ABSTRACTS (alphabetical order)

Danilo Acosta '08
Pamela Baker, Biological Chemistry
A Comparison of the Osteoinductive Effects of the Clinically Approved Bone Morphogenetic Proteins (BMPs)-2 and 7 to Other BMPs
The discovery of the physiological roles of bone morphogenetic proteins (BMPs) as molecules with the capability of inducing bone and cartilage formation has generated a great interest in the orthopedic and trauma medicine fields for over two decades. The production of recombinant BMP-2 and BMP-7 enabled these molecules to be used clinically. Currently, BMP-2 and BMP-7 are the only BMPs that have been approved for various procedures including spinal fusion, grafting surgeries where the BMP is used in conjunction with a graft or as a graft substitute and repair of bone fracture nonunions. Also, these BMPs have been determined to have potential beneficial effects in maxillofacial surgeries and in treatment of osteoporosis and periodontal disease, among others. However, it has been proposed that other BMPs, such as BMP-4, BMP-6, and BMP-9 act at a similar cell stage as BMP-2 and BMP-7 and have been determined to have potent in vivo osteoinduction properties in animal trials. By reviewing five studies that compare the osteogenic activities of the approved BMPs, as well as the BMPs of interest in vivo and in vitro, and also by evaluating the current literature on BMPs, this project attempted to determine the reasons why only BMP-2 and BMP-7 are approved, while others are not. I have concluded that even though some BMPs may display superior in vivo results than BMP-2 and BMP-7, the research on the approved BMPs is currently more advanced than the research on BMP-4, BMP-6, and BMP-9, so it might be just a matter of time before BMP-4, -6, and -9 begin to be tested in clinical trials and may potentially be approved for orthopedic and traumatological use. BMP-4, -6, and -9 seem to be promising osteoinductive molecules for clinical use, but before any conclusions are made on their osteoinductive effects in humans, clinical trials need to be done to evaluate their effectiveness and safety in humans.

Karen Alexander '08
Hillel Soifer, Politics
Pacts and Polarization: The Nicaraguan Political Party System
This thesis sought to measure the effectiveness of the political party system in Nicaragua, especially following the reelection of Sandinista leader, Daniel Ortega. In order to do so, I used four criteria proposed by Scott Mainwaring and Timothy R. Scully to ascertain the level of institutionalization of political party systems. Their characteristics are stable interparty competition, solid roots in society, a belief in democratic elections as the primary route to governance, and strong interparty organization.

Christine Arsnow '08
Nancy Kleckner, Neuroscience
Evaluating the Dose and Voltage Dependent Effects of the Herbal Antiepileptic Huperzine A at Different Subunits of the NMDA Receptor
N-methyl D-aspartate (NMDA) receptors are ionotropic glutamate receptors that contribute to excitatory neurotransmission throughout the central nervous system. The NMDA receptor is composed of two types of subunits, an NR1 and NR2, which form a nonselective cation channel. NR2 subunits are further subdivided into types NR2A-D, each of which imparts subtle functional differences to receptors. Hyperactivity of NMDA receptors causes neurological disorders such as stroke and epilepsy. As a result, NMDA receptor inhibitors are often used to prevent excitotoxicity arising from these conditions. Huperzine A, an alkaloid isolated from Chinese club moss *Huperzia serrata*, is a centuries-old herbal cure for epilepsy. Research has revealed that HupA exerts its antiepileptic effects by blocking the NMDA receptor via an unspecified mechanism. Evidence for binding activity similar to polyamines, MK-801 and PCP exists, but is not definitive. The current experiment uses various receptor subunits expressed in *Xenopus laevis* oocytes to investigate the subunit specificity and mechanism of action of HupA. This knowledge will help predict the side effects and pharmacological interactions of HupA, and thus provide information relevant to its therapeutic use.

Dylan Atchley '08
Ryan Bavis, Biology
The Effects of Hypoxia and Hypercapnia on Body Temperature and Metabolism in Birds
Birds and mammals exhibit both lower body temperatures (hypothermia) and lower metabolic rates (hypometabolism) during acute hypoxia (low O_2), but the time course and magnitude of these re-

sponses, particularly as ambient temperature changes, are poorly described in birds. The purpose of this thesis was to explore these factors in the Japanese quail. Exposure to 9% O_2 for 60 minutes was sufficient to significantly lower both body temperature and metabolic rate. Exposure to chronic hypoxia (1 week @ 10% O_2) significantly reduced the drop in body temperature. As expected, metabolic rate increases at lower ambient temperatures (i.e., metabolic rate increases to maintain body temperature), however the lower critical temperature for this response appears shifted to a lower ambient temperature during hypoxia. In contrast to hypoxia, hypercapnia (3-9% CO_2) had no effect on metabolic rate, although body temperature was reduced at the level of highest CO_2 tested (9%).This effect is most likely due to evaporative cooling associated with heavy panting. Preliminary analysis suggests that contrary to previous literature the drop in body temperature is not solely a result of the drop in metabolic rate.

Rae Bacharach '08
Susan Langdon, Psychology
Coping Strategies Relate to Quality of Life in Patients with Inflammatory Bowel Disease
Inflammatory bowel disease (IBD) is a chronic gastroenterological disease with no known cause or cure. Previous research has shown a correlation between coping strategies and quality of life in a wide variety of chronic diseases, but little work has looked systematically at the variety and effectiveness of coping strategies used by people with IBD. The present study examines how people cope with this condition and how this relates to their quality of life. An online questionnaire, completed by 78 individuals with IBD, revealed that participants use a variety of coping strategies, primarily those appraised as effective. Infrequent use of avoidant/emotion-focused coping strategies (e.g., denial) and moderate use of approach/problem-focused coping strategies (e.g., future planning) were correlated with higher ratings of quality of life. Qualitative data were collected through telephone interviews and revealed interesting themes. This study suggests that healthcare providers should advise patients on appropriate strategies for coping with IBD.

Molly Balentine '08
Lee Abrahamsen, Biology
Effects of Platelet-Derived Growth Factor on Cytomegalovirus Replication in Cultured Human Aortic Endothelial Cells
Atherosclerosis is a complex disease associated with lipid buildup in the lining of the blood vessels that can develop into heart disease. Along with other health risks, viruses, including human cytomegalovirus (CMV) have been implicated with the pathogenesis of atherosclerosis. The purpose of my study is to investigate whether platelet-derived growth factor (PDGF) has an effect on the replication of CMV in aortic endothelial cells. PDGF is responsible for wound healing, cellular differentiation, and proliferation and migration of smooth muscle cells. PDGF is also involved in the pathogenesis of atherosclerosis, although its mechanism remains unclear. Infected cells will be exposed to several concentrations of PDGF and a standard plaque assay will be performed to determine whether viral replication is changed in treated cultures compared with controls. By examining the interactions between CMV and PDGF we can better understand the mechanisms involved with the development of atherosclerosis.

Nicholas Bauer '08
Paula Schlax, Biological Chemistry
Examining the Interactions* of E. coli *Ribosomal Protein S1 with* rpoS *mRNA, DsrA, and RNA Polymerase
Ribosomal protein S1 is the largest protein in the *Escherichia coli* ribosome and has two RNA binding sites. S1 specifically binds to both rpoS mRNA, the transcript for the general stress response regulator σS, and DsrA, a noncoding RNA upregulator of rpoS translation, and S1 may also interact with RNA polymerase. RNA binding was examined by electrophoretic mobility shift assays (EMSA), filter binding assays, and fluorescent quenching (natural tryptophan and pyrene fluor). RNA polymerase interaction was examined using FeBABE conjugation. EMSA is a good method for demonstrating equilibrium binding, but is of limited use for kinetics. Nitrocellulose filter binding assays were not reliable due to problems with adsorption of S1 to the membranes. Natural tryptophan fluorescence was unusable because the signal was too weak. The pyrene fluor was not usable due to S1 aggregation problems and inhibition of RNA binding. Finally, work on FeBABE is ongoing as of the submission of this abstract.

Maura Beatty '08
Helen Boucher, Psychology
Acknowledging and Expressing Emotions: Can It Account for the Effect of Mortality Salience on Cultural Worldview Endorsement?
Cognitive dissonance theory and terror management theory describe defense mechanisms that people use as protection against aversive emotions. Research has shown that use of defense mechanisms (attitude change to resolve tension sparked by counter-attitudinal behavior) can be eliminated by acknowledging the feelings of tension that result from counter-attitudinal behavior. The current study will test the hypothesis that acknowledging feelings of tension that stem from thoughts of one's mortality will eliminate use of a defense mechanism (heightened endorsement of cultural worldviews). Participants will be induced with mortality salience; some participants will be encouraged to acknowledge the emotions that thoughts of their inevitable death arouse in them. Cultural worldview will be assessed with measures that determine preference for stereotype-consistent targets, in-group targets, and religiosity. It is predicted that acknowledging tension will eliminate the effect of increased cultural worldview endorsement. These findings would suggest the importance of acknowledging emotions.

Anthony Begon '08
Mark Kessler, Politics
Looking to Courts for Positive Change
Looking at the legal system in the United States and the history of how rights have affected African Americans, I investigate whether the process of litigation and judicial decision-making has the ability to influence positive social change. Examining the critique of rights through the lens of critical legal studies and critical race theory, I consider whether the concept of the "myth of rights" contributes to perpetuating a democratic hegemony or actually has the ability to politically mobilize and empower social movements.

Katherine Bernier '11
Sylvia Federico, English
Arthurian Love Dynamics
While many believe that Lancelot is a strong valiant knight, one must consider what drives his actions. Two Arthurian ideas are vividly depicted in Sir Thomas Malory's *Arthurian Romances* and Chrétien de Troyes' *Le Morte D'Arthur*. Courtly love and chivalry prevent Lancelot from living a balanced life. Lancelot is constantly breaking the rules of one for the other. Anytime he does something for Guinevere out of love, he is committing treason against his king, and every time he obliges the rules of chivalry for a damsel in distress, he is side tracked from Guinevere. Lancelot may have power over other knights in this classic legend, but Guinevere and the numerous other damsels he encounters rule his actions and ultimately bring his downfall.

Aaron Bobik '09
Gerald Bigelow, Environmental Studies
An Interdisciplinary Study of Lifeways in the Shetland Islands: 1600-1800
The earliest useful historical records of socioeconomic activity in the Shetland Islands, Britain's northernmost county, date from the seventeenth century. Scholars have analyzed written records in agriculture, fishing, trading, consumption habits, and social interaction, but important aspects of Shetland life are undocumented. Recent archaeological excavations of several sites may shed light on historically ambiguous subjects. Work by the Shetland Islands Climate and Settlement Project on the lost township of Broo, including work by the 2006 Shetland Islands field archeology Short Term unit, has brought to light material evidence of seventeenth-century economy, farm architecture, and challenges presented by climate changes brought on by the Little Ice Age. This independent study assembles and utilizes information from primary and secondary historical sources paired with archaeological evidence to reconstruct important aspects of Shetlandic culture during a time of great transition from the medieval to the early modern periods.

Erin Bonney '09
Karen Melvin, History
The Legacy of the* Desaparecidos *in Argentina
This research examines the role that victims of political kidnappings (*los desaparecidos*) during the 1970s still have in Argentine society; the role that Madres de Plaza de Mayo, a human rights group

founded by the mothers of the desaparecidos, played in forming the social collective memory of the desaparecidos; and what their own place is in Argentina today. Sources include interviews, examinations of public spaces in Buenos Aires, literature written about the victims and those who protested the kidnappings, and visual images used to depict or represent both groups.

Daphne Braden '09
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Mapping Camp Glen Brook
This GIS project studies Camp Glen Brook in Marlborough, NH. The property has been a working farm since 1776 and a summer camp since 1946. The Waldorf School of Garden City, NY, currently owns the camp. I mapped the boundaries of the 250 acres that the camp owns and made a series of maps showing important characteristics of the property. These maps include the location and layout of the property, the topography and surficial geology, soil types and land cover (forest, water, agricultural fields, buildings). This information will be useful to the camp in future planning for placement of new buildings and the redesign of gardens and agricultural fields.

Jonathan Browher '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Mapping Demographic Change in New Hampshire
The state of New Hampshire is currently going through a period of unprecedented growth and change. Native New Hampshire residents often remark to one another that their state is undergoing an "invasion" by so-called "flatlanders" from southern New England. Using powerful ArcGIS mapping software, I apply census data and other database information to spatially represent the political, demographic, and economic changes facing the state of New Hampshire.

Jonathan Browher '08, John Murphy '08, and **Keegan Runnals '11**
Beverly Johnson, Geology
A Study of Beach Erosion at Popham Beach, Phippsburg, ME
In the fall of 2007, students in Global Change (GEO 109) conducted a study of erosion at Popham Beach in Phippsburg, ME. Using handheld GPS receivers, waypoints were taken every few meters as students walked along the shoreline at mid-tide in September 2007. Later, at the Bates College Imaging and Computing Center, students superimposed GPS data on 2001 GIS aerial photographs to illustrate changes to the beach between 2001 and 2007. Earlier aerial photographs were also used to observe previous changes such as the movement of the Morse River. The significant erosion observed between 2001 and 2007 resulted in a considerable northward shift in shoreline. Approximately 50,000 m^2 of the vegetated dune were lost and the shape of the beach was altered. This erosion seems to be a result of the north and eastward migration of the Morse River, exascerbated by storm surges during the six-year period. Sea-level change was ruled out as a significant cause due to dissimilar amounts of erosion observed on the western and eastern sides of the beach.

Beth Brown '08
Alexandre Dauge-Roth, French
La Francafrique
My thesis research began during my semester abroad in Paris, when I studied Franco-African relations. My thesis focuses on the development of *la Francafrique*, a neocolonial system established by the French government under President Charles de Gaulle to maintain French control over its former colonies in Africa during the period of decolonization. My aim is to develop a better understanding of the relationship between the justifications presented by the French government to the international community about certain neocolonial actions in Africa and the reality of the consequences of this behavior. I found that the effects of this neocolonial system continue to exist today and are manifest in the social and political instability that persists in many African countries, despite the French claims that the policies of *la Francafrique* were carried out with benevolent intent. Looking to the future, it is important to first reflect on the past honestly--which has not yet happened in many cases--and when developing proactive steps, allow for an amelioration in the state of many of these countries, as well as in Franco-African relations.

Laura Burns '08, Winthrop Rodgers '09, and Qinglan Wang '10
Robert Farnsworth, English
Poetry Reading and Discussion
Laura Burns '08, Winthrop Rodgers '09, and Qinglan Wang '10 share their poetry. Qinglan and Winthrop share their works written in ENG 392 (Advanced Poetry Writing). Laura presents a selection from her creative writing thesis. The three poets discuss their work following the reading.

Gina Capalbo '08
Nancy Koven, Neuroscience
Orbitofrontal Correlates of Impulsivity and Goal-Directed Behavior in Bipolar I and Schizophrenia
Differential diagnosis between bipolar I (BPD) and schizophrenia (SZ) has always been a problem in the field of psychology. Both disorders have been associated with structural and functional abnormalities of the orbitofrontal cortex (OFC). The objective of this study is to measure volumetric differences of OFC between BDP and SZ patients and identify relationships between volumetry and neuropsychological performance. Structural MRI data were obtained via manual tracing on SPGR images (124 1-mm slices acquired on a GE 1.5T scanner) in 3-D slicer; neuropsychological data on the same patients were also collected. Relative to control patients, both female bipolar I and schizophrenia subjects are predicted to have an increase in the left OFC, while male bipolar I and schizophrenia subjects are predicted to have a decrease in the right OFC. Neuropsychological data show that both BPD and SZ patients performed worse than controls on tests that evaluated impulsivity and goal-directed behavior. These data may demonstrate new diagnostic criteria for differentiating BPD and SZ.

Jared Cassin '08
John Kelsey, Neuroscience
The Opioid Receptor Antagonist, Naltrexone, Enhances the Therapeutic Effect of L-DOPA in the 6-OHDA Rat Model of Parkinson's Disease, but Does Not Affect L-DOPA-Induced Dyskinesia
While levodopa (L-DOPA) is currently the most effective therapy for Parkinson's disease (PD), it is also associated with the development of L-DOPA-induced dyskinesia (LID), a debilitating side effect that appears in up to 80% of PD patients within 5 years of L-DOPA treatment. Because endogenous opioids, particularly dynorphin, upregulate in response to L-DOPA in striatal output neurons underlying PD, much research has focused on the role of endogenous opioids in PD and LID. I chose to investigate the effects of the nonspecific opioid receptor antagonist, naltrexone (1, 4, and 10 mg/kg), and the specific kappa opioid receptor agonist, U50,488 (0.5, 1, and 2 mg/kg), on both the therapeutic (antiparkinsonian) effect of L-DOPA and LID using the 6-OHDA rat model of PD. Thus far, naltrexone has dose-dependently enhanced the therapeutic effect of 35 mg/kg L-DOPA on forepaw stepping, but has not affected LID.

Carlos Castro '10
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Tectonic Faults in New Zealand
This project explores active tectonic faults in the northern New Zealand island using ArcGIS computer software. These data allow us to develop earthquake hazard maps for a region prone to such natural disasters. I traced the active fault line through satellite images, developed a buffer hazard for these faults, and correlated the number of active fault lines with the current population in New Zealand. Final maps include the New Zealand active fault lines along with their respective hazard potentials.

Besir Ceka '08, Arta Osmanaj '09, and **Miljan Zecevic '10**
Dennis Browne, Russian
Kosovo's Future
On Sunday, 17 February 2008, the former Serbian province of Kosovo unilaterally declared its independence. The United States, the United Kingdom, France, Germany, and Italy rushed to recognize an independent Kosova. Russia, Greece, China, Indonesia, and Spain moved just as quickly to label the declaration illegal. The European Union struggled to issue a statement its members could accept, eventually removing reference to Kosovo as "an independent state" and settling on wording acceptable to Spain that "[M]ember states will decide, in accordance with national practice and international law, on their relations with Kosovo." As a senior political advisor of Kosovo said, independence "…will not be the ideal our leaders had in mind. Sometimes reality defeats you." In this panel,

students from Kosova, Macedonia, and Montenegro offer their views on this new "reality" in the Balkans: what it means in global terms, what it means for Europe, and most importantly, what it means for the people of Kosovo.

Ariel Childs '08, Alexandra Conroy '08, Margaret Gross '09, Susan Hawes '08, and **Justina Kaminskaite '10**
Anna Bartel, Harward Center for Community Partnerships
Community-Based Research Panel
What is community-based research? Why it is important? How does community-based research differ from traditional research? This panel addresses these questions by focusing on several students' experiences as community-based research fellows. A question-and-answer session follows their remarks.

Brittany Clement '08
John Kelsey, Neuroscience
Propranolol Does Not Interfere with the Reconsolidation of a Cocaine-induced Taste Aversion to Saccharin
While memories are assumed to undergo an initial consolidation process, at least some memories may also undergo an additional reconsolidation process after they have been reactivated (Nader, Schafe, & Le Doux, 2000). Understanding how to interfere with this reconsolidation may have therapeutic benefits, including eliminating drug-cue memories that lead drug addicts to relapse into drug taking. The current study investigated whether a taste-drug memory undergoes a process of reconsolidation. Rats initially developed an aversion to the taste of saccharin after six pairings with cocaine. One day after conditioning, rats were reexposed to saccharin without a cocaine injection to reactivate the taste-drug memory, and propranolol (a drug shown to interfere with the reconsolidation of other memories) or saline was administered. The following day, the strength of the taste-drug memory was assessed by measuring if the rats were still reluctant to drink saccharin. Rats given propranolol following reactivation drank the same amount of saccharin on the subsequent test days as rats injected with saline, suggesting that propranolol did not interfere with the reconsolidation of the saccharin-cocaine memory. Further research using a modified paradigm will be required to determine if a taste-drug memory can undergo reconsolidation.

Catherine Cluett '08
Mary Rice-DeFosse, French
French Language and Culture Re-acquisition in Lewiston-Auburn
My senior thesis in French examines the social and generational aspects of language and culture re-acquisition in the Lewiston area. In cooperation with the directors of Museum L/A and the Franco-American Heritage Center, I interviewed members of the Franco-American community from both younger and older generations. I studied changes and trends of embracing language and heritage, investigating attitudes about past and present in relation to how language shapes community.

Maayan Cohen '10
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Wind Power in Maine
Using GIS, I have mapped possible sites in Maine where wind turbines or wind farms could be used to produce energy. The map shows view sheds and the approximate energy output for the wind turbines. The map will be a useful tool for those who are considering the use of wind turbines as a renewable energy source.

Meghan Conley '08
Michael Sargent, Psychology
Moderation of the Distinction Bias: Does Being a Maximizer or a Satisficer Impact Satisfaction with Decision-Making?
When presented with multiple options, decision-makers fail to choose the option that makes them happiest, because choosing between options leads people to scrutinize certain factors, typically quantitative, as more important than other factors. These factors do not tend to make a difference when the option is evaluated alone. This mismatch is known as the distinction bias. The current study attempts to determine if being a maximizer or a satisficer moderates this effect. Approximately 120 undergraduate participants, aged 17-23, are assigned to either a separate-evaluation condition or a

joint-evaluation condition where they rate happiness of both a low- and high salaried job. Predicted findings include more exhibited distinction bias among maximizers in the joint-evaluation condition. Implications could explain why maximizers are overall less satisfied with their choice when the bias is moderated.

Kara Constantine '08
Matthew Côté, Chemistry
Careful Study of Tip-Enhanced Raman Spectroscopy (TERS) on Gold Coated Nanospheres
Recent scanning probe microscopy (SPM) advancements have increased our ability to study and manipulate objects on the nanoscale. While SPM is a viable way to measure the topography of samples with features smaller than the wavelengths of visible light, it lacks the chemical sensitivity of which spectroscopy is capable. Raman spectroscopy, on the other hand, allows the vibrational "fingerprint"of materials to be studied but it lacks the spatial resolution of SPM. Combining these two methods in the form of tip-enhanced raman spectroscopy (TERS) promises to combine the strengths of both techniques. The primary goal of this project is the development of a TERS instrument and the application of it to the study of arrays of nanostructures.

Meaghan Creedon '08
Georgia Nigro, Psychology
Understanding Identity Development: Individualization and Agency in Narratives of Emerging Adults
This study examined the identity development of emerging adults using two different approaches. Emerging adulthood is a developmental stage between ages 18 and 25 during which individuals explore their identities and roles in society. Emerging adults in Western industrialized societies who pursue post secondary education are largely untethered from the responsibilities typically associated with adulthood, such as marriage, parenting, and full-time work. They spend these years experimenting with different identities, exploring academic and career interests, developing relationships, traveling, and gaining life experiences. Theorists increasingly recognize emerging adulthood as the time during which the majority of identity work occurs. According to some theorists, identity development is made more difficult by the diminished availability of social and institutional support. For this reason, theorists propose that to successfully develop an identity, individuals must possess agency or a sense of drive, responsibility, and control over one's life course. In this study, I measured agency in emerging adults at Bates and other American universities through two measures. Participants responded to a questionnaire that measured agency and wrote a turning point story that was later coded for elements of agency. This study will provide information on the links between agency and identity formation in emerging adults.

Leeanne Cunningham '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: The Intersections of Race, Class, and Gender in the Democratic Presidential Race: Looking at the Participants in the Primary Elections of New York and Maine
Using ArcGIS, I have mapped the primary election results of New York and Maine focusing specifically on race, class, and gender. From this, I analyze, according to the composition of each group, the type of people that participated in the primary elections for the two running Democratic presidential candidates, Barack Obama and Hillary Clinton.

Peter Dennehy '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: The Effects of Road Salt on a Lake in New Hampshire
I examined the effects of road salt from major highways on two lakes in New Hampshire and compared those effects to a lake in the area that only receives natural salt inputs. I identified the natural salt inputs from the bedrock and the atmosphere into the two "pristine" lakes and subtracted those values from the total inputs observed in the salt-effected lake in order to find the true anthropogenic input into the lakes. By overlaying a bedrock geology map on the topographic maps for each lake, I calculated the surficial area of each rock type in all three watersheds. By using a formula for the weathering rate of each type of rock and determining each rock's elemental composition, an estimate of salt ions from each rock into the lake's watershed was made. I also used known salt aerosol deposition rates to determine that atmospheric input of salts per area of each watershed. From this information, the total amount of salt ions entering the pristine lake's watershed can be subtracted from the salt concentrations measured in each lake to determine the total amount of salt input from the highway.

Peter Dennehy '08
Michael Retelle, Geology
The Effects of Road Salt on Three White Mountain New Hampshire Lakes
My year-long limnology and hydrology thesis examined the effects of road salt on lakes in New Hampshire, focusing on two lakes that have a major New Hampshire highway in their watershed, Lily Pond and Ammonoosuc Lake. By comparing profiles of these two lakes to a third, Ammonoosuc Lake, which does not contain a major highway in its watershed, I am assessing the impact of highway deicing on natural lake cycles.

Michael Detweiler '08
Shepley Ross, Mathematics
Cryptology Decrypted
Cryptology, the study of secret messages, is very important in modern life. Transmitting secure information on the Internet is only possible because of the mathematics developed for modern cryptology. One of the most widely used Internet security systems is the RSA cryptosystem, which remains secure only because of the length of time required to mathematically break the encryption. This poster discusses both the number theory that enables the RSA cryptosystem, and the different techniques employed to break it. These methods, while using advanced number theory techniques, still cannot break modern RSA encryptions in a reasonable time. The laws of quantum mechanics, however, permit a more powerful computing architecture. While the security of our digital lives will be threatened by the first quantum computer, it remains unknown whether such a machine could ever be built.

Caitlin deWilde '08
Kirk Read, French
Coming of Age in the Francophone World: Sentimental and Academic Education
The untranslatable French word *formation* connotes both a formal education and a nuanced, psychological development. My work treats the *formation* of three protagonists in Francophone Vietnam, Mali, and Algeria, presented in fictional works. My approach to understanding immigrant *formation* in particular, highlights the stigma and difficulties attached to comprehending and shaping one's identity. I analyze the ever-changing nature of the *formation* and re-*formation* of the immigrant identity based upon the immigrant's acceptance, rejection, denial, and reconciliation of apparent and subtle influences.

Avalon Dibner '08
Stephanie Richards, Biological Chemistry
Ketogenic Treatment Causes a Heterogenetic Shift and Is a Potential Therapy for Pearson Bone Marrow Pancreas Syndrome
First discovered in 1979 by Pearson et al., Pearson marrow-pancreas syndrome (PS) is characterized as a multisystem mitochondrial cytopathy that occurs in early infancy (Rotig, et al. 1990). Initial symptoms are diverse and make diagnosis difficult. Common deletions of 4.9 kb results in the deletion of many essential tRNAs. This large-scale deletion in the mitochondrial genome is most prevalent in the peripheral blood DNA as well as other tissues. Symptomatic treatments exist for complications due to PS. However, no cure for PS exists and there are no direct treatments for the mtDNA of PS. Gene therapy is complicated because of the heteroplasmy of wild-type and mutant mitochondrial DNA found in the cells. However, a therapeutic approach known as gene shifting has been the most promising strategy to treat the mutation. Gene shifting can be accomplished in vitro by the ketogenic diet, which is a high ketone, low carbohydrate diet that mimics the state of starvation. In previous experiments, a intracellular and intercellular heteroplasmic shift has been observed. For my thesis, I would like to hypothesis why a heteroplasmic shift occurs and if the ketogenic diet is a potential therpy for PS.

Laura Director '08 and **Michael Henry '08**
Lee Abrahamsen, Biological Chemistry, and Pamela Baker, Biological Chemistry
The Clinical Application of an Autologous Platelet-Rich Plasma Gel in Total Knee Arthroplasty
As part of a nationwide multi-center study, total knee arthroplasties (TKA) were performed on patients at Central Maine Orthopedics by Dr. Wayne Moody and Dr. Jeff Bush using a novel surgical technique for improving wound healing and decreasing blood loss through the perioperative application of a plasma gel. Platelet gels are used therapeutically during total knee replacements in an

effort to improve the post-surgical wound healing process by stimulating clot formation, and initiating bone and other tissue regeneration. Tissue cultures were performed using human embryonic lung cells to determine the effect of varying growth factor concentrations on fibroblast proliferation. Variables of age and gender were examined as they have been shown to have an effect on wound healing. We are investigating the effects of these variables in PRP-treated patients and untreated controls. As wound healing capabilities are progressively impaired with age, it is predicted that platelet rich plasma will have a stronger effect in elderly patients. Additionally, it is predicted that due to the positive role of estrogen, women will have an improved wound healing process, which will increase with the application of PRP. Patients participating in the study are divided into two groups; a control group, and those receiving PRP. The patients receiving the PRP should have a holistic improved wound healing response measured by different variables over different time intervals ranging from 24 hrs to 6 weeks post-operation.

Theresa Dokus '10
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: United States Presidential Primary Election Results
GIS technology was used to map the United States presidential primary election results showing various aspects of the election in maps, graphs, and tables. Data tables of actual election results (from CNN.com) were placed in Arc tables. Maps of Maine, New York, and the United States show which candidates received the most votes and consider voter demographics (age, gender, race, and possibly economic status).

Andrew Drabek '08
Rachel Austin, Chemistry
Purification and Characterization of Omega-Alkane Hydroxylase
Alkane hydroxylase is a ubiquitous integral membrane non-heme diiron monooxygenase found in diverse hydrocarbon degrading microorganisms. AlkB is a NADH-dependent enzyme that adds one oxygen atom to various substrates, usually a terminal methyl group or alkene double bond. In this study, we expressed AlkB from Pseudomonas putida GPo1 under the control of the C7-12 n-alkane inducible PalkB promoter and modified a method utilized by May and Katopodis (1990) to partially purify a membrane fraction enriched in AlkB with oxygenation activity. Through analysis of the distribution of products from the oxidation of the diagnostic substrate bicyclo[4.1.0]heptane (norcarane) by the partially purified enzyme there is evidence for an "oxygen-rebound"mechanism and a substrate based radical. This method should shed light on possible differences in mechanism for AlkB partially purified in vitro versus in a cell free lysate or in vivo.

Kyle Dunmire '08
Ryan Bavis, Biology
Expression of Cell Cycle and Apoptotic Regulators in Neonatal and Adult Rats Following Hyperoxia
Development of the respiratory control system is influenced by external environmental cues. Rats that have been exposed to high levels of oxygen during perinatal development have a blunted hypoxic ventilatory response because of abnormal development of the carotid body. The exact cause for this is unknown, but previous studies have suggested it may involve decreased expression of genes regulating cell growth and death within the carotid body (CB), a group of chemosensor cells responsible for regulating breathing. This study focuses on the expression of these cell cycle and apoptotic regulators. Primer pairs were designed for the genes TGF-β, p53, p21, Bax, and Bcl-XL and optimized for quantitative PCR (qPCR) techniques through primer matrices and standard curves. qPCR was used to determine any differences in expression of the apoptotic genes Bax and Bcl-XL from CBs between adult rats that were exposed to either hyperoxia (60% O_2) or normoxia (21% O_2) for one week. All five genes of interest will also be tested for any expression level differences in RNA isolated from the CBs of neonatal rat pups raised in either hyperoxia or normoxia. CBs isolated from the adult rats indicated no significant difference in expression levels of the apoptotic genes, while research is still being conducted on the neonatal rats. This is in agreement with previous data which has shown no significant differences in the volume size in adult rats exposed to hyperoxia for one week as compared to rats in normoxia. It is hypothesized that significant expression level differences will be observed in the neonatal rats, since previous data shows a decline in CB volume of neonatal rats that are raised in hyperoxia for one week.

Elizabeth Elliott '08
Bonnie Shulman, Mathematics
Game Theory and the eBay Auction
Auctions have been used for centuries for the exchange of many commodities. The advent of the Internet has opened up the opportunity for online auction platforms such as the vastly popular eBay. The online auction site is classified as a California auction when all bids are sealed (known only to the person who places the bid) and the price paid by the winner is that of the second highest bid. The bidding is continuous up until the pre-set deadline and the posted price is always the second highest bid at the time. With these rules, what is the best strategy to win an object in the eBay environment? Should bidders bid their full value or rather shade their bids to gain added surplus? This poster investigates which type of auction is in the best interest of the seller. Game theory and the Revenue Equivalence Theorem are used to describe the optimal strategies for both players.

Karla Erickson '08
Rachel Austin, Chemistry
Mechanistic Inquiries into Metalloenzymes
Mechanistically informative chemical probes are used to characterize the activity of environmentally-important metalloenyzmes. ω-alkane hydroxylase (AlkB) oxidizes hydrocarbons and been studied with increasing interest as its integral role in the degradation of oil spills and naturally occurring alkanes is being understood. The chemical probe bicyclo[2.1.0]pentane is smaller in size and has a faster rearrangement rate than previously studied probes bicyclo[3.1.0]hexane and bicyclo[4.1.0] heptane. Results from the oxidation of this newly developed probe are reported with additional study into constraints via computational methods. The use of bicyclo[2.1.0]pentane provides important, if controversial, mechanistic information regarding the oxidation of hydrocarbons by AlkB, allowing for a deeper understanding of the oxygenation processes of these metalloenzymes.

Thomas Esponnette '11
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: The Average Slope Level of the Lake of the Ozarks in Missouri
The Lake of the Ozarks is a 92-mile-long manmade lake in Missouri with many tourist attractions and varied landscape. The shore of the lake features steep cliffs carved out by erosion. The slope tool was used to construct raster maps of the slopes of the lake, which help illustrate the average slopes of the area. Hill shade maps show the three dimensional surfaces of the lake and surrounding landscape.

Erin Faulder '08
Thomas Hayward, Classical and Medieval Studies
Reading Roman Women through the Rhetorical Invective
The study of Roman women from the Late Republican era suffers from the classical rhetorical invective against them. I examine how this attack worked by comparing Cicero's abuse of Clodia with Sallust's of Sempronia. By studying how their invectives work rhetorically and how Roman men viewed and portrayed women within the literary topos, further insights into their roles within the public and private spheres are possible.

Clara Finley '10, Henry Mastain '09, William Morse '09, and **Meghan Somers '09**
David Scobey, American Cultural Studies/History
Weaving a Millworkers' World: Building a Traveling Exhibition
Weaving a Millworker's World is a travelling exhibition created by a team of Bates students in cooperation with Museum L/A, a museum devoted to the history of the shoe- and textile-mill workers of Lewiston and Auburn. The exhibit focuses on the macro-trends of Lewiston-Auburn's economic history over the past 150 years, a story told in tandem with more personal stories extracted from mill worker's oral histories (also compiled by Bates students). This year, the Bates team will continue with the project by creating educational literature to accompany the exhibition on its upcoming tour.

First Year Seminar 334 Film Screening
Steven Dillon, English
Library Horror Movie
An homage to David Lynch and Jean-Luc Godard. A digital manipulation of light and dark. A dubious use of college space and resources. An analysis of gender relations. A Dionysian triumph of acting. An encyclopedia of screams, yells, and general hollering. The finest movie ever shot in 12

hours. Another lame excuse to gather in a dark room and stare off in a given direction. A collaborative project of FYS 334, Film Art.

Anne Fulton '08
Loring Danforth, Anthropology
Music and the Kurdish Question
Kurdish music is a valuable tool to gain an understanding of the social and political aspects of the Kurdish question in Turkey. Turkey has censored Kurdish music and language in the last century. Contemporary popular artists such as Aynur Dogan have been very active in promoting Kurdish rights in a highly nationalistic country through music.

Rachael Garreffi '08
Susan Langdon, Psychology
The Effects of Cognitive Dissonance Induction on the Implicit and Explicit Attitudes of Maladaptive Eaters
This two-part study examined the effects of a cognitive dissonance essay-writing task on the implicit and explicit eating attitudes of Bates College females. Participants first completed measures assessing eating attitudes, body image, and current behavior. At a later date, they were instructed to write a brief paragraph arguing against the thin ideal, and their eating attitudes were again assessed following this task. It was hypothesized that following the intervention, maladaptive eaters would exhibit significantly less body dissatisfaction, drive for thinness, and internalization of the thin ideal as well as an increased desire to change their current eating behavior. The results of this study will help clarify the implicit and explicit attitudes of maladaptive eaters and verify the effectiveness of cognitive dissonance approaches to the prevention of eating disorders.

Kerry Glavin '08
Pallavi Jayawant, Mathematics
Beyond Prim and Kruskal: An Algorithm for Minimum Spanning Trees
In a connected, weighted graph G, a minimum spanning tree T is a connected, acyclic subgraph of G with minimum total weight. The task of finding a minimum spanning tree in a given graph G represents an optimization problem. Prim's algorithm and Kruskal's algorithm are both unique, proven methods of finding minimum spanning trees. I present a new algorithm for finding minimum spanning trees and discuss the implementation and complexity of this algorithm.

Jason Godsell '08
Nancy Kleckner, Biology
MAPK Inhibition in BRAF(V600E) Mutant Cancer Cell Lines after Treatment with RAF-265 or PD325901
The mitogen-activated protein kinase pathway (MAPK) is a cell proliferation signal cascade that is frequently mutated in certain cancers. A single amino acid point mutation in the BRAF protein of the MAPK cascade is the cause for 60% of malignant melanomas and 22% of colorectal cancers. The recent development of BRAF inhibitors, specifically RAF-265, has provided a potentially more effective form of treatment for BRAF mutated cancers. In this study, the protein expression of BRAF mutant cell lines were analyzed after treatment with RAF-265 and compared to PD325901, a MEK inhibitor. Inhibitors of MEK, a downstream signal of BRAF, have proven to be effective at promoting apoptosis in $BRAF^{V600E}$ cancers. Growth curves were also preformed to identify apoptosis and the specificity of each drug. It was found that RAF-265 was less specific in targeting specific cancer mutations then PD325901 while never achieving a complete knockdown of the MAPK signal.

Kelly Gollogly '10
Christine McDowell, Theater
Restaurant Commerical Design
This presentation is the product of an independent study in aspects of industrial design that address aesthetics of contemporary commercial businesses. The class contained a hypothetical element that incorporated goals of the Lewiston-Auburn community of urban renewal on Lisbon Street. Through the design of the student's desired business, in this case an organic café/restaurant, the course went through the process of developing it into a functional and practical shop of operations. Elements developed in the form of design proposals included assessing and choosing real estate on Lisbon Street; renovations and modifications implemented on chosen space; aesthetics and ground plan layouts for the business; and storefront design for facade renovations.

Emily Grady '10
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Impacts of Climate Change Policies on Sea Level Rise: Popham Beach and Shanghai
I compare the potential repercussions of climate change legislation on the Maine Coast. I mapped the projected rise in sea level at Popham Beach State Park in the year 2100, depending on worldwide greenhouse gas emissions reductions of 80% below the 1990 levels by 2050. I then mapped the same region in 2100, modeling the impacts of zero emissions reductions. I made two maps of Shanghai, China, representing the same conditions. Accompanying text explains the images as well as the cultural and environmental implications of each circumstance. Finally, the status of local and global greenhouse gas emissions mitigation policies are addressed with regard to Popham Beach State Park and Shanghai.

Charlotte Green '11
Sylvia Federico, English
National Identities in Arthurian Legend
Geoffrey of Monmouth's *The History of the Kings of Britain* and Chrétien de Troyes' *Arthurian Romances* are two of the earliest texts on Arthurian legend. They are also two of the most different versions of the tale. The reasons for these differences are due to the vast dissimilarities of the lifestyles of the two authors. While Monmouth was living in an England recovering from the physical and mental defeat by William the Conqueror, Chrétien lived in France in luxury, with time to retaliate against Monmouth's blatant pro-English text.

Simon Griesbach '08
Pamela Baker, Biological Chemistry
Conditioning as a Means of Immunosuppression in the Treatment of Allergic Asthma
In 1985, Karen Olness and Robert Ader successfully treated a serious case of lupus erythematosus with a regimen that consisted of classical conditioning using low doses of an immunosuppressant drug called cyclophosphamide paired with distinct tastes and smells. Since that time, no one has performed similar procedures on humans, and the mechanism through which it worked is not well known. Because neurons within the body's organs can accurately detect infection and damage, the brain and central nervous system play a large role in coordinating and regulating immune responses to these threats. Scientists can use this pathway between the brain and immune system to bring about desired immune responses similarly to the way that the ringing of a bell caused Pavlov's dogs to salivate. It seems that this pathway could theoretically support similar conditioning with immunosuppressant drugs such as FK506 or Cyclosporin A in the treatment of asthma, another disease resulting from hypersensitive immune function. While conditioning treatment in this manner may be possible and effective, no human trials have commenced probably due to the moral implications of "tricking" the immune system and the high costs of administration required by such a procedure.

Kaitlin Hagan '08
Thomas Wenzel, Chemistry
Water-soluble Calix[4]resorcinarenes as Chiral NMR Solvating Agents
A series of hydroxylated prolinylmethyl derivatives of tetrasulfonated calix[4]resorcinarenes have been synthesized and their effectiveness as chiral NMR solvating agents for water-soluble aromatic-containing secondary amines examined. The aromatic substrates form host-guest complexes with the calix[4]resorcinarenes. The aromatic resonances of the substrates show large upfield shifts because of shielding from the aromatic rings of the calix[4]resorcinarenes. The H-1 NMR spectra of most substrates exhibit significant enantiomeric discrimination suitable for the determination of enantiomeric purity. The extent of enantiomeric discrimination depends on the interactions of the substrate with the proline moiety of the calix[4]resorcinarenes.

Emma Halas-O'Connor '09, Joshua Lake '09, Keating Pepper '08, and **Rebecca Wason '09**
David Scobey, American Cultural Studies/History
History Out of Doors: Creating a Street Exhibit
As part of an ongoing collaboration between the Harward Center for Community Partnerships, Bates students, and Museum L/A, a local museum focusing on Lewiston-Auburn's rich industrial, labor, and immigrant history, students created catalogue materials for a traveling exhibition about mill-workers' family, community, and work life in twentieth-century Lewiston.

Jeanette Hardy '08
William Ambrose, Biology
Implications for Climate Change in the Arctic Based on the Growth Rates of* Hiatella arctica *from the Western Barents Sea
Bivalve shells provide a record of environmental conditions during their life. In the Arctic, *Hiatella arctica* are long-lived (up to 100 years), making them ideal monitors of long-term environmental change. *Hiatella* were collected from 5 stations in the Barents Sea and annual growth lines measured. *Hiatella* growth was negatively correlated to maximum ice extent and precipitation and positively correlated to air temperature. On the Arctic side of the polar front, number of ice-free days, maximum ice extent, and North Atlantic Oscillation explained 45.2% of growth variation, while on the Atlantic side, precipitation, sea temperature, and number of ice-free days accounted for 41.5%. At a fjord site, precipitation and sea temperature accounted for 61.4% of variation. These results suggest that increased temperatures, and decreased ice cover, likely consequences of climate change in the Arctic, will impact benthic communities and result in increased growth of *Hiatella* and possibly other bivalves.

Owen Harris '08
John Kelsey, Neuroscience
CB1 Antagonist Rimonabant Improves Forepaw Stepping in Animal Model of Parkinson's Disease
Parkinson's disease (PD) is a neurodegenerative disease selectively attacking dopamine neurons in the basal ganglia. It has been shown that there is an upregulation of cannabinoid CB1 receptors in the basal ganglia in animal models of PD. If this increase in CB1 receptors contributes to PD, then drugs that block these receptors should decrease PD symptoms. I produced a rat model of PD by unilaterally injecting the dopamine neurotoxin, 6-OHDA into the basal ganglia. My results indicate that very low doses of Rimonabant, a selective CB1 receptor antagonist, improves forepaw stepping in these rats, a sensitive measure of PD. These results suggest that the increase in cannabinoid receptors contributes to PD and suggests novel therapies.

Victoria Haymes '08
Susan Langdon, Psychology
Exploring the Rise of HIV/AIDS in the Black Community by Examining the Relationship between Black Males' Risk for Incarceration and Risk for HIV
Sixty-five percent of HIV/AIDS cases in men in the United States are found among African Americans. With HIV/AIDS prevalence almost five times higher for incarcerated populations, media reports focus their attention on prisons as a major factor in spreading HIV within the black community. However, literature suggests that although black males are contracting HIV in prisons, the majority arrive at prison with the virus. These implications suggest there may be a relationship between behaviors that lead to incarceration and behaviors that lead to HIV/AIDS. To explore this relationship, one-on-one interviews were conducted with eight black male HIV positive former inmates, three HIV health educators from Philadelphia FIGHT, and three prison guards. The purpose of the study was to examine multiple perspectives of social factors related to HIV positive status in formerly incarcerated black men. Implications from results could be influential in creating effective HIV/AIDS intervention programs in the future.

Gregory Henkes '08
William Ambrose, Biology
***129 Years of Barents Sea Environmental Variation through Growth and Geochemical Evidence from Shells of the Greenland Cockle,* Serripes groenlandicus**
Long-lived bivalves can provide detailed oceanographic and environmental information from regions where instrumental records are brief and geographically sparse. I examined the growth rates, mineral ratios (Sr/Ca, Mg/Ca, Mn/Ca, Ba/Ca), and stable isotope ratios ($\delta^{18}O$, $\delta^{13}C$) from bivalve shells of the cockle, *Serripes groenlandicus*, collected from the Barents Sea. These shells provided evidence for local- and large-scale climate forcing and temperature, salinity, and hydrographic change over a period of 129 years (1878-2007). Growth patterns were cyclical at all sites and at some sites growth was negatively correlated with the North Atlantic Oscillation. All mineral ratios, except Ba/Ca, had maximum or minimum values associated with growth checks. Ba/Ca ratios peaked during the spring, and there were differences among sites, which suggest that barium shell proxies distinguish site-specific differences in coastal hydrography. Additional comparisons between ($\delta^{18}O$, $\delta^{13}C$), and other

mineral ratios elucidate oceanographic differences associated with accelerated climate change in the Arctic.

Erik Hood '08
Amy Douglass, Psychology
Perceptual Fluency: How Processing Ease Affects Eyewitness Confidence
Two experiments examined the effect of task difficulty on eyewitness behavior. In Experiment 1, participants saw a video of a culprit and then listed either three (an easy task) or 12 descriptive characteristics (a difficult task). Participants identified the culprit from a photospread not containing the culprit, and answered a questionnaire containing several testimony-relevant dependent measures. It was predicted that participants would display higher confidence after completing the easy task versus the difficult task. However, there was no difference between participants' reports in the two conditions. To test two explanations for these results, a second experiment was conducted. Results examine eyewitness confidence between conditions and the role need for cognition plays in moderating the effect of task difficulty on confidence reports.

Emily Howard '08
Georgia Nigro, Psychology
Teaching a Child with Autism How to Make Socially Appropriate Facial Expressions
In this service-learning thesis, I worked with an eight-year-old boy with classic autism at the Margaret Murphy Center for Children (MMCC) in Lewiston, Maine. Individuals with autism are capable of identifying and labeling emotion in others, but often make facial expressions that are incongruent with the social context they are in. In this project, I helped a child with autism learn how to make socially appropriate facial expressions. In order to teach the participant how to make recognizable faces, I used a mirror to appeal to his visual skills, and to foster his joint attention and imitation skills. In order to help the participant learn how to use these expressions appropriately, I created a series of social stories, presented as "books on tape." The results are discussed in light of research on emotional recognition, the use of social stories, and other aspects of cognitive development in autism.

Timothy Howard '09
Christine McDowell, Theater
Urban Renewal and Commercial Design in Lewiston-Auburn
This project is the culmination of a semester-long independent study on industrial design, specifically the aesthetics of contemporary commercial business. This project contains a hypothetical element that incorporates the goals of the Lewiston-Auburn community for urban renewal on Lisbon Street. A number of properties were considered; I chose 113 Lisbon Street for my design. I designed a space that would house two businesses, a periodical bookstore, and a day-café/restaurant. The challenge was to accept the physical limitations of an existing building and then to design an interior that would accommodate two different but aesthetically integrated businesses while remaining within the functional limits presented by the building's current state. In addition to the floor plan and front facade designs, I addressed various aspects of interior decorating including furniture, light fixtures, paint and wall treatments, additional custom architectural features needed to complete the space, and facade renovation and storefront design.

Jennifer Imrich '08
Amy Douglass, Psychology
The Effect of Post-identification Feedback on Observers
Research suggests that witnesses' confidence about an identification can be inflated by feedback. However, little research has investigated how feedback influences the perceptions and judgments of observers. The current study sought to determine whether post-identification feedback affects observers and if providing instructions can effectively mitigate the effects. The first experiment replicated the post-identification feedback effect by manipulating feedback, confirming or disconfirming, given to participant-witnesses (N=18). In the second experiment, instructions to participant-observers (N=107) were manipulated; individuals received information about the manipulability of eyewitnesses' confidence or not. Participant-observers viewed the videotaped identification procedure from experiment 1, including the administration of feedback, and rated their perception of the witnesses' confidence. The experiment revealed that participant-observers were influenced by instructions, instead of mitigating the effects of feedback, participant-observers who received instructions rated

witnesses as more accurate overall. Implications for these findings suggest the judicial system needs to address the impacts of feedback on both eyewitnesses and jurors.

Yuanyuan Jiang '09
Lilian Childress, Physics
Manipulation of Single Electron Spin in Nitrogen-Vacancy (N-V) Center of Diamond
The nitrogen-vacancy (N-V) center is a defect in diamond formed by a nitrogen impurity next to an adjacent vacancy formed by one missing carbon atom. Behaving like a trapped atom, N-V center has been studied as a stable solid state system for quantum computing at room temperature. In this study, we measured, isolated, and manipulated the single electronic spin associated with the NV center. Using the confocal microscope with magnetic field control and microwave coupling, we detected the fluorescence of NV center under green laser optical excitation. After continuous-wave (CW) calibration, we drove the transition with different microwave pulse sequences, observing Rabi nutations, Ramsey fringes, and spin-echoes. We observed the hyperfine interaction with ^{14}N nuclear spin, which complicated the Ramsey signal. Also, as expected, the decaying time for spin-echo signal is much longer than the dephasing time of Ramsey signal, which suggests the NV center as a potential building block for quantum information science.

Lawrence Jones '09
John Strong, Religion
The Power of the Practice
The meditative practice is a phenomenon found in eastern religions that holds both romantic power and misinterpreted meaning to the western student. By emerging myself in two ten-day meditative retreats in Buddhist centers, living with a Hindu guru, and interacting with monks, ascetic babas, and laymen, I encountered the power of the practice. But what kind of power does this practice bring? What exactly happens to the practitioners who enter into meditation? And how does it work to change their lives? My research shows how a Hindu family man became a traditional guru, how a woman from North Carolina became a Buddhist nun, and how my life was affected by this experience. My research found that perfect meditative states were thought by many practitioners to be impossible to reach, that the most rewarding days of meditation were the most difficult, and that the consequence of meditation could be transformative.

Melissa Jones '08
William Ambrose, Environmental Studies
Short Term Effects of Baitworm (*Glycera dibranchiata*) Digging on Oxygen Demand and Nitrogen Flux on Two Intertidal Flats in Maine
Commercial harvesting of marine benthic organisms such as the baitworm (*Glycera dibranchiata*), often affects large areas of the intertidal and may affect important ecosystem processes such as nutrient cycling. Several studies found the greatest impact of these harvesting practices on sediment oxygen demand and nutrient fluxes occur within the first few days following digging. No study has focused specifically on the immediate effects of digging. Short-term experiments were run in both the spring (May-June) and fall (October-November 2007) on two flats with digging histories, Maquoit Bay and Wiscasset, Maine. Aerobic respiration increased within first 24hours of fall digging in Maquoit by 24% for micro- (69.8 to 86.7 mg $0_2/m^2/hr$) and 61% for macro-fauna (47.3 to 76.1 mg $0_2/m^2/hr$). Similar trend was observed for spring digging in Maquoit in addition to fall digging at Wiscasset. A short term increase in oxygen demand also indicates a likely nutrient release from disturbed sediment.

Kristofer Jönsson '08
Charles Val Carnegie, Anthropology
Negotiating Maine as "Vacationland"
This thesis investigates what Maine means to the people who live there, as well as to visiting tourists. In particular, it asks three pertinent questions: How has the "Vacationland" slogan risen to prominence as Maine's alternative state motto? How does Maine perpetuate the image of untouched wilderness when, in fact, the vast forests have a long history of management and settlement? Why is tourism a political issue in many Maine communities? To answer these questions, this thesis draws on a case study of tourism in the Moosehead Lake region in Piscataquis County. It applies anthropological scholarship to provide a framework for studying tourism in Maine as an anthropological subject. The intended purpose of this project is to connect the tourist encounter in Maine, local concerns regarding

tourism development, and anthropology in order to understand how Mainers and tourists alike negotiate the notion of Maine as "Vacationland."

Marshall Karpel '08
Paula Schlax, Biological Chemistry
In silico Customization of siRNA-Mediated Antiretroviral Therapies
The RNAi pathway provides a means of generating intracellular or systemic gene knockdown if supplied with short RNA duplexes complementary to target RNA sequences. RNAi is also effective against viruses, preventing infection, inhibiting viral replication, and even clearing preexisting infections without the damage sometimes associated with interferon responses. HIV, with its rapid rate of mutation, can eventually escape this interference either by mutating the genomic target itself or by altering the RNA's secondary structure such that the target becomes sequestered. By targeting portions of the HIV ssRNA genome that directly perform essential catalytic activity, the possibility of escape mutants developing can be reduced. Such regions exhibit conservation of both sequence and structure, preventing viral escape via either pathway. This study investigates the gag-pol frameshift stimulatory sequence, the genomic packaging signal and a poly-adenylation signal, generates a battery of possible siRNAs against each, calculates their predicted efficacies and ranks them accordingly.

Katy Kerkian-Winton '08
Karen Palin, Biology
Using Photovoice to Identify Eating and Activity Habits of Local Somali Middle School Girls
The goal of this project is to investigate ideas about eating and activities among local Somali middle school girls. Utilizing the photovoice methodology, girls who are part of the Hillview Aspirations Club were invited to take pictures of food they eat and physical activities in which they partake. I facilitated discussion among the girls about the image content and related their ideas and experiences to my own examination of literature about the health of immigrant populations in the United States, in particular issues with overweight and obesity.

Carter Kindley '11
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Wildfires in the Boundary Waters
Using Geographic Information Systems (GIS) data, I constructed maps analyzing the Boundary Waters Canoe Area Wilderness of Superior National Forest, MN. The maps explore the effects of wildfires on vegetation and habitat in the wilderness and educate viewers about the benefits of and issues concerning wildfires. The project considers soil type, tree cover, underbrush, lakes and streams, human development, and wildlife habitat before and after wildfires using data from the Minnesota Department of Natural Resources MIS Bureau and other sources. Assessing the spatial extent of wildfires is critical to understanding their impact on the environment and human development, and informs discussions on fire management.

Margaret Kinney '08
Anita Charles, Education
Socioeconomic Integration in Urban Public Schools
Historically, cities have used race as a factor in integrating neighborhood schools to compensate for the de facto segregation among neighborhoods. This summer, a set of court cases brought before the Supreme Court significantly restricted the use of race as a factor in determining public school placement. Many of the current racial integration programs are by default unconstitutional, which may lead to a shift in the demographics of a number of school districts. To circumvent this shift, several schools have replaced race with socioeconomic status as an important factor in making school assignments. My presentation will investigate the feasibility and effectiveness of the school assignment programs that use socioeconomic status. I speculate that the use of socioeconomic status as a defining factor in school assignment policies will be as successful as well-implemented racial integration programs in creating equal and balanced schools that allow students to excel academically.

Cassandra Kirkland '08
Peter Wong, Mathematics
A Technical Analysis of the Hammer Throw
The hammer throw has been traced back to 2000 B.C.E., yet there has been very little research to

evaluate the technique from the viewpoint of physics. My thesis analyzes the throw after release and before release. In order to achieve a certain distance, the thrower must release at a specific angle and velocity. The distance achieved will be less than it would be in a vacuum due to air resistance; I studied how much this resistence effects distance. I also evaluate the technique used to achieve a given release angle and velocity, and analyzed the effectiveness of particular techniques in achieving optimum conditions.

Peter Klein '08
Nancy Kleckner, Neuroscience
***Pharmacological Characterization of GluR5,6,7 Containing Neurons in the Buccal Ganglia of Pond Snail,* Helisoma trivolvis**
Glutamate plays a crucial role in regulating the triphasic central pattern generator (CPG) responsible for feeding in the pond snail, *Helisoma trivolvis*. This CPG is composed of groups of neurons in subunits S1, S2 and S3 within the buccal ganglia. Previous studies applied a fluorescently labeled GluR5,6,7 monoclonal antisera to the buccal ganglia and identified a region on the dorsal surface that showed highly specific staining for this receptor subunit. In vertebrates, GluR5,6,7 subunits are known to form receptors that respond to the agonist kainate, while less is known about the action of these receptors in invertebrates. This study aimed to further characterize the neurons in this region through measuring changes in electrophysiology when exposed to glutamate, kainite, and quisqualate. This will aid in understanding the mechanism of the feeding CPG in *Helisoma* and further that study of CPGs in general.

Julie Knopf '08
Michael Sargent, Psychology
Avoidance Behavior as a Response to the Perceived Threat of Homosexuality
Research on explicit and implicit attitudes of heterosexuals toward homosexuals suggests that today, as in the past, homophobia is a problem faced by gays and lesbians. Studies have shown that implicit attitudes toward homosexuals tend to be negative; this finding is consistently demonstrated in Gay-Straight Implicit Association Tests (IAT). My study implements this type of IAT, as well as a priming task that tests if priming heterosexual participants with stimuli connoting homosexuality elicits the response behavior of avoidance more so than priming with stimuli connoting heterosexuality. A possible implication of such results is that deviant sexualities are perceived as threatening to the individual who perceives them.

Elizabeth Lakin '08
Jennifer Koviach-Côté, Chemistry
Exploring the Synthesis of Spiroketal Enol Ethers
Spiroketal enol ethers are common motifs among natural products isolated from plants in the *Asteraceae* family. This project describes our attempts to form spiroketal enol ethers by addition of an internal acetal to an activated pendant alkyne.

Elizabeth Lakin '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Tsunami Hazards in the Pacific Northwest
Studies have shown that the coast of the Pacific Northwest is vulnerable to potentially devastating tsunami events. Using ArcGIS, I analyze information relevant to an evacuation necessitated by such an event. I generated maps detailing the number of people being affected by tsunamis of various magnitudes as well as maps that demonstrate the road system and its potential capacity to evacuate the population in an area. An analysis of elevation was used to determine where shelters could be placed to minimize the need for a full coastal evacuation.

Zachary Lapin '08
Hong Lin, Physics
Polarization Dynamics in a Multi-Transverse-Mode Vertical-Cavity Surface-Emitting Laser
We have experimentally studied the polarization dynamics in the multi-transverse-mode regime of a vertical-cavity surface-emitting laser (VCSEL) under isotropic optical feedback. Orthogonally polarized states of the total power of the VCSEL manifest antiphase dynamics. Spatially resolved measurements indicate that the antiphase dynamics are governed by the fundamental mode. For each polarized state, different transverse modes show synchronized fluctuations at a time scale ranging

from 0.01 to 0.1 μs, but do not have a fixed correlation for fluctuations in the nanosecond range. Research continues in both the single- and multi-transverse-mode regimes while the VCSEL is subject to polarization selective feedback. With polarization selective feedback we can control which polarization is dominant. We have observed low frequency fluctuations (LFF) in both the single and multiple transverse mode regimes, which were not observed with isotropic feedback.

John Leavitt '08
Eric Hooglund, Politics
Democratic Peace Theory and the Election of Hamas in Palestine
This presentation examines the intersection between Hamas' 2006 legislative victory and Immanuel Kant's democratic peace theory. In early 2006 Hamas won a decisive victory within the legislature of the Palestinian Authority. These elections were imposed by the United States and Israel, yet their results were condemned due to Hamas' victory. The elections were originally implemented with the ideals of democratic peace theory, in hope that the Palestinians would elect a "peaceful" party. When Hamas won, America and Israel turned their backs on the theory and condemned the new government. I look at why this happened, examining in the process the history of Hamas and the period from the start of the second Intifada up to Hamas' election.

Jung Min Lee '08
Matthew Côté, Chemistry
Synthesis and Characterization of Plasmonic Nanostructures
Metallic nanostructures have recently captured the attention of physical chemists because they interact differently with electromagnetic waves than do bulk metals. In structures measuring up to hundreds of nanometers, the electronic and optical properties of conductor materials such as gold, silver, and tungsten are dominated by the quantum structure. Such structural properties give rise to plasmons, which are quantized collective movements of conduction electrons within metals. These plasmons are governed by their identity, size, shape, and the environment of the structure. This project focused on synthesizing two types of spherical gold nanoparticles and measuring their plasmonic properties. The resulting nanostructures were studied using UV-visible spectroscopy, transmittance and reflectance dark-field microscopy, and scanning tunneling microscopy.

Caroline Lemoine '08
Michael Sargent, Psychology
Eye Gaze Direction and Stereotype Activation
Prior research has suggested that the process of person construal is facilitated when targets display direct eye gaze. This research examines the effects of eye gaze direction on the extraction of stereotypic knowledge surrounding the categories of black and white. It is hypothesized that the activation of racial stereotypes are most pronounced when stereotypically consistent information is presented following a prime that displays direct eye gaze relative to primes displaying averted eye gaze. Experiment 2 seeks to investigate whether direct eye gaze moderates the effect of the presence of racial information on the identification of weapons. Implications surrounding racial stereotype activation and future research are discussed.

Shawna-Kaye Lester '08
Ryan Bavis, Biological Chemistry
RNAi Biotechnology in Asthma Care
This thesis investigates the use of interference RNA in asthma care. It surveys the discovery of RNAi and current uses of RNAi biotechnology in asthma care, and looks towards currently unexplored fields that could be promising in the future.

Benjamin Levin '09
William Ambrose, Biology
Geographic Variation among* Clinocardium ciliatum *Found along the Polar Front of the Barents Sea: Growth Rates and Climate Forcing
Bivalves have long been used as environmental monitors because of their longevity and annual growth increments. We examined 37 *Clinocardium ciliatum*, from six different sites in the Barents Sea, in an effort to compare their growth to local and large scale environmental conditions. Oxygen isotopes of shell material confirmed the annual nature of the growth lines. We found growth of these bivalves correlated to the Arctic Climate Regime Index (ACRI, at some sites r=0.57) and total pre-

cipitation on Hopen Island (at some sites r=0.782). Ice coverage only significantly affected growth for sites close to the shore. The correlation of growth to environmental conditions suggests that the ACRI and total precipitation on Hopen Island are proxies for food. Bivalves collected from the Polar Front in the Barents Sea exhibited very little relationship to environmental parameters we assembled and showed poor in-site synchrony due to the varied hydrographic conditions at the front.

Jennifer-Kate Linton '08
Lee Abrahamsen, Biological Chemistry
Is Antibiotic Resistance Transferred between Canine Bacteria and Human Methicillin-Resistant* Staphylocohccus aureus*?
Methicillin-resistant *Staphylococcus aureus* (MRSA), both hospital and community associated, has recently become a significant health threat. It is known that antibiotic resistance can be transferred between strains of *Staphylococcus aureus* by genetic exchange. This exchange can happen between strains of *S. aureus* within or between animal species. In a clinical study using owned and shelter canines, we have isolated methicillin-resistant strains of *Staphylococcus intermedius*, a bacteria normally found on the nose of dogs. We hope to determine whether antibiotic resistance can be conferred from canine Methicillin-resistant *S. intermedius* to non-resistant human *S. aureus* through conjugation or transformation. This will help to elucidate possible modes of MRSA transmission from canines to humans.

William Locke '08
William Ambrose, Biology
Effects of Bloodworm (*Glycera dibranchiata*) Digging and Epibenthic Predation on Growth and Survival of Pre-commercial Softshell Clam (*Mya arenaria*)
I investigated the effects of commercial bloodworm digging on the growth and survival of pre-commercial softshell clams (*Mya arenaria*). I established experimental plots at three sites (Brunswick, Woolwich, and Freeport). All plots were seeded with pre-commercial clams (<50mm shell length) that had been measured and injected with the biomarker, calcein. Predator abundance was monitored at all experimental plots immediately following digging half the plots, as well as prior to collecting the experimental clams. There were significant differences in clam recovery, 12-13% higher in control plots than digging treatments for Freeport and Brunswick. In Brunswick more horseshoe crabs (*Limulus polyphemus*) were observed in dug plots than undug plots for two tides immediately following digging. There were no significant differences in growth between treatment and control clams. Finally, I show that calcein, which binds to calcium used in shell construction, can be used to mark *Mya arenaria* for growth studies.

Jeanne Lothrop '08
Nancy Koven, Neuroscience
Asymmetrical Motivational Behavior in the Anterior Region of the Brain in Adults and Adolescents
Previous studies have indicated that greater left frontal brain activity is associated with approach behavior. Conversely, greater right frontal activity is associated with avoidant behavior. This study investigates the association between approach/avoidant coping strategies and asymmetrical anterior brain activity in adolescents and adults. It is hypothesized that adults will exhibit asymmetrical activity of the frontal lobe, with higher left anterior brain activity associated with approach coping behaviors and higher right anterior brain activity associated with avoidant coping behaviors. Given the late maturation of the frontal lobe, the current study also explores whether adolescents also exhibit these asymmetric relationships. Patterns of cerebral dominance uncovered in this study will be discussed in the context of competing neuropsychological models of cognitive-emotion processing.

Noah McCreight '11
Sylvia Federico, English
A Knight's Moral Compass: Courtly Love and Chivalry in Conflict in Arthurian Literature
In tales of Arthur's legendary court at Camelot, we often read of passionate affairs between knights and noble ladies, such as the all-consuming love between Lancelot and Guenevere that ultimately brought down Arthur's regime. These relationships were all regulated by a dynamic that has come to be called courtly love, which dictated how a knight should act towards his secret lover. Very often, this code came into conflict with the code of chivalry, the foundation of knighthood. How then did the authors of such fanciful stories reconcile these two conflicting ideals, and to what end did they employ the interplay between the two to further the legend?

David Miller '08
Sonja Pieck, Environmental Studies
Isla Cañas, Panama and Its Olive Ridley Sea Turtle Eggs: A Political Ecology of Environmental Resource Management
In this thesis I examine the struggles and interdependence between turtles and people both fighting to survive on Isla Cañas, Panama. The beach of Isla Cañas serves as a critical nesting site for Olive Ridley sea turtles, and the sale of turtle eggs has been essential to the community's economy. Since 1975, the Panamanian government and local community have co-managed a project to commercialize as well as conserve the eggs. I examine values and power struggles at local, national, and transnational scales as they are negotiated by local people directly involved in the turtle project. Ethnographic fieldwork conducted on Isla Cañas in 2006 and 2007 creates a base for understanding local realities within a global context. Focusing on conceptions of ownership and practices of management, I present an anthropologically grounded political ecology that teases apart the complex meanings, values, and ethics behind consumption and conservation of sea turtle eggs. By understanding the values behind power struggles in Isla Cañas, I hope to inform more effective policy. I conclude by situating the Isla Cañas case study within the context of global conservation and poverty, showing how this unique case puts into clear relief the complicated tensions between conservation and development worldwide.

Samuel Milstein '08
Robert Thomas, Biology
***Metal Binding Proteins from the Nickel Hyperaccumulators* Thlasi caerulescens *and* goesingense**
Thlaspi caerulescens and *goesingense* are known to thrive in soil contaminated with toxic concentrations of heavy metals and actively bioaccumulate them in concentrations up to and exceeding 1% their dry mass. Although the organic acids responsible for binding to nickel ions are well studied, the proteins required to bind to organic acid-metal ion complexes are wholly uncharacterized. The goal of this experiment is to elucidate the different types of proteins capable of binding to nickel ions. Nickel ion affinity chromatography columns (Ni-NTA, Qiagen) are used to purify cell extract from three species of the *Brassica* family; of which two species are hyperaccumulators (*T. caerulescens* and *T. goisingense*) and a third, non-hyperaccumulating species. Discovery of novel proteins would allow the possibility of creating synthetic genes with the ultimate goal of producing transgenic species of plants capable of efficiently extracting heavy metals from the soil, with applications ranging from phytomining of metals to green remediation of toxic soils.

Hristo Mintchev '08
Joseph Pelliccia, Biological Chemistry
Methicillin-Resistant* Staphylococcus aureus *(MRSA): A Rising Epidemic?
The success of antimicrobials against disease-causing microbes has saved countless lives and decreased the fear in many diseases and infections previously deemed deadly. The widespread use of these drugs has provoked evolutionary adaptations among bacteria developing ways to circumvent the effects of antibiotics. MRSA has acquired the mecA gene encoding a new penicillin-binding protein PBP2A giving it resistance to essentially all beta-lactam molecules. This thesis examines the molecular basis of the insensitivity of PBP2A to lactams while still carrying out peptidoglycan cross-linking functions, and the origin of the mecA gene. Does MRSA pose a global health problem? Will hospital-acquired infections become resistant to the most powerful antibiotics available?

Phuong Nguyen '09
T. Glen Lawson, Biological Chemistry
The Kinetic Analysis of EMCV Polyprotein Capsid Precursors by the Viral 3C Protease
One of the mechanisms by which viral protein concentrations in encephalomyocarditis virus (EMCV)-infected cells is regulated is the rate of specific viral polyprotein cleavage reactions catalyzed by the viral 3C protease. To carefully analyze the kinetics of the 3C protease-catalyzed cleavage reactions an in vitro experimental system using natural viral proteins as substrates is being developed. In this study, we aim to generate natural substrates based upon EMCV capsid polyprotein precursors using recombinant GST-fusion and his-tag protein purification procedures. DNA encoding either a full-length and truncated viral P1CD region containing the 1C/1D protease cleavage site was inserted into the novel expression vector pET-K-GST-HT and expressed in *E. coli* cells. We are attempting to investigate whether the length of the amino acid chains flanking the cleavage site impact the kinetics with which the 3C protease catalyzes the hydrolysis of the target QG peptide bond.

Jamie Nickerson '11
Sylvia Federico, English
The Paradox of Courtly Love
Arthurian literature seems couched in the paradox of courtly love, a system that seems to venerate women while simultaneously holding women to misogynistic views. By exploring the texts of "Sir Gawain and the Green Knight," and Chrétien de Troyes' "The Knight of the Cart," courtly love can be shown to be a veneration of love itself, and not a veneration of women, allowing courtly love to express the male superiority of medieval misogyny.

Kevin O'Connor '08
T. Glen Lawson, Biological Chemistry
An Experimental System for the Kinetic Analysis of Picornaviral 3C Protease Processing Activity Using Natural Substrates
One of the mechanisms by which viral protein concentrations in encephalomyocarditis virus (EMCV)-infected cells is the rate of specific viral polyprotein cleavage reactions catalyzed by the viral 3C protease. To carefully analyze the kinetics of the 3C protease-catalyzed cleavage reactions an in vitro experimental system using natural viral proteins as substrates is being developed. The DNA encoding two EMCV polyproteins that contain 3C protease cleavage sites, the 3A/3B and L/VP0 polyproteins, were inserted into a novel vector and expressed in *E. coli* cells. The expressed proteins are fused with two affinity purification tags plus a protein kinase site. The methodologies for purifying proteins expressed by this system via the affinity tags were optimized and applied to the purification of the viral protein substrates in anticipation of their use in the kinetic studies.

Matthew Offenbacher '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Modeling Potential Climate Change Induced Habitat Shift for Plant Species in Maine
Triphora trianthophora (Swartz) Rydb. (Nodding Pogonia or Three-birds Orchid) is an herbaceous perennial found in northern hardwood forests in the Southwestern portion of Maine. Projections by the Intergovernmental Panel on Climate Change (IPCC) have shown that its habitat is likely to be affected by climate change thus further endangering a species that is already threatened in Maine. The aim of this project is to model using existing ecological, soils, climatic, and other relevant data what regions of Maine may provide suitable habitat for the species given certain possible shifts in climate.

Kelsey Omstead '08
Lee Abrahamsen, Biological Chemistry
An Examination of Blood Conservation in Critical Care Patients at Central Maine Medical Center, in Lewiston, ME
Blood conservation has become a primary concern in hospital settings due to the risks associated with blood transfusions, limited blood donations, storage concerns and a significant effect on patient health. Blood transfusions have recently been associated with increased negative side effects in patients in intensive care units, coronary care units, and cardiac units in local hospitals; these side effects include a longer hospital stay, increased morbidity and mortality rates, and an increased risk of contracting other diseases. Decreasing these associated blood transfusion risks can be accomplished by limiting any unnecessary blood loss. This study examines three areas of blood laboratory testing in which substantial volumes of blood can be conserved: perioperative use of blood analysis instrumentation; sample and vial size of each blood draw; and the amount drawn for and frequency of specific laboratory tests. This study is based on chart data from patients at Central Maine Medical Center. We examined the number and frequency of particular lab tests and how much blood was drawn for each. We then compared the protocols at Central Maine Medical Center to published protocols. The goal is to provide the hospital with helpful information in order to establish the best practices in hematology.

Dana Oster '09
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Map of Volcanic Hazards of Mt. Rainier
I live in Seattle, Washington, and Mt. Rainier is only fifty miles from my home. Consistently, it is ranked in the top five most deadly volcanoes in the United States, due to its large volume of glacial coverage and increased geothermal activity. As a consequence, western Washington is susceptible to

massive lahar flows and the Pacific Northwest is vulnerable to volcanic eruption. In this project I used GIS to make maps showing the geology and structure of Mt. Rainier, and the areas surrounding the volcano that are in danger of volcanic hazards.

Julie Otton '08
Kirk Read, French
J'aime l'Afrique: La rhétorique de Nicolas Sarkozy sur sa nouvelle société
The major riots of 2005 in the French suburbs sparked an infamous comment by then-interior minister Nicolas Sarkozy, who called the rioting students "scum." My work analyzes the political rhetoric surrounding immigration to France, specifically from Africa. In order to understand how politicians, particularly the current President Sarkozy, use rhetoric to discuss immigration, I first examine a brief history of the French colonial empire and the model of colonial rhetoric. I then examine past speeches of Charles de Gaulle and Jacques Chirac, addressing the populations of Algeria and Senegal. Did they use the same rhetorical model? This rhetorical heritage helps inform the newer immigration rhetoric of Sarkozy, particularly his recent inflammatory speeches in Senegal and Algeria. Finally I conclude by discussing the relevance of French immigration rhetoric in current politics and its ramifications for French society.

Alida Ovrutsky '08
Nancy Kleckner, Biology
The Effects of Drought Stress and Grazing on Secondary Metabolite Concentrations in Medicinal Plants, Toxicity and Overdose
The World Health Organization estimates that 80% of the world's population relies on traditional, plant-derived medicines. However, the safety and efficacy of many commonly utilized plant medicines has not been examined. Environmental stressors have been proven to alter the concentrations of secondary metabolites, the active compounds within medicinal plants. My work aims to examine the effects of drought stress and grazing on the concentration of artemisinin. Found in the plant *Artemisia annua*, artemisinin and its chemical derivatives effectively clear resistant strains of malarial parasites. If the concentrations of plant medicines fluctuate extensively with environmental stresses, the safety of traditional remedies may change seasonally and with climate change. Substantial changes may result in less efficacious treatment or a toxic effect similar to overdose. I plan to relate these findings to plants traditionally used to treat malaria throughout rural East Africa, elucidating the potential of traditional medicines to elicit harmful effects.

Michael Palmer '08
Nancy Kleckner, Neuroscience
***Characterization of Potassium Channels Implicated in Glutamate-Induced Inhibition of Buccal Neurons in* Helisoma trivolvis**
Glutamate has been implicated as a critical neurotransmitter within vertebrate as well as invertebrate species. Glutamate modulates motor neuron firing within the buccal ganglia of model organism *Helisoma trivolvis* and is responsible for the organism's triphasic feeding pattern. Glutamate is responsible for the excitation of neurons within the phase 2 (S2) neurons and has been shown to simultaneously inhibit phase 1 (S1) and phase 3 (S3) motor neurons. This project utilized electrophysiological and pharmacological techniques as well as visual staining methods using neurobiotin to help characterize the mechanism of glutamate induced inhibition of S1 and S3 buccal motor neurons. Inhibitors of G-protein mediated potassium channels such as pertussis toxin and tertiapin-Q, as well as general potassium channel inhibitors such as TEA and 4-AP, were administered to determine whether the glutamate mediated mechanism of inhibition involves activation of potassium channels. Knowledge of the mechanism of glutamate induced inhibition within Helisoma trivolvis can be extrapolated to better understand pattern generated cellular communication within other invertebrate as well as vertebrate organisms.

Michelle Parent '08
Rebecca Fraser-Thill, Psychology
Narcissism as a Predictor of Permissive and Authoritarian Parenting
Parental discipline has been shown to be a key predictor in the development of narcissistic personality in early adulthood, and as a result, the younger generations of our society are becoming increasingly narcissistic (Twenge, 2006). Research suggests that both the lack of discipline associated with permissive parenting, as well as the over-controlled characteristic of authoritarian parenting, are strong predictors of increased narcissism (Watson, 1992). This study aimed to prospectively examine

narcissistic personality as a predictor of projected permissive or authoritarian parenting in a sample of young adults aged 17-25. Participants completed adaptations of the Narcissistic Personality Inventory, the Parental Authority Questionnaire, and disciplinary, situational vignettes. It was expected that participants who scored higher on the NPI would be more likely to project themselves as permissive or authoritarian based on narcissistic personality characteristics such as inflated self-views and overt over-control. In performing this study, the behaviors elicited by narcissistic personality with respect to parenting could be better understood.

Megan Patey '08
Karen Palin, Biological Chemistry
Vitamin D Deficiency and Tuberculosis: A Biochemical and Public Health Approach
It has been estimated that one third of the world's population is infected with *Mycobacterium tuberculosis*, the etiological agent responsible for tuberculosis (TB). Vitamin D deficiency has been linked to increased susceptibility to bacterial infections, specifically TB. Research has shown that vitamin D induces LL-37, an antimicrobial peptide in humans which can kill *Mycobacterium tuberculosis*. Among the patient population at the B Street Health Center in Lewiston, 503 latent infections and 19 active infections were identified in 2007. Laboratory tests indicate that many of these patients are also vitamin D deficient. As a community based research project, I have developed a symptom survey as a measure to indicate vitamin D deficiency in order to evaluate effectiveness of high dose vitamin D treatment. Further research could validate vitamin D as a practical and cost effective tuberculosis prevention mechanism.

Sarah Peters '08
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Map of the Watershed of Sebago Lake, ME
I used GIS to delineate the watershed of Sebago Lake, about 10 miles northwest of Portland, ME. Sebago Lake is the primary water source for the Portland Water District, thus watershed monitoring and maintenance is a high priority for water quality assurance. I delineated the watershed boundaries and determined factors such as land ownership and land use. Analyzing the roads, septic systems, and businesses in the watershed is important to figuring out where any risk areas are or what possible sources of contamination are contained within the watershed. I also calculated a maximum yield for the Portland Water District, how much water they could take from Sebago on a given day, week, or month without adversely affecting the lake.

Anthony Phillips '10
Rebecca Herzig, Women and Gender Studies
Symbolic Racism
In African American history, imagery and symbols have been the subject of many student protests. From the days of demonstrations led by SNCC over segregated facilities and now to the recent Jena 6 student protest over the hanging of nooses, African Americans have used symbolic racism as a way to exercise their freedom to protest for justice. This poster focuses on the recent University of Virginia student sit-in demonstration at the office of the University's student paper. It concerned two racial comics published by the *UVA Student*. I compare the UVA scandal with the Morningside Park 1968 student protest led by African American students at Columbia University over the building of a gymnasium that represented the final barrier between Columbia and the majority black Harlem community in New York City. I also consider why we must be careful about the symbols we produce, especially if we wish to become a more racially tolerant nation. The leading protester of UVA's sit-in was interviewed for facts on the demonstration. Analysis of the protest revealed that both the Morningside Park case at Columbia and the incidents that took place at UVA were the result of not only the precipitating event, but also several previous cases of racism on these campuses. This presentation spotlights the importance of student protest over symbols, and provides ways for our nation to become more racially considerate when invoking racial representations in public.

Lucia Piacenza '08
Nancy Koven, Neuroscience
The Role of the Inferior Parietal Lobe in Schizophrenia: Unawareness and Lack of Insight
A significant number of patients with schizophrenia exhibit unawareness of their illness. Patients with poor insight are often noncompliant with treatment and subsequently experience worse functional outcomes. While the neurological basis of impaired insight in schizophrenia is as yet unknown,

the parietal lobe is a likely candidate given its involvement in awareness of self and awareness of self with respect to one's environment in normal healthy controls. In the present study, structural MRI and psychiatric interview data were collected from 10 patients with schizophrenia-spectrum disorders and 10 demographically-matched healthy controls. Statistical analyses examine the relationship between right inferior parietal lobe volumetry and degree of awareness of illness. Results are discussed in the context of competing neuropsychological models of impairment in schizophrenia.

Politics 253 Class Performance
Eric Hooglund, Politics
Gaza Bombshell*, an Original Two-Act Play*
Students in Politics 253 (U.S. Foreign Policy in the Middle East) collaborated with learning associate Tim Collins, a playwright and solo performer, to write and perform an original play. In *Gaza Bombshell*, the discovery of oil in the Gaza Strip prompts an international crisis, because Gaza, which the United Nations considers an Israeli-occupied territory, is an area from which Israel withdrew all its forces in summer 2005 and for which it renounces any responsibility for the welfare of the 1.5 million Palestinians who live there. Since elections in January 2006, Hamas, a political party/armed militia that both Israel and the United States have classified as a terrorist organization, has controlled Gaza, consolidating this control by expelling all PLO members from Gaza in June 2007. The PLO controls the Palestinian Authority, which both Israel and the United States recognize as the proposed governing entity of an independent Palestinian state in Gaza and the West Bank. How will the United States and its allies react to this situation? How will the United Nations manage the debate? Will the U.N. authorize an Israeli reoccupation of Gaza? Will it authorize a U.S. invasion of Gaza? Will the U.N. send its own peace-keeping mission to the region? These deliberations take place against a backdrop of demonstrations in New York, international political intrigue, and unexpected romance. The risks for all parties of a wrong decision are high.

Jeremy Porter '10
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Visualizing the Maine Coast below Sea Level
Using GIS, I created a representation of the Maine coast using digital elevation models to display the surface below sea level. The maps compare different bottom surface types by location while considering the composition of materials, the exposure to the forces of nature, and human impacts.

Project Pericles Panel
William Blaine-Wallace, Multifaith Chaplaincy
Learning about Social Justice through a Service Trip to Honduras
Students discuss an inspiring trip to Honduras, where they spent the winter break collecting information on the social and political factors that contribute to widespread hunger in the country. Project Pericles is a not-for-profit organization that encourages and facilitates commitments by colleges and universities to include education for social responsibility and participatory citizenship as an essential part of their educational programs, in the classroom, on the campus, and in the community.

Katelyn Provencher '08
Thomas Wenzel, Biological Chemistry
Carboxymethylated Cyclodextrins and Their Lanthanide Complexes as Chiral Discriminating Agents
Primary, secondary, and indiscriminately carboxymethylated derivatives of α-, β-, and γ-cyclodextrin are prepared and compared to native cyclodextrins for their effectiveness as chiral NMR discriminating agents. The anionic carboxymethylated cyclodextrins are especially effective for the analysis of cationic organic substrates. Enantiomeric discrimination with the indiscriminately substituted carboxymethylated cyclodextrin derivatives is larger than that with the secondary and primary derivatives. This is likely the result of the high degree of substitution with the indiscriminately substituted derivative. Paramagnetic lanthanide ions such as praseodymium(III) and ytterbium(III), when added solutions of the carboxymethylated cyclodextrins, complex with the carboxymethyl groups and cause pronounced enhancements in enantiomeric discrimination. Cationic derivatives of α-, β-, and γ-cyclodextrin will be prepared and compared to native cyclodextrins for effectiveness in the analysis of anionic organic substrates in future research.

Brian Quarrier '09
Ryan Bavis, Biology
Wing Morphology and Flight Patterns of Microbats
Microbats have adapted their wing morphology to increase foraging efficiency in a cluttered rainforest environment. Wing loading, aspect ratio, wingspan, and the wing tip index, all control different aspects of flight. Bats that are clutter tolerant are likely to have a low wing loading, aspect ratio, wing tip index, and a short wingspan, which allows them to have a slow, highly maneuverable, and agile flight. It is hypothesized that comparing two rainforest bats' wing morphology (*Nyctophilus bifax* and *Miniopterus australis*) and flight patterns can be used to predict other bat species' flight pattern based on their wing morphology alone, such as *Vespadelus pumilus*, which is a relatively unknown species since its small size precludes the use of transmitters and light tags. Bats were caught in four rainforest sites, where forearm lengths and weights were recorded. Photos of the bats' extended wings were taken for later wing morphology calculation. Bats were light tagged, released, and the flight patterns observed. It was found that *Miniopterus australis* had a significantly higher wingspan, wing area, and aspect ratio than *Nyctophilus bifax*. The average wing loading and wing tip index was also higher, but not significantly so. *Vespadelus pumilus* had a lower average wingspan, wing loading, wing tip index, and a higher wing area than the other two species. The aspect ratio however was between *N. bifax* and *M. australis*. The flight patterns of *N. bifax* showed that it flew inside the forest and used all levels of the rainforest, while *M. australis'* flight pattern showed that it spent most of its flight time along tracks and open areas. Both wing morphology and flight patterns suggest that *N. bifax* is more clutter tolerant than *M. australi*. Since *V. pumilus* has wing morphology suggestive of a clutter tolerant bat, a flight pattern that consists of flying mostly near the ground and sometime in the canopy is suggested.

Brian Quarrier '09
J. Dykstra Eusden, Geology, and Camille Parrish, Environmental Studies
Mapping and GIS: Map of the Receding Ice Cap on Mt. Kilimanjaro
This poster shows the receding ice cap on Mt. Kilimanjaro. Kilimanjaro is located near Tanzania and Kenya, and is known for having a large ice cap that used to cover the whole mountain. This map will show where the ice cap used to be and how climate change has caused it to recent so far that it is almost all gone. I plan to represent this in a poster and as a computer simulation. The simulation will look at all angles of Kilimanjaro and you will be able to watch the ice cap melt and disappear. This will be done using GIS mapping software and Arc Globe witch can digitally animate maps.

Mallika Raghavan '08 and **Nina Schwabe '08**
Lavina Shankar, English
***Traditional versus Modern Perceptions of Bengali American Women in* The Namesake**
In Jhumpa Lahiri's *The Namesake*, two different representations of Bengali women are exhibited through the characters of Ashima and Moushimi. Ashima's status as a first-generation mother figure stands as a Bengali cultural reference for her second generation, Americanized children. Moushimi, Ashima's daughter-in-law ultimately rejects Bengali culture and stands as an extreme example of how this culture is lost among the second generation. Lahiri's work is reflective of the constant struggle that immigrant women face in balancing two identities. Lahiri honors the maintenance of Bengali culture, and condemns complete absolution into American culture.

Kevin Reyes '08
Susan Langdon, Psychology
The Effect of an Athlete's Emotional State in Regard to Verbal Persuasion and Collective Efficacy
The current research study examines the possible mediating effect of an athlete's emotional state in response to hearing a pregame speech on collective efficacy, group cohesion, and performance. Male students from Bates College participated in the study as a member of a team instructed to imagine an upcoming match. The participants were randomly assigned to hear one of four verbal persuasion speeches. The pregame speeches focused on: information/control group, strategy, emotional persuasion, and emotional/strategic. After hearing the pregame speech, the participants took part shooting task, where they shot at a circular target for points. Results examined the effects of the pregame speech on emotional arousal, collective efficacy, group cohesion, and performance. Implications of the study suggest monitoring arousal levels within individuals before an upcoming sporting competition in order to enhance performance in the individual and as a team.

Elizabeth Rie '09 and **Emma White '11**
Dennis Browne, Russian
***The Autobiographical Aspects of Bulgakov's Novel,* The Master and Margarita**
Bulgakov incorporated many aspects of his own life in his novel, *The Master and Margarita*. Bulgakov primarily used his work as a medium to express his criticisms of Soviet life. He addressed Stalinist Terror, the secret police, and other downfalls he viewed in Russian life. Many members of Soviet society appear in his novel, particularly within the ranks of bureaucratic organizations. There are many similarities between the Master and Bulgakov. Like the Master, Bulgakov was unable to get his masterpiece published during his lifetime. The novel was completed by Bulgakov's second wife after he passed. She is arguably portrayed in the novel as the Master's muse and inspiration.

Zachary Risler '08
Ryan Bavis, Biology
Effect of Hyperoxia on the Hypoxic Ventilatory Response and the Role of Reactive Oxygen Species in the Cellular Pathway
Hypoxia (low oxygen) is encountered at high altitude, during recurrent apnea syndrome, apneas in premature infants, and asthmatic attacks. Animals deal with hypoxia in many ways including the hypoxic ventilatory response (HVR) that is characterized by increased rate and depth of breathing. Previous studies show that brief exposure to hyperoxia (high oxygen) increases the magnitude of the HVR. This study sought to determine if reactive oxygen species, produced by hyperoxia, are involved in the augmentation of the HVR. Ventilation was measured in rats that acutely exposed to hyperoxia (100% O_2) or room air and then acutely exposed to hypoxia (10% O_2, 5% CO_2). This was repeated with rats injected with MnTMPyP, a powerful antioxidant drug, to block reactive oxygen species. To date, we have not been able to replicate the augmented HVR following acute hyperoxia reported by previous researchers. Additional studies are underway to test possible reasons for this discrepancy (e.g., duration of hyperoxia and/or hypoxia).

Leah Roberts '08
Georgia Nigro, Psychology
The Experiences of Pregnancy and Childbirth in the United States for Native Spanish-Speaking Latinas
Research suggests that language barriers can dramatically impede health care; however, little of this research has focused specifically on how linguistic and cultural communication affects obstetric care. The current study seeks to identify and describe the birthing and pregnancy experiences of immigrant and limited English proficient (LEP) Latinas in the United States. Through qualitative analysis of face-to-face interviews, I closely investigate how communication during pregnancy and childbirth is perceived and how it might affect these women's experiences. Specifically, I explore how communication, language ability, and interpretation services influence immigrant and LEP Latinas' experiences of pregnancy and childbirth. In addition to the perspectives of Latina immigrant women, the current study also incorporates the perspectives of health care professionals and Spanish/English interpreters who work with immigrant or LEP Latinas during pregnancy and delivery.

Mallory Rosenblatt '08
Ryan Bavis, Biology
Effects of Prenatal Hypoxia on the Hypoxic Ventilatory Response of Japanese Quail
Exposure to hypoxia (low oxygen) causes an increase in ventilation known as the hypoxic ventilatory response. In rats, exposure to hypoxia during the prenatal period enhances the hypoxic ventilatory response subsequently measured in young rats. My study looks at whether prenatal exposure to hypoxia has an effect on the hypoxic ventilatory response in adult Japanese quail. Japanese quail eggs were incubated in either room air (21% O_2) or hypoxia (15% O_2). As adults, their breathing was measured during exposure to both room air and acute hypoxia (10% O_2). This was used to determine whether the hypoxic ventilatory response differed between the two treatment groups.
Rebecca Rubenstein '08
Amy Douglass, Psychology
The Role of Reactance in the truth® Anti-Smoking Campaign
Research suggests that comprehensive anti-tobacco campaigns with a media component are the most effective in reducing youth smoking rates. More specifically, the truth® campaign, with its industry manipulation theme, has been very successful. The current study looks at the role that psychological reactance, the desire to acquire and prefer censored information, plays in the success of the truth®

ads. The predicted findings include an interaction between participants who view the truth® ads and those that think the viewing is censored. These participants should show particularly high levels of psychological reactance. Implications for these findings would suggest that a previously censored advertisement with an industry manipulation theme is the most effective form of anti-tobacco media advertising for youth.

Courtney Sargent '08
Aimée Bessire, Art and Visual Culture
From Bahia, Brazil, to Bronx, NY, USA: A Compilation of Altar Themes from the African Diaspora
Various scholars have studied aspects of Afro-diasporic religions from their births in slave societies in the colonial world and their transference to New York City and other urban cities with large immigrant populations to current and evolving postcolonial discourse about African religions in the West. Drawing from various disciplines and languages, this altar combines elements from Brazilian Candomblé, Santeria/Lucuumi/Regla de Ocha, Haitian Vodu, and Voodoo from the southern United States to explore issues of health and healing, the Orixás/Orishas/Lwa and their corresponding Catholic saints. The constructed altar combines these elements to stress continuity and similarity between the religions. On the other hand, the chart explains distinctions between the faiths and those aspects unique to each. The altar presentation also reflects anthropological research in Bahian markets and botanica shops and reflects, in turn, the alternative methods used to gather the history, theory, and materials.

Rosanna Schatzki '08
Michael Sargent, Psychology
Explicit Stereotype Threat and Men's Verbal Test Performances
This study tested the effect of stereotype threat (ST) and the implied role of effort on men's verbal test performance. The stereotype that men are inferior to women on verbal tasks was used. Ninety-three male undergraduate students took a verbal reasoning test. For half the participants, ST was explicitly induced, and for the other half ST was nullified. Additionally, half of the participants in each ST condition were given test directions with an effort-independent framing, and the other half given test directions with an effort-dependent framing. There was a significant interaction of ST and effort-framing for accuracy on the test: when the test was framed as effort-independent, participants under ST performed worse than participants not under ST, but when the test was framed as effort-dependent, participants under ST performed better than participants not under ST. Additionally, there was a main effect of ST on the number of test items attempted, such that participants under ST attempted more items that those not under ST; however, this effect only approached significance. The association between assumed role of effort and motivation is explored, as are implications for standardized testing.

Kathryn Schierberl '08
John Kelsey, Neuroscience
The Opiate Kappa Receptor Antagonist, nor-BNI, Reduces the Aversiveness of Opiate Withdrawal in Rats
Dynorphin, an endogenous opiate, has been implicated in the anti-rewarding effects of repeated administration of various drugs of addiction and therefore is expected to enhance the aversiveness of opiate withdrawal. Given that the effects of dynorphin are due to its selective binding to kappa-opioid receptors, I tested this hypothesis by examining the effects of nor-BNI, a selective kappa-receptor antagonist, on the symptoms of opiate withdrawal and the aversiveness of opiate withdrawal using a conditioned place aversion paradigm. Consistent with the hypothesis, I found that nor-BNI given prior to opiate withdrawal reduces some of the symptoms as well as the aversive motivational effects, indicating that dynorphin secretion likely mediates both of these effects.

Michael Simel '08
David Haines, Mathematics
Statistical Analysis of Historical U.S. Hurricanes
By every measure, 2005 was the worst hurricane season on record. In economic damage, 2004 was the second worst hurricane season on record. Is this due to the rising intensities of tropical storms, or are we simply inhabiting more danger-prone areas along the eastern seaboard? In my talk, I reanalyze the "impact" of all North Atlantic tropical storms since 1850 based on an original model. My model

projects the potential "impact" of historical hurricanes on current population. This measure allows us to look at nineteenth-century storms as if they were to strike now and compare their "impact" to recent U.S. hurricanes. Was the 2005 hurricane season a sign of things to come or were "impact" totals from that season within the range of computed historical values?

Michelle Sisco '08
Steven Kemper, Anthropology
Oppari Performance as a Counter-Discourse to Patriarchal and Brahminical Ideologies
With the support of the Hoffman Research Support Grant and the Hamill Prize, and with the assistance of a nonprofit organization, the National Folklore Support Centre (NFSC), I studied South Indian performance from a feminist perspective in the Tamil city of Chennai, India. As a nonpaid intern working for the NFSC, I spent eight weeks in Chennai conducting ethnographic fieldwork with low-caste widows, who lived in a small fishing village on the coast of the Bay of Bengal. My research centered on Oppari performance, a ritual lament sung by dalit widows at funerals and other death-related ceremonies. My primary informants were four professional Oppari singers whose livelihood depended on invitations to perform at funerals in the area. My year-long honors thesis considers Oppari performance as a counter-discourse to patriarchal and brahminical ideologies.

Sociology Thesis Panel
Emily Kane, Sociology
Contemporary Social Issues: Sociological Perspectives
In this panel, sociology thesis researchers address a variety of contemporary social issues: sexual assault, food insecurity, health care access, and institutional assertiveness. These issues are explored in the context of their connections to key social institutions including education, employment structures, the family, public policy, and inequalities of gender, race, class, sexuality, age, and nation.

1) **Dionne Akiyama '08:** ***Enter the Young: Empowerment for Youth Consumers of Mental Health Services***
2) **Jason Buxbaum '08:** ***Social Class, Parenting Styles, and Assertiveness with Authorities and Institutions***
3) **Ariel Childs '08:** ***Food Insecurity and Community-based Food Assistance in Hillview Public Housing***
4) **Lauren Pluchino '08:** ***Breaking the Food-for-Sex Trade: Informal Education as a Preventative Measure against Sexual Assault for Street Girls in Tanzania***
5) **Julia Resnick '08:** ***Somali Perspectives on Their Doctor-Patient Interactions***

Gregory Sousa '08
Nancy Kleckner, Neuroscience
Satiating Snails: Investigating the Immunohistochemical Distribution of Neuropeptide Y (NPY)-like Molecules in the CNS of the Pond Snail **Helisoma trivolvis** ***and Determining the Impact of NPY on the Buccal Feeding Circuitry***
The neuropeptide tyrosine (NPY) family constitutes one of the largest and most highly conserved vertebrate peptide families and is known to modulate a vast array of physiological functions (e.g., ingestion, sexual behavior, and circadian rhythmicity). Interestingly, the invertebrate NPY homologue neuropeptide phenylalanine (NPF) is also thought to play a role in feeding and feeding-related behaviors. Additionally, it is well established that gut distension mimics ingestion-induced satiety in several mollusk species. I investigate whether NPF or a NPF-like substance is linked to the acquisition of a satiety state in the pulmonate mollusk, *Helisoma trivolvis*, and is associated with gut distension. Determination of the distribution of NPY-like molecules is accomplished via immunohistochemical means. Electrophysiological recording techniques on isolated CNS and semi-intact preparations are employed to ascertain the role of NPY and gut distension on the *H. trivolvis* feeding CPG, respectively.

Lee Spivak '08
Krista Scottham, Psychology
The Racial Socialization of Preschool-age Children
We all want to raise children who do not treat people differently because of their skin color. The best way to ensure this is to talk with children, but engaging in such conversations is difficult because adults do not understand how young children think about race and what they are capable of understanding. The current study gathers information on preschoolers' perceptions of race, and the multiple

contextual spheres that impact this understanding. Specifically, preschool children of differing racial backgrounds were asked to respond to a series of questions regarding their thoughts, attitudes, and beliefs about race. Information regarding their primary caregiver's race related attitudes, beliefs, and socialization practices were also collected. Additional information was also collected from teachers to offer insight into their race related beliefs, classroom observations, curriculum, and practices. Finally, community assessments were made through census data, which provided details on the social climate and social composition of each community from which participants are drawn. Findings offer insight into race related attitudes during early childhood and the spheres that may shape these beliefs.

Jonathan Stange '08
Michael Sargent, Psychology
Ease of Retrieval and Perceptions of Self
Past research has shown that the ease with which people can recall examples of certain events or characteristics can affect their self-descriptions. For example, participants who were able to easily list instances of their past assertive behavior rated themselves as more assertive than people who had difficulty recalling such instances, even if they listed more examples of their assertive behavior. The present study examined the effect of ease of retrieval on individuals' self-perceptions of the future and of the past. Study 1 evaluated the effect of ease of retrieval of reasons why one would make a good employee after graduating on students' perceptions of their future. Study 2 assessed the relationship between ease of retrieval of childhood memories on self-reported memory quality. Exploratory analyses were conducted to evaluate the potential moderating effects of measures of cognitive style, such as need for cognition and attributional complexity.

Whitney Thomas '08
Nancy Koven, Neuroscience
Neuropsychological Correlates of Executive Dysfunction in Alexithymics
Difficulty attending to and distinguishing among emotions are two aspects of the alexithymia construct. Etiological theories of alexithymia include frontal lobe impairment, which would suggest corresponding weaknesses in executive functioning. Although some studies have identified isolated cognitive deficits in alexithymics, no study to date has systematically investigated executive functioning in this population while simultaneously deconstructing alexithymia into empirically-derived dimensions. Participants in this study completed self-report surveys of alexithymia as well as a neuropsychological measure of executive functioning. Principal components analysis revealed two alexithymia-related factors: Emotional Clarity (EC) and Emotional Monitoring (EM). Subsequent analyses revealed that low-EC participants performed worse than high-EC participants across multiple executive function domains. No relationship was found between EM and patterns of cognitive performance. These data further suggest frontal lobe abnormality in alexithymia when specifically considering the EC aspect of the construct. Subsequent neuropsychological tests are being administered to corroborate these results.

Lincoln Tirpaeck '08
John Kelsey, Neuroscience
Does Dopamine Depletion of the Medial Prefrontal Cortex Produce an Animal Model of the Negative Symptom Category of Schizophrenia?
Schizophrenia is an incapacitating mental disorder known to affect approximately one percent of the world's population. Of the three subsets of symptoms, the cognitive and negative prove to be the most debilitating for both the individual and greater society. Although the physiological epistemology of these symptoms is not very well understood, the amended dopamine hypothesis proposes that cognitive and negative symptoms are derived from insufficient dopamine activation in the prefrontal cortex. The purpose of this study was to test this hypothesis. A low and a high concentration (4 and 12 µg/µl) of the neurotoxin 6-hydroxydopamine (6-OHDA) was injected bilaterally into the medial prefrontal cortex (mPFC) of male adult rats to deplete dopamine. Lesioned animals were then exposed to varying doses of phencyclidine (PCP), a drug that has been shown to induce all three subsets of schizophrenic symptoms. If the amended DA hypothesis is correct, it would be expected that the mPFC lesion would enhance PCP-induced schizophrenic behavior in a hole-board apparatus and forced swim test. Contrary to this prediction, the high concentration 6-OHDA attenuated the PCP-induced increase in locomotion (putative positive symptom) and decrease in head dips (putative negative symptom). Previous literature indicates that the optimal level of selective dopamine deple-

tion is achieved at lower concentrations of 2-4 µg/µl 6-OHDA. Therefore, I am currently examining the effect of smaller mPFC lesions on PCP-induced schizophrenic-like behaviors.

Ross Van Horn '08
Hillel Soifer, Politics
Identity Politics: Indigenous Social Movements in Northeastern Brazil
Over the course of the last three decades, ethnic mobilization efforts emerged in the transitional process and aftermath of the third wave of democratization in Latin America. The rise of these ethnic-based movements challenges the depoliticized understanding of identity politics in the region. Thus, with the events leading up to the most recent round of democratization and in the continual process of democratic consolidation ethnic-based movements, but more specifically indigenous-based movements, have mobilized around "indigenism" to promote "indigenist" agendas in the region of world least likely to witness the salience of ethnic identity. This thesis aims to build on our understanding of ethnic mobilization through a regional comparative analysis drawing on the experiences of indigenous movements in the Northeast of Brazil.

Craig Van Keuren '08
Paula Schlax, Biological Chemistry
The Wilms Tumor Gene, WT1: The Effects and Actions of its Major Isoforms
Pediatric cancers affect about one out of every 500 children before the age of 15, making cancer the leading cause of death by disease among this population (Sinnett et al. 2006). Accounting for 8% of these childhood cancers is the common renal tumor Wilms tumor (nephroblastoma) (Sharma et al. 2007). One out of every 10,000 children are affected by this tumor. The tumor represents an instance where abnormal kidney formation can result from mutations in a tumor suppressor gene, Wilms tumor 1 (WT1). There are many different forms, called isoforms, of this WT1 gene that arise from differing conditions. In particular, we focused on the WT1 protein isoforms of alternative splicing, which include the presence or absence of a 3 and 17 amino acid splice. The primary question that arises is: Which one of these isoforms is possibly more prevalent with certain defects that may lead to cancer (i.e., how do the isoforms effect patient outcome)? And how do these isoforms act distinctly (i.e., activate/repress)? An additional question that arises is the effect of differing genes on the isoforms of WT1, with particular focus is on the insulin-like growth factor family of genes.

Kelly Wakeham '08
Rebecca Fraser-Thill, Psychology
External Rewards and Anxiety's Effect on Intrinsic Motivation
Research suggests that the presence of external rewards undermines one's intrinsic motivation to complete a task. Intrinsic motivation can be defined as the internal desire of an individual to want to complete a given task regardless of any external outcome. Different types of external rewards have been examined and performance-contingent rewards, those that are dependant on the quality of the performance of the individual, are most complex and can either enhance or undermine an individual's intrinsic motivation. Anxiety plays a role in intrinsic motivation, such that it affects aspects of the individual such as self-perceived competence, which is directly related to intrinsic motivation. The results from the current study examined the interaction between anxiety and performance-contingent rewards on the participant's intrinsic motivation to complete an anagram task.

Rachel Warner '08
Rebecca Fraser-Thill, Psychology
Sexual Teasing at Bates College
Sexual provocation or "teasing" involves the communication of intent, or an offer, to engage in sexual intercourse with an individual, and then an offer withdrawal, while all along having no intentions of engaging in the interaction. This discrepant form of communication is representative of the ineffective, unclear, and indirect communication that commonly occurs between potential casual sexual partners regarding sexual intentions. Understandably, miscommunication between partners occurs and may lead to potential negative consequences. Based on Meston and O'Sullivan's 2007 study, the current research was conducted at Bates with a randomly selected group of students. Findings indicate the degree to which sexual teasing is occurring at Bates College and outcomes associated with this behavior. The results also provide information from both the elicitors and the targets of this behavior about their involvement in sexual teasing. In addition, for those who indicated experience, their motives (or perceived motives) behind this behavior, their type of relationship and sexual his-

tory between the elicitor and target, their experiences and perceived experiences of the other person, and their reactions and outcomes associated with the interaction were investigated. Additionally, responses to scenarios of sexual teasing confirm sexual teasing's ambiguous nature and speak to the role it plays in rape myth ideology. Associations between sexual teasing and negative consequences emphasize the ineffective sexual communication methods as a risk factor and point to the need for intervention.

Madeline Weber '08
Jennifer Koviach-Côté, Chemistry
Steric and Electronic Effects of Secondary Alcohols on Reaction with Martin's Sulfurane
Martin's sulfurane is a dehydrating agent that is commonly used in organic synthesis which can give both elimination and oxidation products when reacted with alcohols in varying chemical conditions. In the case of secondary alcohols, it has been previously expected that only the elimination product will be formed, however this has proved to not always be correct. Depending on the characteristics of the R and R' groups, oxidation, elimination or ether products can all be formed. This research is intended to determine which steric and electronic conditions will result in the production of the elimination, oxidation or ether as the major product of the reaction.

Eleanor Yee '08
Amy Douglass, Psychology
An Evolutionary Perspective of Environmental Effects on Creative Thinking and the Role of Stress
This study used a 2x2 [(stress v. no stress) x (open-space v. cramped-space)] factorial design. Two work environments were created to resemble a spacious or a cramped office environment. Participants were asked to prepare a five-minute speech addressing their personal faults and undesirable habits. For the stress manipulation, participants were told that their speeches would be videotaped and evaluated. Next, participants were given three creativity tasks. The predicted findings are that stress will reduce creativity. However, the difference between the stress and no-stress conditions should be larger in the cramped-space condition than in the open-space condition. Finally, creativity will be enhanced in the open-space condition. The results from this study could provide information regarding the types of environmental factors architects should consider when planning a building intended to enhance creativity.

Alix Zamansky '08
Krista Scottham, Psychology
Looking at Sexual-Minority Youth through a New Lens: Using Photovoice to Examine Resilience
In collaboration with Outright Lewiston-Auburn and Proud Rainbow Youth of Southern Maine (PRYSM), this study explored resilience among gay, lesbian, bisexual, transgendered, questioning, and queer (GLBTQ) identified youth through a grassroots research method called photovoice. Participants were given cameras and asked to take pictures of their lives and come together for group discussions. A combination of content analysis and grounded theory were used to analyze the subject matter of the photographs. Strong social support systems, including participation in the GLBTQ community, were found to be particularly important for the youth who participated in this study. These findings suggest that youth organizations such as Outright and PRYSM, as well as, gay-straight alliances in high schools, are integral aspects of the lives of GLBTQ-identified youth.