spatial Frequency
Jonathan Gill, Psychology
Sponsor: Dr. Marisa Carrasco, Psychology

We investigated how the availability of spatial filters affects performance in a texture segmentation task. Performance in this task peaks in the mid-periphery, where the average spatial filter size is optimal for segmentation and drops at peripheral and foveal locations of the visual field where filters are either too large or too small, and therefore resolution either too low or too high (e.g., Gurnsey, Pearson, and Day, 1996).

We used selective spatial-frequency adaptation to limit the availability of spatial filters of different scales, thereby shifting the average filter size at a given location to either increase or decrease spatial resolution. By adapting observers to patterns of low (0.25 cpd), middle (3 cpd), or high (7 cpd) spatial frequencies prior to conducting the texture segmentation task, we found that compared to the control (0 cpd), peak performance shifted towards the fovea when adapted to high spatial frequencies, and towards the periphery when adapted to low spatial frequencies. This shifting of the performance peak based on available spatial filters after adaptation provides further evidence that spatial resolution limits performance in this texture segmentation task.

Genetic Analysis of Purkinje Cell Fate and Axon Projections in the Developing Mouse Cerebellum
Nithya Gopal, Biochemistry
Sponsor: Dr. Alexandra L. Joyner, NYU Langone Medical Center

The establishment of specialized neuronal circuits is dependent on the ability of each neuron to project its axon to an appropriate target field containing a specific repertoire of neurons. In the cerebellum (Cb), it is well established that Purkinje cells (PCs) project to the deep cerebellar nuclei (DCN) and the vestibular nuclei. In this study we used a genetic approach to understand how PCs acquire organization at both the anatomic and molecular levels. Both in the embryonic and adult Cb, PC gene expression patterns reveal a striking medial-lateral (M-L) molecular code. Of significant importance is how PC axons from particular M-L domains acquire topographic order during the same time period that their target DCN and vestibular nuclei are assembling into discrete nuclei. Furthermore, within each DCN, PC axons contact small, gamma-aminobutyric acid (GABAergic) inhibitory interneurons and large, glutamatergic excitatory projection neurons that derive from different germinal zones in the Cb. Using a mouse genetic fate mapping strategy pioneered in the Joyner laboratory, Genetic Inducible Fate Mapping (GIFM), we genetically marked PC neurons at specific developmental stages and followed their fate throughout embryogenesis and into adulthood. We found that the embryonic M-L molecular code bears a specific and predictable relationship to the adult M-L molecular code. In addition, using a combination of GIFM and antibody staining, we determined that PCs from specific embryonic parasagittal molecular domains establish contact with their target nuclei by E16.5, and we also determined that selective, genetic removal of their glutamatergic excitatory target cells results in altered projections of PC axons. These studies reveal that the early stages of PC development likely lay down the foundation upon which entire circuits later develop.

The Effect of Stress on Recovery from Fear
Evelyn Gordon, Neural Science
Sponsor: Dr. Joseph LeDoux, Neural Science

Post-traumatic stress disorder (PTSD) is characterized by responses to fear that are considered to be exaggerated, inappropriate, and prolonged. Past research has focused on the exaggerated and inappropriate fear responses of PTSD, while neglecting to study the prolonged effect. In this research project, therefore, I attempted to study the prolonged response to fear in rats that have been fear conditioned after being subjected to stress. The experiment consisted of three stages: mild restraint stress, fear conditioning, and cue fear test. Half of the rats received the mild restraint stress while the other half were not subjected to any stress. My data analysis consisted of watching the recorded cue fear test and rating the duration and frequency of various
behaviors (freezing, rearing, grooming, and sleeping) using a behavioral rating computer program to assess recovery from fear. For freezing, a two-way ANOVA revealed a significant effect of group (F(1, 1260) = 37.29 and time (F(89, 1260) = 3.611 with a significant interaction effect (F(89, 1260) = 1.32. For sleeping, a two-way ANOVA also revealed a significant effect of group (F(1, 1260) = 10.49 and time (F(89, 1260) = 3.216 with a significant interaction effect (F(89, 1260) = 1.548. The results obtained from this study suggested that recovery from fear was modified based on the induction of stress.

This investigation was not only the first to focus on the prolonged response to a stress-modulated fear response, but it may also provide information on more accurate target drugs for pharmaceutical manipulations of fear and stress.

**Spatiotemporal Response Properties of Neurons in Macaque Visual Area MT**

*Lee Hwang, Neural Science*

**Sponsor:** Dr. Anthony J. Movshon, Neural Science

Visual motion perception, or the ability to extract spatiotemporal information, is a critical tool for survival. In the visual pathway, approximately 20 percent of neurons in the primary visual cortex (V1) are selective for motion direction, and they relay information to neurons in area MT. Most of the cells in area MT are direction-selective and sensitive to motion speed. In this study, we hoped to determine whether the spatiotemporal response properties of these MT neurons can be described by a mathematical model. We collected extracellular recordings from single units in area MT of macaque monkeys while presenting random-dot stimuli. We varied the spatial and temporal intervals between the dots, keeping in mind that their ratio represents the speed of a moving stimulus. We began with three predictions for the types of cells in area MT. A cell can be perfectly tuned for a particular speed (separable model), not selective for any particular speed (separable model), or exhibit intermediate behavior between the two extremes (intermediate model). According to these predictions, we proposed a model for each type of response; comparing these models to the data then allowed us to determine which model best describes the actual responses of MT cells. By analyzing the parameters extracted from these model predictions, we conclude that the spatiotemporal response properties of MT neurons can be best described by the intermediate model, which accounts for cells that are neither completely separable nor perfectly speed-tuned.

**Hard Magnets from Soft Magnetic Materials**

*Taran Jain, Physics and Mathematics*

**Sponsor:** Dr. Andrew Kent, Physics

This research has shown that nanomagnets made from soft magnetic materials can have sufficiently large energies to be used for data storage. This is a surprising result because many nanomagnetic structures become superparamagnetic. To complement these practical results, I attempted to understand the underlying physics behind the coercive field in elliptical nanomagnets. The coercive field is important because it is a quantitative measure of how strong an applied magnetic field needs to be to change the magnetization of a material. Specifically, I successfully reduced the physical description of the coercive field to geometric effects and volumetric effects. Geometric effects are caused by the dipole energy of the magnet, while volumetric effects are caused by the varying influence of exchange energy as volume increases. My research therefore provides some insight into the single domain model of magnetization and the scaling of the exchange energy on the nanometer scale.

**Hippocampal Morphological Abnormalities in Knockout Mice Modeling Tuberous Sclerosis Complex**

*Sachin Jhawar, Neural Science*

**Sponsor:** Dr. Eric Klann, Neural Science

Tuberous sclerosis complex (TSC) is a severe genetic disorder that can manifest in a variety of different physiological ways. Study of the disease has been conducted in knockout mice with a mutation in one of the genes essential for tumor suppression. Previous studies in knockout mice have shown that morphological differences can exist in different brain structures. In this study, we tested two of the models for TSC, mutated in either the TSC1 gene or the TSC2 gene, for morphological changes occurring in the pyramidal cells of the hippocampus in mice that are homozygous, heterozygous, and wild type for the respective mutations. We used Golgi staining to view the spine density, size, and shape in order to characterize the differences.

**Evolution of the Pax Gene Family in the Wasp Nasonia vitripennis**

*Robert G. Keller, Biology*

**Sponsor:** Dr. Claude Desplan, Biology

The Pax genes comprise a family of DNA binding transcription factors that are regulators of embryonic
Inquiry XII.indd   60

patterned DNA. All members possess a paired-domain DNA binding domain and, in several subgroups, a second DNA binding domain, a homeodomain. I am carrying out a bioinformatics analysis with the goal of identifying and understanding in an evolutionary context the function of Pax genes in the long-germ wasp, Nasonia vitripennis. Identification of Pax genes in Nasonia and sequence comparisons will allow us to generate a phylogenetic tree which will assist in placing each of the Nasonia Pax genes in known families of Pax genes from other species. This analysis will shed light on the history and consequences of Pax gene dynamics.

Using the Drosophila paired domain protein sequence, I queried the Nasonia genome, which has been completely sequenced and is available on-line, to locate all putative Pax genes. I identified and cloned seven genes, all containing the characteristic paired domain. Using a computer sequence alignment program called ClustalX, I generated multiple alignments and phylogenetic trees relating all cloned Nasonia Pax genes to homologues from other species, with the goal of inferring evolutionary relatedness among them. I completed in-situ hybridization experiments which report patterns of gene expression for the cloned Pax genes paired, eyeless, and shaven; I am currently analyzing these results. Future project goals include: (1) characterization of the embryonic expression of remaining Nasonia Pax genes, and (2) using RNAi-knockdown experiments to characterize the function of all Nasonia Pax genes in the embryo.

Thermodynamics of DNA Bending and Supercoiling Alexander Kotlyar, Chemistry
Sponsor: Dr. Alexander Vologodskii, Chemistry

The free energy, $\Delta G$, of DNA supercoiling has been a subject of biochemical and biophysical study for over thirty years. Its dependence on the value of DNA supercoiling is well known at physiological conditions, with superb agreement between experimental data and theoretical computations. What has not yet been understood is the temperature dependence of $\Delta G$. While a simple consideration predicts that $\Delta G$ should increase with temperature, the available experimental data showed the opposite. To clarify the issue, we first accurately repeated the measurements of $\Delta G$ at 5°C, 25°C, 42°C, and 60°C. Our results confirmed the published data. This puzzle could be solved if we account for the temperature dependence of DNA persistence length, $a$. Our approach to the latter task was based on measuring the efficiency of DNA cyclization, the $j$-factors, of short, generic sequence DNA fragments. We measured the $j$-factors and determined the value of $a$ at different temperatures. For 5°C and 42°C the value of $a$ is 55.7 (±1) nm and 42.8 (±1) nm, respectively. A comparison of data calculated from the observed persistence lengths and the measurements of $\Delta G$ showed good agreement, which indicated that the change in persistence length could explain the decrease in supercoiling free energy with temperature.

Molecular Dynamics of Imidazole Based Polymers
David Krisloff, Chemistry
Sponsor: Dr. Mark Tuckerman, Chemistry

Discovering new alternative clean power sources has become an increasingly important target area in research over the last few years. Fuel cells have long been considered as a possible alternative power source and are still being actively developed. One of the major challenges in current fuel cell technology is the design of proton exchange membrane (PEM) materials that are stable at high temperatures and capable of maintaining a high proton conductivity under low- or zero-humidity conditions. To that end we are currently investigating a new material to be used in the PEM, namely imidazole-terminated polyethyleneoxide polymers. We are currently employing molecular dynamics simulations to investigate the structure, hydrogen-bond connectivity, and hydrogen-bond lifetimes in these materials as functions of temperature and spacer length. The forcefield describing the polymers was designed starting from the work of Krishnan and Balasubramanian on polyethyleneoxide (2004) and the CHARMM22 forcefield (MacKerell et al., 1998) for the imidazole ring. Partial atomic charges and new intramolecular force parameters needed to attach the ring to the spacer were calculated at the Hartree-Fock level of theory. All simulations are being performed using the PINY_MD package developed by Tuckerman et al. (2000).

Uncovering the Mechanism of HP1 Recognition and Binding with Methylated Lysines
Jonathan Lai, Chemistry
Sponsor: Dr. Yingkai Zhang, Chemistry

Heterochromatin Protein 1 (HP1) is an evolutionarily conserved family of proteins involved with gene silencing; it is believed to silence genes by recognizing and binding to a specific amino acid sequence on a tail coming off the histone H3. Further, the binding between HP1 and the histone only occurs if the lysine in the hexa-
peptide sequence is dimethylated or trimethylated. While the structure of HP1 is known through crystallography and NMR studies, the mechanism for the recognition and interaction with the histone tail remains unclear.

In my research, I have made progress to elucidate this binding mechanism through the use of classical molecular dynamic models. I constructed these models using the Amber 99SB forcefield, and they are explicitly solvated. I have employed a variety of modeling techniques to analyze the histone-protein binding interaction. My preliminary results indicate that the binding between the histone tail and the HP1 protein comes from a combination of cation-π and hydrophobic interactions. Future research will explore how serine phosphorylation prevents HP1 binding.

1,2,3-Triazole-Linked Porphyrin-Fullerene C₆₀ Dyad
Olivia P. Lee, Chemistry
Sponsor: Dr. David I. Schuster, Chemistry

Research on alternative energy sources has become an important field. The Schuster group focuses its research on the synthesis of artificial photosystems involving porphyrin-fullerene C₆₀ macromolecules that can potentially harvest light energy and convert it into electrical energy. These macromolecules form a donor-acceptor system in which an electron transfer reaction can take place. Upon excitation by light at ~425 nm, the porphyrin moiety donates an electron through a linker to the fullerene C₆₀ moiety and creates a charge-separated state; the electron will eventually return to the porphyrin moiety through a back electron transfer (BET) reaction. My research project involved the study and synthesis of a 1,2,3-triazole linker that connects the porphyrin moiety and the fullerene C₆₀ moiety, and my goal was to synthesize molecules with a slow BET rate. I synthesized the 1,2,3-triazole linker through Huisgen 1,3-dipolar cycloaddition, the so-called “click” reaction, in which a terminal alkyne reacts with an azide under copper (I) catalyzed conditions. Because microwave heating has been shown to give better yields in “click” reactions than traditional heating, I aimed to develop novel techniques to synthesize my target compound with microwave-assisted one-pot methodology. I successfully synthesized the dyad shown below in two steps: first, I performed a one-pot microwave-assisted reaction to obtain porphyrin-triazole-boronic acid, which I then attached onto the fullerene C₆₀ moiety. I have encountered some difficulty in synthesizing this compound, including a low yield of ~1 percent and the loss of the boronic acid during the triazole synthesis. For future experiments, I will investigate functional groups other than boronic acid to attach the triazole-porphyrin moiety onto the fullerene C₆₀ moiety, and will subject all fully synthesized 1,2,3-triazole-linked porphyrin-fullerene C₆₀ dyads to fluorescence-quenching characterization, photophysical characterization and electrochemical characterization.

Enhanced Immunogenicity of Malaria CS Peptide Vaccines Using a Topical Adjuvant Containing a Synthetic TLR 7 Ligand
Rebecca Lee, Chemistry
Sponsors: Dr. Elizabeth Nardin and Dr. Caroline Othoro-Watta, NYU Langone Medical Center

In the development of successful candidates for pre-erythrocytic malaria vaccines, approaches to block the sporozoite invasion of the host hepatocytes are being studied. It is important to target residual exoerythrocytic forms by cellular immunity, mediated by the inhibitory cytokine IFN-γ. Existing synthetic peptides which contain minimal T and B cell epitopes of the P. falciparum circumsporozoite (CS) protein as branched tetramers or linear peptides have been shown to produce sporozoite-neutralizing antibodies and IFN-γ producing CD4+ T cells in humans and animal models. These suboptimal cellular responses can be enhanced through the use of Toll-like receptors (TLR) which help to stimulate dendritic cell maturation and cytokine production, vital to T and B cell adaptive immune responses.
Here I studied the capabilities of the synthetic imidazoquinoline, TLR 7 ligand Imiquimod, to function as a potent topically applied adjuvant for the CS peptide vaccines. I subcutaneously immunized C57/B16 mice with branched or linear P. falciparum CS peptide, then followed with topical applications of Imiquimod. I analyzed the sera of the immunized mice using the circumsporozoite precipitin reactions (CSP) with viable P. P. sporozoites. This yielded high titers, indicating effective cross-linking of the native CS on the viable sporozoite surface. This strongly inhibited invasion of hepatoma cells in vitro by transgenic sporozoites expressing P. falciparum CS repeats. I increased the responses to the less immunogenic linear CS peptide through multiple applications of the adjuvant. Topical Imiquimod has been FDA approved for the treatment of dermatologic conditions in humans, demonstrating its safety and simplicity, often issues in vaccine formulation.

Uncovering the Roles of XBP-1 in the DNA Damage Response and Cell Cycle Progression
Christen Lennon, Biochemistry
Sponsor: Dr. Brian Dynlacht, NYU Langone Medical Center

The Unfolded Protein Response (UPR) is a signaling pathway required for resolving Endoplasmic Reticulum (ER) stress caused by accumulation of unfolded proteins in the ER lumen. In previous work we demonstrated that XBP-1, an essential transcription factor and terminal effector of the UPR, targets genes involved in DNA replication and repair (Acosta-Alvear et al., 2007). Additional investigations also support a connection between the UPR, cell cycle progression, and genotoxic stress. For instance, an intact UPR is required for cytokinesis in budding yeast (Bicknell et al., 2007). Further, UV irradiation is sufficient to activate PERK, a critical UPR sensor-effector (Wu et al., 2002). Here we show a relationship between XBP-1 and regulators of cell cycle progression and DNA repair in murine and human cells. We found that the cyclin-dependent kinase inhibitor p21 is upregulated and DNA repair in murine and human cells. We found that the cyclin-dependent kinase inhibitor p21 is upregulated with branched or linear P. falciparum CS peptide, then followed with topical applications of Imiquimod, analyzed the sera of the immunized mice using the circumsporozoite precipitin reactions (CSP) with viable P. P. sporozoites. This yielded high titers, indicating effective cross-linking of the native CS on the viable sporozoite surface. This strongly inhibited invasion of hepatoma cells in vitro by transgenic sporozoites expressing P. falciparum CS repeats. I increased the responses to the less immunogenic linear CS peptide through multiple applications of the adjuvant. Topical Imiquimod has been FDA approved for the treatment of dermatologic conditions in humans, demonstrating its safety and simplicity, often issues in vaccine formulation.

RNAi Library Representation: A Comparison of Two Different Approaches
Valerie Lerebours, Psychology
Sponsors: Dr. Scott Powers and Dr. Nancy Liu-Sullivan, Cold Spring Harbor Laboratory

Barcode technology, pioneered by a collaborative team of researchers at Cold Spring Harbor Laboratory (CSHL) is an evolving RNA interference (RNAi) approach used to screen for candidate genes susceptible to anti-cancer drugs. This approach is characterized by several important features. (1) It utilizes retroviral-based RNAi production. RNAi design is based on micro RNA that closely mimics naturally occurring micro RNA with high efficiency of target gene silencing. (2) Moreover, libraries are screened as pools consisting of individual RNAi plasmids. (3) Additionally, each RNAi is physically linked to a unique 60-base-pair molecular barcode. The focus of my project was to compare two different approaches of pooled RNAi plasmids transformation with the goal of determining which approach is more efficient in RNAi plasmid representation. The two approaches involve transformation of the human cancer-1000 RNAi library via electroporation and heat-shock. I performed both types of transformation, following this, I purified and PCR-amplified the plasmid DNA using a set of primers specific for full-length barcode and half hairpin. I then tagged the purified PCR products with a fluorescent label and measured the barcode representation via barcode microarray. My findings suggest that transformation via electroporation is considerably more efficacious in barcode representation than is heat-shock. My results provide an important basis for successful downstream steps in the RNAi library screen that involve the utilization of well-represented, barcoded RNAi to generate retroviral stocks for the infection of target human cancer cell lines. The goal of screening and identifying candidate genes important for tumor maintenance.

Induced Dynamics for Infinite-Dimensional Systems
Jessica Lin, Mathematics
Sponsor: Dr. William Ott, Mathematics

Imagine that you are studying a complicated fluid flow. As the fluid moves, you measure its velocity (or temperature) at several different points. Using this data, you reconstruct the fluid flow on a computer. Does your simulation accurately reflect the flow itself? In this research project, I develop a mathematical theory of observation to address questions of this type.

In 2003, Ott and Yorke explored the idea of deducing properties of complex finite-dimensional systems by...
studying projections of the systems onto low-dimensional spaces. I extended the work of Ott and Yorke by studying systems in infinite-dimensional Hilbert spaces. Under suitable conditions, I show that the projected finite-dimensional system is equivalent to the infinite-dimensional system. This allows us to make inferences about the infinite-dimensional system by studying a lower-dimensional one, which is analogous to an experimentalist using data to analyze an experiment. In future research, we can apply my results here to flows on function spaces that are generated by the partial differential equations of fluid mechanics.

Enhanced Episodic Encoding for Semantically Related Objects
Nicole Long, Psychology
Sponsor: Dr. Lila Davachi, Psychology

Previous research has shown that different objects are best remembered when studied with a question emphasizing the relationships between the objects. The speculation is that this relation-centric orienting task brings memory for different objects up to the level for that of similar objects; this hypothesis, however, does not consider the possibility that the encoding of similar objects is enhanced because of their preexisting semantic relationships. In this study, I tested the idea that semantically related objects undergo enhanced encoding regardless of orienting instructions. Study participants were asked an item-centric question about groups of objects; some objects came from the same category (e.g., fruits) while others did not (e.g., tools). Category similarities or relationships were not mentioned to participants during any part of the experiment. Using a forced-choice recognition task that tested episodic memory, participants had to choose which of two objects had been paired with another during the study. Participants were more accurate when choosing from category-same pairs than from category-different pairs. As I did not instruct participants to notice or create any type of relationship between the objects presented, my results imply that encoding is enhanced for those objects with preexisting semantic relationships.

An RNAi Screen for the Identification of Genes that Control Male Tail Tip Morphogenesis in Caenorhabditis elegans
Grayson Maldonado, Biology
Sponsor: Dr. David Fitch, Biology

Understanding the molecular mechanisms that control morphogenesis is a major goal of developmental biology. To approach this goal, we use the model organism Caenorhabditis elegans, for which many genetic tools are available. C. elegans males undergo a sex-specific morphogenesis of the four most posterior cells, hyp 8-11, during the last larval stage. Prior to morphogenesis, the worms have a pointed tail tip. Then, hyp 8-11 fuse together and retract away from the overlying cuticle, resulting in a rounded tail tip in adults. A number of genes were identified that disrupt this process. For example, a lin-41 loss-of-function allele causes precocious retraction and fusion resulting in over-retracted tail tips in adults. Gain-of-function alleles cause a delay in this process, causing pointy tails to be retained into adulthood. In order to identify more genes and further our understanding of the mechanisms that control tail tip retraction, I have applied reverse genetics by RNA interference (RNAi) to knock down systematically all genes on chromosome IV. Bacteria that express double-stranded RNA (dsRNA) targeting the gene of interest were fed to L1 larvae of a C. elegans strain hypersensitive to RNAi. Upon scoring adults for any disruption in tail tip morphogenesis, I identified 26 out of 4,500 genes as potential regulators of this developmental process.

A High Through-Put RNAi Screening System for Identifying Genes that Functionally Interact with the Notch Pathway in Caenorhabditis elegans
Manuel Montano, Biology
Sponsor: Dr. Jane Hubbard, Biology

Identifying functional interactions between genes or their products is critical to elucidating their role in development. Using the nematode worm Caenorhabditis elegans, the Hubbard lab identified a novel mutation in a Notch receptor gene that causes germline tumors. Similar mutations in humans cause cancer. To identify additional genetic interactors, we initiated an RNAi-based genome-wide genetic screen. The initial screening protocol worked; it was, however, arduous and time consuming. Here I detail my development and testing of a more efficient new protocol. In the initial protocol, worms were treated in the fourth larval stage (L4) by feeding them RNAi-inducing bacteria on solid media, and then the phenotype of their progeny was tested. With this new protocol, I used L1 larvae in liquid media and tested their phenotype directly. Using a known gene set, I performed two sets of parallel experiments. I tested the initial protocol (L4, solid) vs. L1 on solid media and then L1 liquid growth vs. solid. My results compared well with the initial protocol: the new protocol positively and reproducibly identified all strong functional interactions and reduced...
the detection of weak interactions. My results shed light on the further implications of high-throughput screening in a model organism with a fully accessible genome.

An MEG Study of the Neural Bases of Semantic and World Knowledge Integration
Bridget Oliveri, Language & Mind
Sponsor: Dr. Liina Pylkkänen, Linguistics

While the cognitive neuroscience of language has advanced dramatically in recent years, the functional neuroanatomy of sentence processing in relation to linguistic theory is significantly understudied. In particular, few experimenters have taken advantage of cases where semantic (grammatically relevant) aspects of meaning differ from world knowledge (grammatically irrelevant) aspects. Some aphasics, however, show evidence of a selective impairment in semantic knowledge of verb usage while world knowledge remains intact, suggesting that the two types of meaning may be integrated in separate neural systems (Kemmerer and Wright, 2002).

My study investigates this phenomenon in healthy subjects, examining the magnetoencephalography (MEG) responses elicited by sentences that violate semantic or world-knowledge criteria, in comparison with sentences that are either double violations or well formed. Target stimuli are un-prefixed verbs, which allow the manipulation of separate semantic and world-knowledge criteria for well-formedness. Semantic violations were associated with early activity in the ventromedial prefrontal cortex (vmPFC) (about 225–300 ms); both world-knowledge and semantic violations engage the left inferior prefrontal cortex (LIPC) at about 300–350 ms. This suggests that while the LIPC is sensitive to violations of both types of meaning, the earlier activity in vmPFC reflects semantic composition only. While not a region classically associated with language, the vmPFC plays a role in many types of higher cognition. These results suggest that semantic composition may share mechanisms with some of the non-linguistic functions implicated for this area.

Is Exogenous Attention an All-or-None Cueing Mechanism?
Yunsoo Park, Psychology
Sponsor: Dr. Marisa Carrasco, Psychology

Exogenous attention can be automatically engaged by a peripheral cue. The cue triggers spatial attention at the cued location. Previous attentional studies have generally used high contrast cues that reliably trigger attention to ensure effectiveness. I am interested in whether the effect of the cue is all-or-none, where attention is fully engaged above a certain cue contrast, or whether attentional effect increases gradually with cue contrast. For this study, I obtained psychometric functions for a cue localization task over a range of cue contrasts. My main experiment presented a brief single pre-cue at one of the two peripheral cue locations or at fixation, followed by two Gabor stimuli. Participants reported the orientation of the higher contrast stimulus.

I calculated the magnitude of the attentional effect for each cue contrast, as well as the difference between the points of subjective equality (PSEs). I addressed the possibility of cue bias by administering a post-cue session. Participants were able to achieve perfect localization around 10 percent cue contrast; even when the cue was perfectly localizable, however, the attentional effect still increased. Thus the magnitude of attentional effect can be seen as a function of cue saliency, not cue localizability. I observed no attentional effect with the post-cue, ruling out the possibility of cue bias. Although exogenous attention is triggered automatically and involuntarily, my results show that there is an underlying flexibility—a gradient of attentional effect that modulates over a range of cue salience.

Characterizing Gli1-Expressing Follicular Stem Cells in Epidermal Wound Healing
Abhishek Patel, Biology
Sponsor: Dr. Alexandra Joyner, NYU Langone Medical Center

In skin the interfollicular surface epidermis is maintained by its own population of stem cells located in the basal layer. It has recently been shown that in response to an epidermal wound whereby the epidermis is completely ablated, follicular stem cells aid in repopulating the epidermis, a behavior that is absent during homeostatic conditions. The hair follicle bulge area is thought to be the source of the adult stem cells responsible for the maintenance of all structures of the hair follicle. This area is strategically located, residing in the outer root sheath, at the most proximal end of the non-cycling portion of the follicle, in between the sebaceous gland and the arrector pili muscle. The Joyner lab has shown that there exists a population of cells within the bulge that express Gli1, a gene whose expression is dependent on the Hedgehog family of secreted morphogens. Our studies indicate that these cells give rise to a progeny of differentiated cells that re-epithelialize the epidermis after wounding. In characterizing the behavior of Gli1-expressing stem cells during the wound healing process, we have found...
that these cells are able to repopulate all layers of the epidermis. Gli1-expressing cells from the follicular bulge gave rise to cells that migrated to and aided in the re-epi-thelialization of the epidermis, as determined by genetic inducible fate-mapping using the Cre-loxP system. The cells that were derived from the Gli1-expressing bulge cells were phenotypically indistinguishable from those that were provided from epidermal progenitors. The long-term contribution of these cells to the epidermis has yet to be determined, but they could play an important role as functioning stem cells in the ongoing maintenance of the epidermis after wounding.

The Effect of Fear Memory Retrieval on Protein Expression within the Amygdala

Ankita Patel, Philosophy
Sponsor: Dr. Joseph E. LeDoux, Neural Science

Fear conditioning is an emotional learning paradigm that involves pairing a neutral conditioned stimulus (CS, e.g., a tone) with an aversive unconditioned stimulus (US, e.g., a footshock). My research focused on the effect of fear memory retrieval on protein expression within the amygdala. I measured changes in protein expression of 4EBP and Phosphorylated 4EBP following the reactivation of a previously established fear memory by exposure to the tone CS. Rats were first habituated to Coulbourn conditioning chambers and then fear conditioned one day later. Rats belonged to one of three conditions: paired, unpaired, and naïve fear conditioning protocols. Paired conditioning involved presenting a tone CS (5kHz, 80dB, 20sec) that coterminated with a footshock US (1mA, 0.5sec). Unpaired controls received the same stimuli but were explicitly unpaired. Naïve controls received the tone CS but no US. Then rats were habituated to the testing context. One week after fear conditioning, I tested the rats for fear memory retrieval in the testing context and gave two CS presentations. One hour later, I removed their brains and isolated the amygdala, hippocampal, and cortical tissue using the cryostat. I then analyzed the tissue using western blots. My preliminary results suggest that the unpaired group shows less amygdala phosphorylated 4EBP expression than the paired group.

Placebo-Controlled Studies: Scientific Rationale and Ethical Issues

Song Qu, Undeclared Major
Sponsor: Dr. David Scicchitano, Biology

Placebo comes from the Latin phrase for “I shall please” and is commonly used today as a control to test the efficacy of new drugs. Placebo-controlled trials (PCT) are important because they allow researchers to observe the responses to placebos and to rule them out when assessing the efficacy of a new treatment. The question now is whether placebo-controlled trials are necessary and ethical, especially in situations where an effective treatment is available. Generally, both opponents and defenders agree that not all PCTs are unethical and that some are even necessary. The debate arises over the inclusion of placebo controls in cases where an alternative effective therapy is already available. Opponents argue that denying available treatment needlessly jeopardizes patient health, and the fifth revision of the Declaration of Helsinki clearly provides no room for placebo use if an effective therapy exists; this conflicts with the United States Food and Drug Administration’s requirements for placebo-controlled evidence. The debate over ethical use of placebo controls will be difficult to reconcile, but steps can be taken to assure that patients are informed about their conditions, the risks and benefits of treatment versus no treatment, and the possibility that they might receive a placebo.

Neuronal Changes and Serotonin Axons in Postmortem Brains from Down Syndrome Donors

Yeison Rodriguez, Neural Science
Sponsor: Dr. Efrain C. Azmitia, Biology

The purpose of this work was to determine if there are abnormally large neurons in the postmortem brain tissue of subjects diagnosed with Down syndrome. Our results suggest that in the superior temporal cortex of the Down syndrome group there are neurons that on average are much larger than those seen in the superior temporal cortex of the postmortem brains of undiagnosed subjects. In addition, there appears to be an increase in neuron size in the Down syndrome group as age increases. The implication is that this is somehow linked to the globally projecting serotonin system. The neurons of this system release the neurotransmitter serotonin (5HT), which, among other processes, is involved in inducing the growth and maturation of the neurons with which the molecule interacts.

The protein S100B may be in excess near regions of pathology. S100B is a neurite extension and maturation factor; it induces the extension and maturation of axons and dendrites. In a second portion of this study, immunoreactive staining for serotonin transporter protein (5HTT) provided visualization of aggregations of excess serotonin-releasing axons around globular neuron-like
Understanding the Mechanisms of Repair of Carcinogen-DNA Lesions with Damaged Complementary Strands
Adam Schwaid, Biochemistry
Sponsor: Dr. Nicholas Geacintov, Chemistry

Damage to human DNA is commonplace and pervasive. One form of DNA damage is the binding of metabolites of bulky polycyclic aromatic compounds (PAC) to the purine bases in cellular DNA. It is the responsibility of the nucleotide excision repair process, NER, to repair the genome. NER succeeds or fails based on the recognition of the damaged DNA by XPC, the protein central to damage recognition and repair. I investigated whether a base flipping mechanism, in which there are local bulges on both sides of the duplex, is crucial to this recognition.

To test this, I used spectrophotometric characterization to assess benzo[a]pyrene DNA adducts with damaged complementary strands, as I suspected these adducts would intercalate without base flipping. Other lab members tested the repairability of the adducts using repair gel assays. The lab found that adducts with a deleted or abasic nucleotide opposite the site of the moiety were repaired poorly. I observed a 10- to 14-degree increase, depending on the stereoisomer, in the melting points of the deletion adducts, and a 4- to 10-degree increase, again depending on the stereoisomer, in the abasic adducts. Moreover, fluorescence quenching of the abasic adduct revealed a 10 percent decrease in fluorescence at 353nm, which is characteristic of an intercalated adduct. Finally, UV titrations using the abasic and deletion complementary strands both revealed redshifts in the region of the moiety. This evidence indicates that these adducts are intercalated and, due to their lack of complementary bases, do not create a base flipped duplex. Thus, their poor repair is congruent with a base flipping dependent repair mechanism.

Expanding the Structural Diversity of Biomimetic Peptoid Oligomers
Neel Shah, Chemistry
Sponsor: Dr. Kent Kirshenbaum, Chemistry

N-substituted glycine oligomers, or peptoids, are a class of peptidomimetic compounds that show promise for a variety of biomedical and materials applications. Additionally, some peptoid sequences incorporating N-alkyl side chains have been shown to adopt stable three-dimensional structures. Despite this propensity to fold like polypeptides, only a small set of well-defined conformations have so far been described for peptoids. This is in part due to a lack of internal hydrogen bonding capability, but is also a result of increased isomerization at the amide bonds that link each monomer, thereby leading to overall conformational heterogeneity. My study demonstrates that N-aryl peptoid side chains can act as local structural constraints that exclusively direct the presence of trans-amide bonds. A variety of substituted N-aryl side chains can be used to display unique chemical functionalities while retaining this structural preference, and their incorporation within peptoid scaffolds will enable the construction of a new array of biomimetic conformations.

Ramming, Biting, and Cracking: The Strength of Animal and Plant Shells
Kelly Sielert, Politics
Sponsor: Dr. David Hu, Courant Institute of Mathematical Sciences

The thin-shelled dome provides lightweight armor for skulls, eggs, turtles, nuts, pumpkins, and other common structures in the animal and plant kingdoms. In this combined experimental and theoretical study, I compared across species the strength-to-weight ratio of the aforementioned domes found in nature. I presented my data in the form of a graph plotting the shell’s characteristic thickness versus characteristic length, primarily using shell geometries measured from numerous collections at the American Museum of Natural History. I analyzed this data using elastic membrane theory to compute scaling relations for the maximum force that these shells can support. I gave particular attention to presenting a structural classification of these shells, allowing for the rationalization of their various thickness-length aspect ratios according to the biting, ramming, or static forces.
they are likely to encounter in nature. I also considered the mechanics dictating the limitations of shelled gigantism, as exhibited by ostrich eggs, giant sea turtles, and one-ton pumpkins.

**Manipulating the Dynamics of Photoinduced Electron Transfer**

*Robert Spencer, Chemistry and Biochemical Engineering*

*Sponsor: Dr. David I. Schuster, Chemistry*

In this project, I am synthesizing a new compound which expands the dimensions of a previously prepared analog of porphyrin-fullerene rotaxane. This rotaxane will have triethylene glycol linkers between the fullerene (electron acceptor) and porphyrin (electron donor) components, while previous compounds employ diethylene glycol linkers. Manipulating the distance between electron donor and acceptor moieties might reveal an effect on the charge separation and charge recombination dynamics of this analog, which can be conveniently induced by excitation of the porphyrin components. The long distance between the electron donor and electron acceptor prevents the electron transfer process from occurring through space. I have completed and characterized the macrocycle of this compound using 1H NMR and MALDI-TOF mass spectrometry. I have begun synthesis of the thread. The aim of this research is to maximize the charge-separation lifetime and verify possible applications of this class of compounds in photovoltaic cells that convert solar light into electrical energy.

**Emotion’s Effect on Relational Binding**

*Louis Tur, Psychology*

*Sponsor: Dr. Lila Davachi, Psychology*

Negative emotion modulates memory for events such that details central to the memory are enhanced whereas peripheral details are more easily forgotten (compared to neutral events). Research on relational binding suggests that binding is impaired for negative scenes; there is evidence, however, that thematic encoding of negative scenes may improve relational binding. In our current work, we had participants view neutral scenes in which either a negative or neutral object was embedded (object-scene pair). Participants were instructed to describe the scene in a manner which incorporated all aspects of that scene. At test, we presented participants with both objects outside of their scenes and scenes without embedded objects; we then asked them to make a same/similar/new discrimination. After each recognition trial, half of the participants (binding group) went on to perform a relational binding task, where they were asked to select the correct matching item to the scene-object pair. For the object recognition task we expect results consistent with prior work as described above. For the relational binding task, due to the thematic encoding strategy we expect that correct recognition performance will be better for negative scenes as compared to neutral scenes.

**Direct-to-Consumer Advertising and Informed Patients**

*Weicheng Wang, Undeclared Major*

*Sponsor: Dr. David Scicchitano, Biology*

Direct-to-consumer advertising (DTCA) of prescription drugs is extremely prevalent in the United States today, despite the fact that the United States and New Zealand are the only countries that have legalized it. It is widely promoted by drug companies, which spend huge sums of money to advertise to the public and use all sorts of media, including television, radio, and magazines. How has such advertising affected both consumers and prescribing doctors, and what actions should the FDA take to regulate DTCA? I find that DTCA raises consumer demand for drugs; the drug commercials, however, often present an overly positive view of the drug and hide the risks. Many doctors feel that patients are not sufficiently informed about the drugs they see advertised. In addition, the FDA’s regulation of DTCA is currently loose, and the FDA often finds problems with advertisements only after their release. I recommend that the FDA more strictly control DTCA and screen commercials for unfair skewing of risks and benefits pre-release.

**Targeting BCL6-SMRT Interaction with Cyclic Peptidomimetics**

*Michael R. Witten, Chemistry*

*Sponsor: Dr. Paramjit S. Arora, Chemistry*

Genetic mutation of the B Cell Lymphoma 6 (BCL6) transcriptional repressor has been implicated in several forms of lymphoma. It is believed that a specific BCL6 mutation results in overexpression of this repressor protein. BCL6 functions by recruitment of a corepressor, silencing mediator of retinoid and thyroid receptor protein
(SMRT), through its bric-à-brac tramtrack broad complex (BTB) domain. The BCL-6-SMRT complex silences genes necessary for cell differentiation, cell cycle, and programmed cell death. The result of such silencing is tumor formation. Two regions of SMRT have been identified as critical for BTB binding—a β-strand and a wide turn. We are designing and have begun to synthesize a small library of short peptidomimetics to mimic the essential five-residue turn region of SMRT. These macrocycles have been designed based on backbone geometry and amino acid sequence, to try to preserve the shape and activity of the wide turn region. They are synthesized by standardized solid-phase methods and are closed, alternatively, with either ring-closing metathesis or 1,3-dipolar cycloaddition triazole formation reactions. Cyclic peptidomimetics represent a promising avenue for such clinical research because they are stable to proteases. Their constrained conformations are favorable for biomolecular recognition and reduce entropy loss upon binding.

**Neuronal Protein Phosphatase 2A (PP2A) Regulation via Removal of FKBP12 Inhibition of Mammalian Target of Rapamycin (mTOR)**

Helen Wong, Neural Science
Sponsors: Dr. Eric Klann and Dr. Charles A. Hoeffer, Neural Science

Long-term memory and synaptic plasticity involve the activation of mTOR kinase, leading to translation initiation and protein synthesis. Increased activation of the mTOR signaling pathway suppresses PP2A, but it is not known if mTOR directly modulates PP2A activity. Because PP2A is known to dephosphorylate mTOR substrates, understanding its mTOR-dependent regulation is important for studies of protein synthesis-dependent plasticity and memory. To characterize the interaction between PP2A and mTOR, I analyzed brain tissue from conditional FKBP12 knockout mice. FK506 binding protein 12 (FKBP12) acts as the intracellular receptor for the immunosuppressants FK506 and rapamycin, and it inhibits mTOR when bound to rapamycin. Recent work has shown that removing FKBP12 enhances mTOR activity and phosphorylation of some but not all mTOR targets. I investigated the effects of FKBP12 removal on PP2A activity. I used immunohistochemical blotting to examine PP2A phosphorylation and functional assays to measure PP2A phosphatase activity directly. I also performed immunoprecipitation studies to determine if PP2A normally binds mTOR and how this binding is altered following electrophysiological stimulation. I found that PP2A phosphorylation is up-regulated in FKBP12 mutants, which both results in a decrease of its enzymatic activity and reinforces the enhanced synaptic potentiation and kinase activity previously observed in these mice.

**Tat-E1B-19K: A Potent Inhibitor of Apoptosis**

Jithin Yohannan, Chemistry
Dr. Harald Sauthoff, NYU Langone Medical Center

Apoptosis, or programmed cell death, plays a crucial role in the development of a plethora of diseases. Myocardial infarction (Rodriguez et al., 2002) and stroke (Graham and Chen, 2001) have both been connected with massive apoptotic cell death. It has been suggested that the viral E1B19KD protein is a potent inhibitor of apoptosis (White, Cipriani, Sabbatani, and Denton, 1991); E1B19KD cannot, however, be delivered efficiently and safely into mammalian cells. In general, proteins such as E1B19KD are unable to pass freely through cell membranes because of their large size and charge. In recent years, a new technology, based on the HIV-1 transcriptional activator protein (Tat), has been used to deliver cargo proteins across eukaryotic cell membranes (Frankel and Pabo, 1988).

In this study I created a Tat-E1B19K fusion protein by cloning the E1B19K gene into the pTat-2.1 plasmid. This plasmid was transformed into BL21 bacteria which were induced to produce Tat-E1B-19K. I purified this protein (which contains a 6x HisTag) in a denatured form using Ni-NTA chromatography. The protein was rapidly refolded as urea and salt were removed using ion-exchange and desalting columns. I verified the presence of the protein using western blot analysis and determined the protein concentration using coomassie blue analysis. I gave 400nm to 1uM of Tat-E1B19K to 1299 cells treated with 50uM cisplatin. Caspase-3 sensitive apoptosis assays revealed that apoptosis in cells treated with Tat-E1B-19K decreased approximately 25 to 50 percent in a concentration-dependant manner. My results suggest that Tat-E1b-19K may serve as a potent inhibitor of the apoptotic effects associated with some diseases.

**The Evolution of Bicoid**

Na-Eun C. Yoo, Biology
Sponsor: Dr. Stephen J. Small, Biology

The homeodomain protein Bicoid establishes the anterior part of the *Drosophila melanogaster* body plan by activating a series of target genes. Specific binding of Bicoid to its target genes requires two amino acids in the homeodomain: a lysine at position 50 and an arginine at position 54. Bicoid, however, is missing in most other
insects, which use several other proteins for anterior patterning. It has been proposed that bicoid evolved from a duplication of a nearby gene called zerknullt (zen). Zen also contains a homeodomain but differs in the two aforementioned positions. It is possible that Zen could bind and activate genes involved in anterior development if these two amino acids were replaced by those present in Bicoid. To test this hypothesis, I performed several rescue experiments to see if deliberately mutated forms of Zen with homeodomains that more closely resemble Bicoid’s are capable of rescuing a bicoid mutant. I found that although an unaltered zen cannot rescue any anterior structures, zen with a single amino acid change to K50 is able to rescue thoracic segments by activating hunchback, giant, and a stripe of eve. Furthermore, zen with bicoid’s homeodomain swapped in is able to rescue partial head structures. This suggests that the process by which bicoid evolved into this morphogen in flies is partially explained by the K50 amino acid change in the homeodomain.

**Stem Cell Biology and Cancer: Hh-Signaling in Mouse Prostate Development**

*Sarwar Zahid, Biology
Sponsor: Dr. Alexandra L. Joyner, NYU Langone Medical Center*

The mouse prostate is a unique organ for studying various aspects of mammalian development, stem cell biology, and cancer. Shh is a secreted signaling molecule that plays roles in each of these processes. During prostate development, in particular, research has revealed Shh-signaling to be a potent regulator of growth and differentiation. Using the Genetic Inducible Fate Mapping (GIFM) technique developed in the Joyner Lab, we have studied Shh-signaling in the prostate during development and in adulthood. This technique allows genetic marking of cells expressing a specific gene of interest during a short time interval. Once marked, the fate of these cells can be followed over time and studied at experimental time points. This approach has allowed us to show that cells expressing Shh during development contribute to the adult prostate epithelium, while cells responding to Shh-signaling developmentally contribute to the stromal compartment. Further fate mapping and expression analysis experiments have allowed us to demonstrate that stromal cells also respond to Hh-signaling in the regenerating and homeostatic adult prostate. Finally, as various groups have reported Hh overexpression in certain prostate cancers, we aim to explore the implicated role of Hh-signaling in prostate tumorigenesis. By combining a well-established mouse model of prostate cancer (TRAMP mice) with our transgenic reporter for positive Hh-signaling (Gli1-LacZ+/- mice), we hope to analyze Hh-signaling through various stages of cancer.

**Elucidating the Effects of Missense Mutations in the Tafazzin Gene: Implications for Barth Syndrome**

*Shali Zhang, Biology
Sponsor: Dr. Mindong Ren, NYU Langone Medical Center*

Mutations in the human tafazzin (TAZ) gene cause Barth Syndrome (BTHS), an X-linked disorder whose symptoms include cardio-skeletal myopathy, neutropenia, and growth retardation. Laboratory findings of Barth patients also show abnormal mitochondria and a decrease in cardiolipin, a mitochondria-specific phospholipid that is crucial for mitochondria function. Tafazzin (Taz) is a mitochondrial integral membrane protein that catalyzes cardiolipin metabolism. About 40 different missense mutations in the TAZ gene, producing single amino acid changes, have been identified in BTHS patients. I tried to determine how single point mutations may generate BTHS.

I first investigated the subcellular localization of all of the missense mutations in human TAZ. Specifically, I transfected HeLa cell cultures with plasmids encoding mutant tafazzins and used immunofluorescence confocal microscopy to determine TAZ localization. Then, I performed subcellular fractionation experiments on transfected 293T cells to assess membrane association. My results reveal that several missense mutations alter correct localization, but the majority of the mutations did not affect targeting to the mitochondria. I did find one missense mutation with very low expression of mutant TAZ. This greatly reduced expression is probably the result of a change in mutant TAZ stability. Additionally, I tested membrane association with the mitochondria of all the mutant proteins, and my findings indicate they are all still membrane bound. These results reveal that mislocalization or rapid degradation of TAZ may underlay the pathogenesis of Barth Syndrome. I have begun to explore the possibility of using enzyme replacement therapy to deliver biochemically active tafazzins to the mitochondria.

**Visualization of Actin and Tubulin in the Caenorhabditis elegans Male Tail Tip**

*Elina Zhou, Biology
Sponsors: Dr. David Fitch, Biology*

The cytoskeleton is a cellular scaffold present in all cells and is a dynamic structure that enables cellular
movement. *Caenorhabditis elegans* males undergo a sex-specific morphogenesis when the tail tip retracts from a pointed form to a rounded form as the worm transitions from its last larval (L4) stage to adulthood. Prior work has involved the reconstruction of changes in cellular architecture and intercellular associations; however, the cytoskeletal mechanisms that possibly facilitate cellular movements during tail tip formation are not known. To study the dynamics of actin and tubulin in the *C. elegans* male tail tip, I performed antibody staining on mixed stage males. Results were inconclusive due to ambiguity between specific and non-specific fluorescence which did not allow me to view the dynamics *in vivo* over time. To address these issues in future research, I plan to make constructs where actin and tubulin are tagged with green fluorescent protein (GFP) and are driven by the *lin-44* promoter to get tail tip-specific expression. This will allow me to understand how these two cytoskeletal filaments are involved in controlling the cellular mechanisms that support morphogenesis of the *C. elegans* male tail tip and will further divulge how changes in cell shape and structure occur in general.