

Celebrating

Collaborations



SMITH COLLEGE

Students and Faculty Working Together
Proceedings from April 16, 2005

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**Celebrating Collaborations:
Students and Faculty Working Together
Proceedings from April 16, 2005
Smith College**

Smith College's annual showcase of student research and performance highlights student intellectual achievements and their collaborative efforts with faculty in a variety of departmental, program and interdisciplinary projects. It is

a celebration
of liberal arts
education.

The 2005 event featured the work of 178 students, who participated in 145 sessions, with the guidance of 90 faculty members. Students participated in individual talks, panels, poster sessions, exhibits and performances, in the areas of science and technology; performing arts; and social, cultural and literary studies.

AFRICAN STUDIES

Rachel Balsham '05

Outlaw Markets: Two West African Case Studies

PowerPoint presentation deriving from thesis with Professor Catharine Newbury

Eve de la Mothe Karoubi '06

Corporate Social Investment or Counter-Productive Superficial Initiatives? A Case Study of CSI Programs in South Africa

PowerPoint presentation deriving from independent study with Professor Catharine Newbury

Allison Maranuk '08

Peace for Kids: From a Child's Dream to an NGO

PowerPoint presentation deriving from work with Professor Catharine Newbury

Allison Maranuk worked as the director of communications of Peace for Kids, a nongovernmental organization that helps improve the lives of children in war-torn countries. Her position included organizing a speaking tour for the founder and president of Peace for Kids, Kimmie Weeks, Amherst College '05. Kimmie recently returned to Western Africa to assess the needs of children in three war-torn countries and developed six campaigns that he thought would be most beneficial to the children. Peace for Kids is currently working on rebuilding playgrounds and supporting orphanages in Liberia; supporting a clinic in Ghana; building new latrines at refugee camps and a center for war-affected girls in Sierra Leone; and a scholarship fund in all three countries for children who lost their sight during the war. Maranuk was also responsible for various promotional and fundraising campaigns.

AMERICAN STUDIES

Jacqueline S. Shine '05

Building the Nation: America as Homeland

Paper presentation deriving from honors thesis with Professors Kevin Rozario and Jennifer Guglielmo

Jacqui Shine's honors thesis in American studies explored the connection between an observed national commitment to homeownership and the ideological currents that have constructed, institutionalized and sustained it, with particular attention to the interwar period (1922–1939). She examined a series of media-based programs and promotions that centered on the American home and appeared between World Wars I and II. She concluded that, through

films, public health campaigns and demonstration communities, the federal government influenced societal attitudes about ideas of home and the relationship of those ideas to American identity. It also developed a media-based state apparatus to model the normative qualities of an ideal American. This apparatus relied heavily on supporting and encouraging race, class and gender differences between citizens.

ART AND LITERATURE

Lilith Dornhuber deBellesiles '08

Producing *Metamorphoses*: An Introduction to the Publication Process of a Literary Magazine

Poster presentation deriving from STRIDE research with Professor Thalia Pandiri

Lilith Dornhuber deBellesiles presented the publication process of *Metamorphoses*, the biannual journal of the Five College Faculty Seminar on Literary Translation. She has been working on *Metamorphoses* as a STRIDE project with Thalia Pandiri. The project incorporated diverse aspects of the publication process, including copy-editing, updating the Web site, distribution and reviewing submissions. The spring 2005 edition of *Metamorphoses* was presented, along with previous issues, the Web site and a supplementary CD, in order to exhibit products of this ongoing endeavor. More information on *Metamorphoses* can be found at the Web site, www.smith.edu/metamorphoses.

Thalia Sparling '05

Indigenous Transformations: Art Identities in Central America

Painting exhibition and paper presentation deriving from work with Professor Nancy Sternbach

Thalia Sparling presented three paintings reflecting upon indigenous identity and transformation in Central American art. Sparling used literature, films and art from Nicaragua, Guatemala and El Salvador to identify the common themes and adaptations through the pre-Columbian, Colonial and Revolutionary periods. The paintings draw upon the importance of not only what is endemic to a place and its people but also what is made indigenous through cultural transformation. Sparling used architecture, sculpture, murals and paintings from many periods of Central American history to show how ideas and values are established and embellished.

Changxin Fang '05**The Pen and the Brush: Poems Drawn from Works of Art**

Poetry reading deriving from independent study work with Professor Eleanor Wilner

Changxin Fang's presentation consisted of a reading of poems she wrote in her independent study with poet Eleanor Wilner, the Grace Conkling Writer-in-Residence at Smith College. The theme of the poems is ekphrasis, or poetry drawn from works of art. With inspiration from diverse sources, such as Frida Kahlo, Andy Warhol and Japanese screen paintings, Fang's work blurs the boundaries between the written word and the painted image by verbally illuminating the meaning in works of art as well as providing new insights into well-known works. Many of her poems tell a story behind the creation of the art, thereby linking the public art with the artist and the viewer's personal history and imagination.

ASTRONOMY, GEOLOGY AND PHYSICS**Alicia Aarnio '05****Guilty By Association?**

Poster session deriving from work with Professor Suzan Edwards

Alexis Knaub '06**Violent Atomic Nuclei**

Poster session deriving from work with Professor Malgorzata Pfabé

Collisions between heavy ions were investigated within the semi-classical mean field formalism (BUU/BNV). Higher order terms were considered to create a fluctuation of the distribution function. Without fluctuations, the widths of calculated mass and charge distributions were too narrow compared to experiment. The implementation and effects of fluctuations on mean field dynamics and fragmentation were discussed using two methods. One assumed a local thermal equilibrium, determining the variances of density and introducing density fluctuations. Another approach had numerical noise leading to fluctuations. The mean field evolution of fluctuation depended on the system's stability. Central ($b=2\text{fm}$) and semi-peripheral ($b=6\text{fm}$ and $b=8\text{fm}$) collisions of the Sn+Sn system at 50 MeV were considered, using both approaches to study the distribution and time evolution of the number of fragments, charge distribution, isospin asymmetry and velocity correlations. Both ways lead to quite similar results for fragmentation and isospin distributions.

Lara Kapelanczyk '05**Dying, Icelandic Rift Offers Evidence for Magma Mixing**

Poster session deriving from thesis with Professor Mark Brandriss

Ana Cecilia Del Cid-Liccardi AC '05**Impact of Hurricane Jeanne on the Hydrochemistry of Kamposoa Bog**

Poster session deriving from special studies with Professor Amy Rhodes

Kamposoa Bog is a calcareous fen located in Stockbridge, Massachusetts, near the Massachusetts Turnpike. Highway runoff containing deicing salts is affecting the wetland chemistry. This study investigated the hydrochemical response of Kamposoa Bog during Hurricane Jeanne. Two hypotheses were tested: (a) rain will dilute the chemistry within the fen and in the outlet stream. The ratios between major ions will remain the same throughout the hydrologic event and (b) salt-contaminated water will exit the wetland during major hydrologic events such as hurricanes. A pulse of sodium, chloride, calcium and magnesium should be observed at the outlet sometime after the onset of the rain. Ratios between major ions may change if a different source of water, such as groundwater, is pushed to the outlet during the rain event. The results obtained indicate that dilution does happen at the onset of the rain event. They also show a visible pulse of ions exiting the wetland approximately half a day after the storm began. Following this pulse, chloride concentration decreased, but sodium and calcium remained elevated for almost half a day. This suggests that the peat mat is retarding the export of sodium and calcium from the wetland to the outlet. Further work should include identifying the chemistry and hydraulic conductivity of the peat.

Ellen Keene '05**Crossover from Collisional to Frictional Regime in a Three-Dimensional Granular Flow**

Poster session deriving from work with Professor Nalini Easwar

Ellen Keene made measurements of force fluctuations on the boundary of a cylindrical, three-dimensional, gravity-driven flow of glass spheres. The flow rate is controlled by an aperture far downstream from the measurements. As the flow velocity is decreased, Keene and Nalini Easwar observed a crossover from a situation where momentum is transferred to the walls almost entirely by collisions to a situation where balls are almost always sliding against the walls. They parameterized this transition by measuring the fraction of time a ball is in contact with the wall, a number that approaches unity in very slow flows prior to

jamming. They presented statistics of the force delivered to the wall in both regimes, finding that in the collisional regime distributions of force were similar to those previously found in two-dimensional flows (E. Longhi, N. Easwar and N. Menon, *Phys. Rev. Lett.*, 89, 2002), however, the distributions in the frictional regime were fundamentally new.

Sharlissa Moore '05

Supernova Search in Nearby Galaxies

Poster session deriving from Praxis research project with Professor James Lowenthal

Elizabeth Thomas '05

Greenhouse Gas Emissions at Smith College: A Comprehensive Inventory from 1990 to 2004 and Suggestions to Reduce Future Emissions

Poster session deriving from work with Gary Hartwell, Physical Plant

As part of Smith College's agreement with Clean Air/Cool Planet, Elizabeth Thomas collected data on the college's energy use (e.g., electricity, fuel for heating and transportation, solid waste). She used this data to calculate Smith College's greenhouse gas emissions for the years 1990–2004. This study provided insight into the sectors that contribute the most to Smith College's emissions. On-campus steam production accounted for 80 percent of the college's emissions in the fifteen years studied. This information is essential for Smith College's movement towards a more sustainable and "green" campus. The college now knows to concentrate efforts on improving steam production efficiency in order to make the largest impact in emissions reductions. Finally, the data required for a comprehensive greenhouse gas inventory is widely dispersed in different departments around campus. Thomas therefore made suggestions on how to facilitate the acquisition of this energy use data in the future.

Kristin Mayer '05

How Clay Mineralogy Affects the Ability of Grape Vines to Absorb Nutrients from the Soil

Poster session deriving from work with Professor Bob Newton

June Yeung '07

Effect of Road Salt on the Cation Exchange Capacity of Peat at Kamposoa Bog

Poster session deriving from STRIDE research with Professor Amy Rhodes

Elizabeth Thomas '05

Using Geochemical Evidence to Determine Sediment Provenance in a High Arctic Glacier–Fed Lake System, Linné Valley, Svalbard, Norway

Poster session deriving from work with Professor John Brady; Professor Al Werner, Mount Holyoke College; and Professor Steve Roof, Hampshire College

Elizabeth Thomas studied sediment provenance in Linnédalen as part of a larger National Science Foundation–funded Research Experience for Undergraduates project to monitor and calibrate lamination stratigraphy in a glacially fed arctic lake. Thomas used major and trace element geochemistry to determine the geochemical fingerprint of each source sediment. She compared this source data to the geochemical composition of samples from the inflow stream and from lake basins to determine glacial and fluvial erosion, weathering and mixing processes in the valley. This information can be used in the future to identify geochemical changes in lake cores and thus extrapolate changes in climate during the late Holocene.

Emily Gardel '06

Forces on the Wall of an Hourglass

Poster session deriving from special studies with Professor Nalini Easwar

It has been previously discovered that for a static column of granular material, the forces delivered to the walls is inhomogeneous. This is due to lines of stress through the system that are called "force chains." In her special studies project with Nalini Easwar, Emily Gardel investigated how stress is transmitted to the wall in a two-dimensional granular flow. To do this, the researchers took force measurements with a transducer at the wall of the system and velocity measurements with a high-speed camera. Analysis of this data has shown evidence of frequently colliding force chains that branch from inside the system to the walls. These frequently colliding chains in the dynamic granular flow are comparable to the force chains already observed for a static granular pile.

Darcy Lambert '05J and Laura Peterson '08

Measurements of Linearity of the Photomultiplier Used in a Precise Measurement of Electron Beam Polarization in the E158 Experiment at the Stanford Linear Accelerator Center

Poster session deriving from work with Professor Piotr Decowski

The aim of the E158 experiment at SLAC was to make the most precise measurement to date of a tiny effect called parity violation predicted by the Standard Model—the most exact model of subatomic particles yet known. The 100-parts-per-billion effect of parity violation is that

high-energy electrons polarized with left-handed spins would have a greater probability of collision with randomly polarized electrons (in liquid hydrogen, for instance) than high-energy right-handed electrons. This invariance with respect to reversal of coordinate axes is especially interesting because it is so bizarre, so tiny, and violates Einstein's Special Relativity. In order to make a very precise measurement of parity violation, the measurement of the polarization of the high-energy electron beam must also be very precise. Here at Smith College, Lambert and Peterson tested the accuracy of the photomultiplier that was used to measure the polarization.

Darcy Lambert '05J

Sharing Neutrons and Protons

Poster session deriving from work with Professor Malgorzata Pfabé

The BUU approach with density fluctuations was used to study the density dependence of the asymmetry term in the nuclear equation of state (EOS). Knowledge of the nuclear EOS is necessary for understanding nuclear binding, neutron stars and dynamics of supernovae explosions. To gain information about the density dependence of the asymmetry term, isospin equilibration was studied in reactions between projectile and target with different isospin asymmetry. In these cases, the asymmetry term provides diffusive forces that drive the isospin equilibration process. It was necessary to use observables that are sensitive to the stiffness of the asymmetry term. The isospin imbalance parameter, which measures the degree of isospin equilibration, seemed to be sensitive to the density dependence of the asymmetry term. This parameter was calculated for the asy-soft and asy-stiff EOS for the semi-peripheral ($b=6\text{fm}$) reactions of $\text{Sn}+\text{Sn}$ at 50 MeV/u, and the results were compared with experimental data.

Mariel Desroche '06

The Origin of Matter: Preheating in New Inflation

Poster session deriving from special studies and summer research funded by the Schultz Foundation, with Professor Gary Felder

Mariel Desroche focused on a computational analysis of the inflation field in the new inflation model. Her work was directed at determining the methods by which the field decayed. Using the LATTICEASY lattice simulation program, it was determined that in the model analyzed, a combination of tachyonic preheating and parametric resonance forced the field to decay within approximately five oscillations. Examination of the inflationary model is useful as a tool to assist in understanding the origins of our universe and the mechanics of high-energy physics.

BIOLOGY, CONSERVATION AND ENVIRONMENTAL STUDIES

Chan Lim '08

Are You "Green"? What Is "Green"? The Launch of Smith College's First "Green" Architectural Library Exhibit deriving from STRIDE research with Professor Gretchen Schneider

Jess Wallis '05

Forest Health and Diversity at Arcadia Wildlife Sanctuary

Poster session deriving from work with Professor C. John Burk

Jess Wallis surveyed the tree canopy, sapling, shrub and herbaceous layers of vegetation in a portion of the Arcadia Wildlife Sanctuary in Easthampton, Mass. The work was completed as a thesis project with adviser C. John Burk. Wallis completed the study in conjunction with an annual breeding bird census that takes place at Arcadia, documenting bird territories in the study area. Data extending back to 1975 illustrated interesting changes in plant cover, especially those due to a gypsy moth infestation around the 1980's. During that time, gypsy moths defoliated oak trees, and populations of the trees experienced a sharp decrease. Current data have shown that these oak populations are increasing once again.

Maja Gray '06

Flood Hazard Mapping for Northampton

Poster session deriving from special studies with Professor Robert Burger

Maja Gray's project focused on the natural disaster risk facing Northampton and Hampshire County. Using the Federal Emergency Management Agency's "HAZUS" software suite, she constructed depth maps for potential floods in the area and analyzed the consequences arising from such scenarios, including damage to structures, agricultural losses, shelter requirements and total recovery costs. Her project was designed to test the usefulness of the HAZUS software, and she has created a presentation outlining its uses and potential liabilities for risk mitigation applications with the intent of providing it as a resource to the Northampton emergency management community.

Claire Matthews '07 and Sarah Thomsen HC '06

The Plight of the Plover: Can Recreation and Endangered Species Mix?

Poster session deriving from work with Professor Thomas Litwin, Clark Science Center director, and Jennifer Seavey, research assistant

Anne Kubitsky '05

Sea Turtle Conservation: What Are the Issues and How Can We Get Involved?

Poster session deriving from work with Professor Paulette Peckol

Anne Kubitsky created a multimedia display on sea turtle conservation. The purpose was to highlight some of the negative anthropogenic effects on sea turtle survival and reproduction; to present a case study on turtle population dynamics off Magdalena Bay, Baja California Sur, Mexico; and to recommend active approaches that people can take to help protect sea turtles. The case study portion of Kubitsky's display was the product of her fieldwork with the School for Field Studies (SFS) in Mexico during fall semester 2004. After completing her work in Mexico, Kubitsky returned to Smith College to create this display as a special studies project under the guidance of Dr. Paulette Peckol, Department of Biological Sciences. Much of the research for this display was conducted in Loreto, BCS, Mexico, in January 2005 with support from the Smith College International Study Grant. Portions of this display have been translated into Spanish and donated to the SFS field station in Mexico and the Coral Reef Ed-venture program in Belize.

BIOLOGY AND GEOLOGY

Anne Jurkowski '05

The Effects of Predation on American Lobster Populations Over Time

PowerPoint presentation deriving from honors thesis with Professor L. David Smith

Anne Jurkowski's honors thesis evaluates the hypothesis that the recent increase in lobster landings is explained by a release from predation by groundfish. Through a comprehensive historical literature survey, she identified and analyzed the suite of species that prey on lobsters. She then explored the role of the most significant predators in regulating lobster abundance in the past and in today's ecosystems. Her research included a stomach-content study of seven fish species from Long Island Sound and the Rhode Island coastline that identified tautog and striped bass as potentially significant lobster predators. Finally, she conducted a case study evaluating the role of striped bass populations in the regulation of lobster stocks in Long Island Sound.

Allison Kerwin '05

D. cirrata: The Fastest Growing Moss in Geneva?

PowerPoint presentation deriving from work with Michelle J. Price, Université de Genève

Allison Kerwin presented her research from special studies with Dr. Michelle Price at the Conservatoire et Jardin Botaniques de la Ville de Genève. *Dicranoweisia cirrata*, a moss recently discovered growing in Geneva, was grown in culture. The germination and germination rates of spores and foliar gemmae were analyzed and compared over a period of 72 days. The foliar gemmae grew at an average rate of 28 cells per week and began germinating after only one day in culture. The spores began germinating after 17 days in culture and by the end of 72 days had grown an average of 14 protonemata cells. The rapidly germinating foliar gemmae are believed to play a key role in the local dispersal and recruitment of *D. cirrata*.

Alicia Simonti AC '05

Sea Stars Get Down! The Trace-Making Activity of Sea Stars: Long Island, Bahamas

Video documentary deriving from special studies with Professor Allen Curran

Alicia Simonti documented, via underwater videography, the trace-making activity of three sea star species (*Luidia alternata*, *Luidia clathrata*, and *Astropectin articulatus*) in a shallow carbonate bay. This project was the first documentation of this activity in a carbonate sand setting. These traces are known throughout the geologic rock record as the trace fossil *Asteriacites* and have been used as paleo-environmental indicators. In producing this video documentary, Simonti traveled to Long Island, Bahamas, to video the activity and then edited and produced the video using professional-grade editing software provided by Smith College's Media Services.

BIOSCIENCES STUDENT RESEARCH SYMPOSIUM

Brooke Betts '05, Wing-Yee Yeung '05, Abena S. Agyeman '04 and Carolyn Turcotte, Teaching Fellow

Modulation of Human GABA_A and Glycine Receptor Currents by Menthol and Related Monoterpenoids

Poster session deriving from work with Professors Adam Hall and Lâle Burk

The effects of common monoterpene alcohols and ketones were investigated on recombinant human γ -aminobutyric acid A (GABA_A; $\alpha_1\beta_2\gamma_2$) and glycine (α_1 homomers) receptors expressed in *Xenopus laevis* oocytes.

GABA currents were enhanced by coapplications of 10–300 μM : (+)-menthol > (-)-menthol > (-)-borneol >> (-)-menthone = camphor enantiomers > carvone enantiomers, with menthol acting stereoselectively. By contrast, thujone diastereomers inhibited GABA_A receptor currents while glycine currents were only markedly potentiated by menthol. Positive modulation by (+)-menthol was explored given its pronounced effects (e.g., at 100 μM , GABA and glycine EC₂₀ responses increased by $496 \pm 113\%$ and $135 \pm 56\%$, respectively). (+)-Menthol, 100 μM , reduced EC₅₀ values for GABA and glycine from 82.8 ± 9.9 to 25.0 ± 1.8 μM , and from 98.7 ± 8.6 to 75.7 ± 9.4 μM respectively, with negligible effects on maximal currents. This study reveals a novel neuroactive role for menthol as a stereoselective modulator of inhibitory ligand-gated channels.

Gitanjali Sidhu '06

The Identification of a T-DNA Knockout of the ELIP 2 Gene in *Arabidopsis thaliana*

Poster session deriving from work with Professor Carolyn Wetzel

Casey L. McGrath '05 and Rebecca A. Zufall, Postdoctoral Fellow

Genome Evolution in Ciliates with Extensively Fragmented Chromosomes

Poster session deriving from work with Professor Laura Katz

Tegan Ahmed '06, Mary Kathryn Dahlgren '06 and Mary Costello, UMass Graduate Student

Potentiation of Light-Induced Phase Shifts Using NPY and Serotonin Receptor Antagonists

Poster session deriving from work with Professor Mary Harrington

In mammals, the suprachiasmatic nucleus (SCN) is the master circadian pacemaker which can be shifted by both photic and nonphotic stimuli. Neuropeptide Y (NPY) is the primary neurotransmitter conveying non-photic information via the intergeniculate nucleus to the SCN (Harrington, 1997). Serotonin is the primary neurotransmitter used to convey nonphotic information to the SCN via the raphe nuclei (Meyer-Bernstein and Morin, 1996). Previous studies have shown that both NPY and serotonin administered are able to inhibit photic phase shifts (Yannielli and Harrington, 2000; Meyer-Bernstein and Morin, 1996). In hamsters, a NPY Y5 antagonist was able to potentiate phase advances after 10 days in DD, but not after only one day in DD (Lall, unpublished). Ahmed, Dahlgren, and Costello examined the effect of the Y5 antagonist in hamsters after three days in DD. In mice, NPY Y5 and 5HT-1A

receptor antagonists have not shown significant effects on phase delays (M. Costello, unpublished). The researchers examined the effects of these receptor antagonists on photic phase advances in C57 mice. In both of their experiments, they were unable to obtain significant differences between light alone and the combination of drugs with light. Further studies with mice are currently investigating the potentiation of light and combined drugs on younger C57 mice, since lack of a significant photic phase advance with the drug combinations could possibly result from the age of the C57 mice used in the treatments (approximately one year old). *This work was supported by a research contract from Pfizer, Inc., Smith College STRIDE, and grant RUI 0234203 from NSF.*

Autumn J. Griffin '05 and Angela Baron AC '03

Understanding the Phylogeography of Ciliates Using Molecular Markers: *Halteria grandinella* and *Meseres corlissi*

Poster session deriving from work with Professor Laura Katz and Oona Snoeyenbos-West, research assistant

Wiam Turki-Judeh '05

Cloning, Expression and Purification of the Polycomb Group Protein EZH2, a Drug Target for Metastatic Breast and Prostate Cancer

Poster session deriving from work with Jennifer L. Ekstrom, Michigan State University

Lee Yuan '07

Immunodetection of ELIP 1 and ELIP 2 in *Arabidopsis thaliana* After High Light Treatment

Poster session deriving from work with Professor Carolyn Wetzel

The function of Early Light Inducible Protein (ELIP) in the chloroplast remains unresolved. Using protein extractions in conjunction with Western blots from *Arabidopsis thaliana* plants subjected to high light and low light treatment, Lee Yuan investigated ELIP abundance in the chloroplast. Based on studies done in other plant species, ELIP expression is known to be induced by increases in light intensity. The ELIP mRNAs and protein are then degraded during recovery in low light intensity. Yuan immunochemically identified and analyzed ELIP1 and ELIP2 proteins for information concerning the location of these proteins and the conditions in which they were present in *A. thaliana*. She discovered that ELIP1 and ELIP2 appear to be present within the leaf membrane fraction after three hours of high light treatment but absent in low-light-treated controls.

Deborah Cwalina, Wilens Fellow and Kalina Dimova '04

Exercise-Induced Activation of MAPK and Akt Signaling Differs by Gender in Murine Skeletal Muscle

Poster session deriving from work with Professor Stylianos Scordilis

This study examined the role of gender in specific physiological responses in murine skeletal muscle following a single bout of downhill running. The researchers analyzed the effects of this run on a series of biochemical enzymes involved in intracellular signaling and stress responses: the mitogen-activated protein kinase (MAPK) cascade (extracellular signal regulated kinase 1 (ERK 1), ERK 2, ERK 5, p38 and c-Jun-NH₂-terminal kinase [JNK]) and Protein Kinase B (Akt). They found that the MAPK and Akt activity responses following the single exercise were gender-specific. Most changes in MAPK and Akt activities were found immediately after exercise through three hours postexercise and were completed by 24 hours. By far, females exhibited the most dramatic responses to exercise, significantly decreasing MAPK and Akt activity levels immediately following exercise through 12 hours postexercise. This work is the first to demonstrate gender differences of these fundamental signaling molecules in skeletal muscle.

Amy Toulson, Teaching Fellow

Population Genetic Structure of *Yucca brevifolia*, the Joshua Tree

Poster session deriving from work with Professor Robert Merritt

Jacquelyn Abbatantono '07

Molecular Characterization of ELIP 2 t-DNA Knockouts in *Arabidopsis thaliana*

Poster session deriving from work with Professor Carolyn Wetzel

Jill Falk '05

Expanding the Target of Bacteriocins: Chimerogenesis of Colicins E3 and E9

Poster session deriving from work with Professor Robert Dorit

Mary Doherty, Teaching Fellow

Molecular Markers for Assessing Community Diversity of Coastal Ciliates

Poster session deriving from work with Professor Laura Katz; Oona Snoeyenbos-West, research assistant; Barbara Costas, University of Connecticut; and George McManus, University of Connecticut

Jeanne McKeon '06, Anne Tanenhaus '07 and Taylor Heald '06

The Role of the Neuropeptide Y Y2 Receptor in the Circadian System of the Mouse

Poster session deriving from work with Professors David Bickar and Mary Harrington, and Penny Molyneux, research assistant

Carol-Anne McPeck '05

Complementation of an RnaseP RNA (mpB) Gene Deletion in *E. coli* by Homologous Genes from Related Eubacteria and Experimental in vivo Evolution of the M1 RNA Ribozyme

Poster session deriving from work with Professor Robert Dorit

Nichole Knight '07 and Tessa Robinson '06

Approaches to Studying Genome Evolution in Ciliates

Poster session deriving from work with Professor Laura Katz

Rachael Shifrin '05

Does the Seed Bank Affect the Standing Genetic Diversity of *Stellaria media* Populations?

Poster session deriving from work with Professor Robert Dorit

Sharon Wirant MA '05

Urinary Behavior in the Female Domestic Dog (*Canis familiaris*) in Relation to Stage of the Estrous Cycle, Location and Age

Poster session deriving from master's thesis research with Professors Betty McGuire and Katherine Halvorsen

Sharon Cudd Wirant, Betty McGuire and Katherine Halvorsen studied urine scent-marking in domestic dogs (*Canis familiaris*). Urine scent-marks convey information about age, identity, reproductive state, social rank and gender. Urinary behavior of ten intact female Jack Russell terriers, ranging in age from 1.3 to 8.7 years, was observed during walks in familiar and novel environments across three stages of the estrous cycle (anestrus, proestrus and estrus). Stage of estrus was assessed using vaginal cytology. Statistically significant higher proportions of directed urinations occurred during proestrus and estrus and at older ages. The proportions of directed urinations in relation to familiar or novel environments did not differ. Their finding that female Jack Russell terriers directed a greater proportion of their urinations during proestrus and estrus than during anestrus suggests that scent-marking with urine serves to advertise reproductive state in female domestic dogs.

Elyse Lasser '06 and Jessica Cardillo '04
Understanding Genome Complexity and Protein
Evolution in Ciliates: Insights from *Tetrahymena*
***thermophila* Mitochondrial and Protein Coding Genes**

Poster session deriving from work with Professor Laura Katz and Oona Snoeyenbos-West, research assistant

Renee Eriksen '05

The Taxonomic Status of the Dusky Salamander
Desmognathus planiceps

Poster session deriving from work with Professor Stephen Tilley

Fifty years ago, an amateur herpetologist described a new species of dusky salamander in Virginia that he called the flat-headed dusky salamander, *Desmognathus planiceps*. Seven years after the species was described, two other herpetologists went to the paratype locality to describe the species' habitat. They claimed to have found only the common northern dusky salamander, *D. fuscus*, and they designated the name of *D. planiceps* as synonymous with the name of *D. fuscus*. With allozyme and mtDNA data, Renee Eriksen and Stephen Tilley have shown that the flat-headed dusky salamander, *D. planiceps*, is, in fact, distinct from the northern dusky salamander, *D. fuscus*.

Lesley-Ann Giddings '05

NMR Kinetic Characterization of
Trifluoroacetylazetidine (TFAZE)

Poster session deriving from work with Professors David Bickar and Cristina Suarez

Talya Davis-Johnson '07

A Comparison of Internal and External Anatomy
of Agouti and Nonagouti *Peromyscus maniculatus*
gracilis

Poster session deriving from work with Professor Virginia Hayssen

As her STRIDE project, Talya Davis-Johnson examined the effects of the agouti gene in *Peromyscus maniculatus gracilis*, which controls coat color by influencing melanocortin receptors on pigment cells. This gene causes a yellow pigment to replace a black pigment in growing hair, but it may also influence internal anatomy. In this study, Davis-Johnson dissected deer mice, taking external measurements and weighing individual organs. Nonagouti *Peromyscus maniculatus gracilis* had shorter ears ($p=0.006$) despite longer body lengths ($p=0.007$) than agoutis; the mutants also had longer ($p<0.001$), wider ($p<0.001$) and heavier ($p=0.05$) spleens as well as heavier adrenals ($p<0.001$) and kidneys ($p=0.011$). These data

suggested that the agouti gene influences cells that are not responsible for coat color, possibly through melanocortin receptors.

Irma Torres-Leon '05 and Erika Barbero '06

Where Are the Bacteria? A Snapshot on the
Biogeography of Bacterioplankton off the Shores of
Ambergris Caye, Belize

Poster session deriving from work with Professors Laura Katz, Esteban Monserrate and Paulette Peckol

In addition to bioinformatics, Irma Torres-Leon applied molecular and genomic techniques to explore the role of human activity on the spatial biodiversity of bacterioplankton off the coast of Ambergris Caye, Belize. She collected seawater samples at sites with restricted human activity and nonrestricted human activity. She observed a borderline statistically significant ($t(4) = -2.863$, $p=.064$, $\alpha = 0.05$) relationship between human activity and the spatial diversity of bacterioplankton. Sites with relatively high human activity showed less bacterial diversity; in addition, they had fewer terrestrial and human known pathogens than sites with nonrestricted human activity. Torres-Leon pursued this project as a Mellon Minority Fellow in the summer of 2004 in collaboration with Erika Barbero and turned the project into her honors thesis.

Larissa Williams '05

The Use of the Brackish Water Clam, *Rangia cuneata*,
in the Biomonitoring of Polynuclear Aromatic
Hydrocarbons at the Marine Corps Air Station
(MCAS), Cherry Point, N.C.

Poster session deriving from work with Professor Paulette Peckol

For her senior honors thesis work, Larissa Williams investigated the biochemical consequences of polycyclic aromatic hydrocarbon (PAH) contamination in the brackish water clam, *Rangia cuneata*. She collected from several sites adjacent to a contaminated military base in North Carolina. She used biochemical and molecular techniques to assess the induction or repression of several proteins from the cytochrome P450 family. She found that the clams showed relatively low levels of contaminants at all field sites. This finding may be due to the fact that PAH compounds are hydrophobic and could not bind to the sandy substrates within the creek. The lack of high concentrations of contaminants in the adjacent creeks has led to a biochemically stable sedentary bivalve community.

Susan MacLauchlan '06 and Elizabeth B. Maynard '03

MAP Kinase Adaptations Following Unweighting and Reloading in the Rat Soleus Muscle

Poster session deriving from work with Professor Stylianos Scordilis

This study focused on how molecular changes are sensed in skeletal muscle during atrophy and the subsequent changes to the atrophied muscle when it is required to bear weight. The biochemical sensors examined were the enzymes in the mitogen-activated protein kinase (MAPK) cascades (extracellular signal regulated kinases (ERK1/2), p38 and c-JunNH2-terminal kinase [JNK]) in the rat soleus. They demonstrated that these MAPKs are exquisitely sensitive responders to the mechanical stresses in the absence and presence of exercise. Each cascade responded to the procedures independently, demonstrating the specificity of these pathways. Atrophy significantly decreased ERK1 and p38 activity while increasing ERK2 activity. Muscle damage caused by weight bearing significantly decreased ERK2 activity and increased p38 within six hours of regular function. This work helps us understand the cellular biochemical communications networks that signal stresses to the muscle and direct us to appropriate countermeasures for the damage seen in weight bearing.

Lindsey Lattinville '05 and Talya Davis-Johnson '07

Fertility in Agouti and Nonagouti *Peromyscus maniculatus Gracilis*

Poster session deriving from special studies and STRIDE work with Professor Virginia Hayssen

Lattinville and Davis-Johnson examined the effects of the nonagouti coat-color mutation on fertility in a colony of deer mice, *Peromyscus maniculatus gracilis*. Mutations of this gene producing high levels of agouti protein are associated with impaired fertility in mice, *Mus musculus*. The nonagouti mutation may therefore be associated with enhanced fertility. Lattinville and Davis-Johnson measured fertility in three ways: number of young per litter, time between pairing of mates and the birth of a litter, and overall proportion of successful mate pairings. Time between pairing of mates and the birth of a first litter was not significantly different; the proportion of successful mate pairings was identical. However, nonagouti *P.m. gracilis* produced larger litters ($p=0.001$), which supported Lattinville and Davis-Johnson's hypothesis.

Lea Occhialini '06

Xenomonitoring for Lymphatic Filariasis in Kirare Village, Tanzania

Poster session deriving from work with Professor Steven Williams; Sandra Laney, research associate; and Stephen Magesa, National Institute for Medical Research

Jill Angelosanto '05 and Jessica Slack '06

RimJ, a Regulator that Controls *pap* Fimbrial Transcription in Response to Environmental Stimuli in *Escherichia coli*

Poster session deriving from work with Professor Christine White-Ziegler

Amy Malhowski '05

Thermoregulation of Iron Acquisition Genes in Uropathogenic *Escherichia coli*

Poster session deriving from work with Professor Christine White-Ziegler

Uropathogenic *Escherichia coli* (UPEC) express pyelonephritis-associated pili (Pap) that allow colonization of the human urogenital tract, leading to upper urinary tract infections. *Pap* transcription is regulated in response to temperature variation; repression occurs during the transition from 37°C to 23°C. Environmental regulation of bacterial virulence is key to the bacterium's identification of location in relation to the host. Previously, Amy Malhowski and Christine White-Ziegler used DNA microarrays to identify other genes in *E. coli* K12 that are temperature-regulated similar to the *pap* operon. Several iron acquisition genes were identified (*btuB*, *cirA*, *fes*, *fecI*, *fepA*, *fepB*, *fhuE*, *entC*, *nrdH*), whose expression showed a statistically significant increase twofold or greater at 37°C as compared to 23°C. These results indicate that iron acquisition, known to be required for virulence in several pathogens, is influenced by temperature. To confirm the observed thermoregulation, quantitative real-time RT-PCR was used to measure *fes* and *cirA* transcription. At this point, *fes* and *cirA* QRT-PCR confirms the observed fourfold decrease from 37°C to 23°C. In the future, the researchers will test the other iron acquisition genes observed in the microarrays by RT-PCR to see if this upregulation at 37°C is more broadly applicable. Two proteins, RimJ and H-NS, known to repress *pap* transcription, are being tested for a thermoregulatory effect. Initial studies with *fes* and *cirA* show similar expression levels in wild type vs. mutant, indicating RimJ is not the thermoregulator. Malhowski and White-Ziegler are presently testing H-NS for a thermoregulatory effect. Future studies will investigate the effect of temperature on iron acquisition gene transcription under iron-limiting conditions. These studies will also indicate

the effect of *pap* in response to low iron. Ultimately, they will be able to determine if there is coordinate regulation of *pap* with iron acquisition gene transcription.

Elizabeth McCarthy '06

The Molecular Characterization of *ELIP1* Knockouts in *Arabidopsis thaliana*

Poster session deriving from work with Professor Carolyn Wetzel

Elizabeth McCarthy is currently working with Carolyn Wetzel to find a homozygous knockout of the *Early Light Inducible Protein 1 (ELIP1)* gene in *Arabidopsis* plants in order to determine the function of the gene product in plant biochemistry. The knockouts were created by the random insertion of a T-DNA into the *ELIP1* gene through *Agrobacterium* infection. The location of the T-DNA inserts in the *ELIP1* gene was identified using PCR, cloning and sequencing.

BIOTECHNOLOGY AND WORLD HEALTH

Jennifer Bienenstock '06

Patents and Patients: A Look at the Ethics and Economics of International Pharmaceutical Patents in the South African AIDS Epidemic

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

Jennifer Bienenstock looked at the interaction between brand name and generic drugs in the global market for AIDS pharmaceuticals and how that interaction affected incentives for innovation. She argued that international patent protection is necessary for the development of new drugs and that patent rights should be protected. Limiting profits, by allowing illegal generic competition, will decrease incentives for innovation and hinder much-needed progress, given the highly adaptive nature of the AIDS virus. In addition, she argued that—given the high cost of generic drugs for the developing world, much higher than annual healthcare expenditures per capita—there could be more effective means to save lives than by investing limited resources in drugs.

Cathryn Oakley '05

AZT vs. Clean Water: An Analysis of Tradeoffs in the Provision of Health-Related Goods to Africa

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

Cathryn Oakley explored policy options intended to halt the spread of AIDS in sub-Saharan Africa. As a more practicable alternative to the universal provision of anti-

retroviral medication, she explored the potential of externalities generated by an overall improvement in the level of public health. She found these externalities significant for both the HIV-infected and noninfected populations. For those who are HIV positive, Oakley found that a slightly increased level of public sanitation and immunization would increase the amount of time that person could live with HIV or AIDS. The noninfected population would also benefit from reduced disease, and the programs proposed were shown to be efficient allocations of resources.

Namrata S. Chandhok '05

Combating Hunger: Is Biotechnology the Answer?

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

Namrata Chandhok explored the potential use of genetically modified crops to address the problem of world hunger as a part of the Kahn Institute’s “Biotechnology and World Health” project. She looked into the risks and benefits of the technology. While the scientific arguments regarding the benefits and risks of genetically modified crops are similar for both developed and developing nations, the issues faced by developing countries are considerably different. The focus of her study was to examine issues pertaining to the appropriate use of agricultural biotechnology in the developing world.

Anna S. Graseck '05

Genetically Tailored Drugs: Helpful or Harmful?

Exhibit deriving from Kahn Institute Project “Biotechnology and World Health”

Prescribed drugs have always had the risk of being either ineffective or causing serious side effects. There have been few ways to distinguish those patients who will be helped from those who may be harmed. But new applications of pharmacogenetics and pharmacogenomics have created drugs tailored to the genes of patients. Anna Graseck’s yearlong research within the Kahn Liberal Arts Institute “Biotechnology and World Health” project explored this emerging science. She discovered that our genes are becoming an increasingly important factor in pharmaceutical treatment. Her research shows that customization has benefits of increased drug safety and efficacy, but these advantages are intertwined with significant economic, social and ethical concerns. This exhibit presents case studies from the perspectives of various stakeholders, highlighting both present and future challenges presented by this technology.

Rachel Shoichet '05**Reproductive Technology: Changing the Face of Society**

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

Isis Ward '05**Religion, Politics and Reproduction in Ireland**

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

For the 2004–05 academic year, Isis Ward has participated in the Kahn Institute project on “Biotechnology and World Health.” Ward has spent the year researching if and how the Catholic Church and its doctrines have influenced the politics, legislation and public debate of reproductive technologies in the Republic of Ireland. Research in this area was conducted through an in-depth analysis of the Irish Constitution, Irish legislation and Supreme Court cases, legal and medical journals, international media coverage and Catholic Church documents.

Emmi Felker-Quinn '06**Are People Petroleum Products?**

PowerPoint presentation deriving from Kahn Institute Project “Biotechnology and World Health”

Natalie Henderson '05**Sperm: One of the Many Chilled Products on the Market**

Poster deriving from Kahn Institute Project “Biotechnology and World Health”

Natalie Henderson examined the industry for donated sperm and the market forces that influence the industry. Her research included interviews with professionals from cryopreservation centers (sperm banks) and reviews of news articles, novels, journal articles, government reports and various Web sites. The exhibit covered many topics, including the industry history, the process of freezing sperm, industry size, characteristics of the good, the sperm buyers, the sperm sellers, the firms, the firm marketing strategies, sperm importation and exportation practices and industry regulations. After careful analysis, Henderson concluded that over the next decade the industry will face considerable consolidation, increasing sperm prices and a tightening of international regulations.

DANCE AND MUSIC**Meaghan P. Kennedy '05****Landscaping: A Dance and Video Performance Work**

Dance performance and video presentation deriving from work with Professors Susan Waltner and Rodger Blum

Meaghan P. Kennedy presented a trio of dancers in a performance that merged live and video choreography, work developed in partial fulfillment of her honors thesis. The performance explored landscaping materials through the dancer’s unusual interactions with familiar environments, both in the movement of the dancers onstage and three video segments projected on two screens. She also spoke on the particularities of simultaneous choreographic processes on video and live dancers, technical decisions and artistic process in the making of “Landscaping.” In a presentation of her thesis research, which includes the dance and video work, she discussed her theoretical research and conclusions about the implications of technological innovations in dance.

Anna Rose Lawrence '06, Toki Tahara '08 and Elizabeth Parker '08

Dvořák “Terzetto” in G Major, op. 74, for two violins and viola

Music performance deriving from work with Professor Joel Pitchon

ECONOMICS AND FOREIGN POLICY**Nupur Parikh '05****Why Attend School? An Economic Analysis of Primary School Attendance in India**

PowerPoint presentation deriving from honors thesis with Professor Roger Kaufman

Swarnali Ahmed '05**How to Wake Up a Sleeping Tiger: Bangladesh in Comparative Perspective**

Paper presentation deriving from thesis with Professor Karen Pfeifer

Swarnali Ahmed focused on identifying factors that help explain economic progress in Bangladesh and other developing countries. Situating her analysis on neoclassical and endogenous growth theories, she found that neither of these provided enough explanatory power for the Bangladesh case. Rather, she developed an econometric model to test her hypothesis that “good governance is essential to growth in less-developed countries like Bangladesh.” Her

econometric analysis shed light on some of the controversial aspects of the literature on governance, such as the relative importance to growth of certain governance variables like stability and democracy. These results opened the path to her contribution to the growing literature on neo-institutionalist theory, combining the econometric analysis with comparative systems analysis to explain how governance variables actually work in shaping economic growth and human development in a set of six comparator countries, including India, Pakistan, Sri Lanka, Malaysia and Vietnam, along with Bangladesh.

Nai Tai '07J

Is Britain America's Poodle?

Poster presentation deriving from work with Professor Jacques Hymans

Andrea Gouy '05

Why Are There So Few Elderly Muggers?

PowerPoint presentation deriving from honors thesis with Professor Randall Bartlett

FIRST-YEAR SEMINAR: STUDIES ON NORTHAMPTON STATE HOSPITAL

Elizabeth Cummings '08

The Case of the Missing Dome: What Happened to the Cupola that Sat Atop the Northampton State Hospital?

PowerPoint presentation deriving from work with Professor Tom Riddell

Emily Burrows '08

The Northampton State Hospital: Relics of Hospital Hill

Paper presentation deriving from work with Professor Tom Riddell

Emily Burrows participated in the first-year seminar concerning the evolution of the Northampton State Hospital. The seminar addressed many aspects of the hospital, such as changes in technology and healthcare, architectural planning and economic impact. Burrows created a newsletter with the goal of creating a better understanding and awareness within the community of the evolution of mental healthcare as well as the physical development of the now-abandoned site. The newsletter is also dedicated to the first-year seminar participants of fall 2004 in honor of their work and studies associated with the abandoned hospital.

Evan Sipe '08

The Northampton Mental Hospital Through the Ages

PowerPoint presentation deriving from work with Professor Tom Riddell

INTERDISCIPLINARY STUDIES

BIOLOGY, ENGINEERING, ENVIRONMENTAL SCIENCE AND POLICY, EXERCISE AND SPORT STUDIES, GEOLOGY, NEUROSCIENCE

Ronnie Yoo '05

Genomic Libraries and Comparative Gene Analysis for the Dog Heartworm Parasite *Dirofilaria immitis*

Poster session deriving from senior honors thesis with Professor Steven Williams

Ronnie Yoo worked on the optimization of the construction of genomic libraries for the dog heartworm parasite *Dirofilaria immitis*. The optimized protocol will be used for the construction of genomic libraries for the related human filarial parasites that cause African river blindness and elephantiasis. Comparative gene analysis will elucidate gene structure and regulatory regions of the critical parasite genes involved in infection, which is essential to identification of therapeutic targets for filariasis.

Amanda L. Gant '06

Light-Induced PER2 Immunocytochemical Staining in the Suprachiasmatic Nuclei

Poster session deriving from work with Professor Mary Harrington

Light is an important cue for resetting the internal circadian clock, allowing daily rhythms to synchronize to external light:dark cycles. The focus of this special studies experiment was the effect of light on expression of the *per2* gene in the mammalian circadian clock by developing a protocol for detection of the PER2 protein. An antibody to PER2 was used and various protocols for visualizing antibody binding to mouse brain sections were tested. After optimizing the protocol, various times after light exposure were tested, and the results were compared with brain tissue from non-light-exposed mice. Finally, a preliminary study of a potential "jet lag" treatment compound was found to alter the light-induced PER2 immunocytochemical staining. This work will lead to a better understanding of molecular events regulating entrainment of circadian rhythms and the development of pharmacological tools to treat circadian disorders.

Lucas Cheadle '05

The NMDA Receptor and Associated Postsynaptic Density Molecules Regulate Dendritic Growth

Poster session deriving from senior thesis with Professor Stefan Bodnarenko

In fulfillment of honors requirements in neuroscience, Lucas Cheadle studied the role of NMDA receptor-mediated glutamatergic activity in regulating retinal ganglion cell (RGC) dendritic growth during early developmental stages. He pharmacologically blocked NMDA-mediated activity during a highly proliferative developmental stage and quantified morphological characteristics of dendritic fields, such as dendritic elongation and branching complexity, for RGCs from treated and normal retinas. Given the effects of the blockade, he also investigated the temporal and spatial localization of the subunits of the NMDA receptor and its associated postsynaptic molecules CaMKII and PSD-95 in the retina during early development.

Mary Kathryn Dahlgren '06 and Katherine Kornecki '08

Circadian Luciferase Imaging: Circadian Rhythms Glow in the Dark!

Poster session deriving from work with Professor Mary Harrington and Penny Molyneux, research assistant

Circadian rhythms are approximately 24-hour rhythms generated by the body. In mammals, the suprachiasmatic nucleus (SCN) in the brain is the master circadian pacemaker, but other parts of the body can show circadian rhythms. Dahlgren, Kornecki, Harrington and Molyneux acquired mice from Dr. Erik Herzog (Washington University) derived from mice from Dr. J. Takahashi (Northwestern University). These mice have a transgene inserted and produce a fusion protein, PER2::LUC. This transgene causes the production of luciferase which allows tracking of the circadian rhythm via production of the PER2 protein. In this experiment, the researchers humanely killed heterozygous transgenic mice using an overdose of halothane anesthetic and prepared tissue cultures from brain and body tissues. Luciferin was added to the culture medium, causing the tissue to emit light equivalent to the amount of luciferase produced. Light was detected using photomultiplier tubes within the LumiCycle (Actimetrics, Inc.) with a turntable device that allowed them to monitor 32 cultures simultaneously. They found strong evidence for circadian rhythms in the SCN, liver, seminal vesicles, adrenal cortex, lung, testes, bladder, esophagus and spleen, and weaker evidence (less than four cycles) for circadian rhythms in the cornea, skin, pituitary gland, mammary gland, tail and thymus. The phase and period varied in tissues throughout the body, but the SCN phase led most body organs (except for tail and testes). In the

future, they hope to employ this technique in studies of jet lag and will test computational models explaining circadian rhythms at the molecular, cellular and systems level, collaborating with the UMass Clocks Club (Drs. Eric Bittman, Kris Hollot, Yossi Chait and Hava Siegelmann). This work was funded by NSF 0423200, Smith College STRIDE and the dean for academic development.

Renee Eriksen '05

The Taxonomic Status of the Dusk Salamander *Desmognathus planiceps*

Poster session deriving from work with Professors Stephen Tilley and Laura Katz

Merilie Reynolds '08

Hydrology Techniques

Poster session deriving from STRIDE research with Professors Andrew Guswa and Amy Rhodes

As part of a STRIDE project, Merilie Reynolds explored techniques for calculating stream stage and discharge. Her focus was a set of data from a stream in Monteverde, Costa Rica. This project is part of a larger effort to better understand the hydrology of the Monteverde region.

Jessica Wilbarger '08

The Form of Design: Surveying Engineering Capstone Design Courses Nationwide

Poster session deriving from work with Professor Susannah Howe

Wilbarger and Howe conducted a survey of senior engineering capstone design courses in colleges and universities across the United States. The survey acted as a follow-up to a similar study conducted by Robert Todd et al. in 1994, to identify both consistent trends and new situations that have arisen in engineering education over the past 10 years. Topics include the structure of the course, the focus of student projects, the role of faculty and sources of funding. Researchers have compiled a database of contact information for all accredited engineering programs in the United States and created a Web site for the survey. After receiving the responses from the survey in 2005, they plan to process and analyze the data and prepare a paper over the 2005–06 academic year.

Sara Therrien '06J

The Treatment of Multiple Sclerosis Using Monoclonal Antibodies

Poster session deriving from work with Professor Christine White-Ziegler

Sara Therrien studied the treatment of multiple sclerosis (MS) using monoclonal antibodies as part of an immunology research project for Christine White-Ziegler. She

discussed how MS is thought to be an autoimmune disease that destroys the myelin sheath that insulates axons. She emphasized that MS is a disease without completely effective treatment. The focus of Therrien's project was how monoclonal antibodies have the advantage of targeting different mechanisms in MS. She discussed how monoclonal antibodies are produced in the laboratory using mice and by what methods they can be "humanized." Using two different humanized monoclonal antibodies as examples, she highlighted how monoclonal antibodies target different mechanisms, their advantages and disadvantages and their performance in clinical trials.

Christina Gooch '07

Environmental Conditions of Serpulinid Worm Aggregation: Insights from Stable Isotopes of Worm Tubes from Western Ireland

Poster session deriving from STRIDE research with Professor Bosiljka Glumac

Celeste Caviness '05

Overuse Shoulder Injuries in Swimmers and Softball Players

Poster session deriving from work with Head Athletic Trainer Debra Coutu

MATHEMATICS

BIOLOGY

Jill Falk '05, Carol-Anne McPeck '05, and Rachael Shifrin '05

Experimental, Retrospective and Computational Approaches to Molecular Evolution

PowerPoint presentation deriving from work with Professor Robert Dorit

Nicole Rosendale '05

Outside of the Biological Bubble: The Sociopolitical Impediments to the Creation and Implementation of the HIV Vaccine

PowerPoint presentation deriving from work with Professor Robert Dorit

Mariel Finucane '05

Statistical Analysis of HIV/AIDS Data: Why What You Learned in Stats Class Won't Work

PowerPoint presentation deriving from honors thesis with Professor Nicholas Horton

Mariel Finucane's mathematics honors thesis, "Incomplete-Data Regression Models for Longitudinal Studies of HIV/AIDS," focused on two statistical problems that arise in the analysis of HIV clinical trials data. First, when repeated measures are taken on an individual in longitudinal studies, these observations are statistically dependent on each other and can thus skew estimates of variability. Second, it is seldom the case that all intended measurements are obtained; the result is missing data, which can induce bias into the estimation of regression parameters. Classical statistical methods are unable to address either of these problems. Finucane studied a computationally tractable "linear mixed effects model" that can accommodate incomplete longitudinal data, and then applied this model to a previously published dataset of HIV-infected individuals with a history of alcohol problems to determine the effect of alcohol use on HIV disease progression over time.

Stephanie Jakus '05

Pits, Peaks and Passes

Poster session deriving from work with Professor Jim Callahan

Stephanie Jakus wrote her senior thesis on the Morse Lemma, a seemingly modest lemma, which, in fact, has far-reaching consequences in topology, manifold theory, singularity theory and variation problems. Funded by Smith College with a Susan M. Rambo Fellowship, Stephanie spent summer 2004 researching background material relevant to her thesis. She chose to write her thesis on the Morse lemma because of its elegance and fundamental importance in modern manifold theory. In her poster session, she explained how handlebody theory can be thought of as a process of constructing a manifold by filling it with water.

CHEMISTRY

Min Zheng '08

Modeling Drinks per Day Using the Poisson Model: Does It Give the Right Answer?

Poster session deriving from work with Professor Nicholas Horton

As part of her STRIDE project, Min Zheng studied Poisson regression, a statistical technique used to model count outcomes. The goal was to examine the robustness of these models when the underlying data were not Poisson. She considered a trial of two treatments where alcohol consumption (drinks per day) was the outcome. She simulated data assuming that there were no differences between the two groups, but the distribution did not match the assumptions of the Poisson (it was overdispersed). For

each simulated dataset, she fit two models: the standard Poisson as well as a model that allowed the Poisson to be over-dispersed. She compared how often each of these models rejected the null hypothesis. She found that the Poisson model was highly anticonservative when the underlying distribution was not Poisson. This suggests that fitting incorrect Poisson regression models for data that were not Poisson yields incorrect answers.

Anu Singh Maharjan '06

The Anti-fertility Properties of Some Herbal Plants from South Asia

Poster session deriving from work with Professor Lâle Burk

In summer 2004, Anu Maharjan went to Nepal and gathered information about her grandmother's abortifacient medicines. Her research led to two major plants, *Aloe vera* and *Acacia catechu*. The present project involved an investigation of the bioactivities of the chemical constituents of these plants. The chemical and medical literatures were surveyed to document research in this area: it was found that while *Aloe vera* has been well-studied, little is reported on *Acacia catechu* constituents. *Aloe vera* contains the compound aloin, which has been shown to have anti-fertility activity. In the present work, chromatographic techniques were used to examine extracts from *A. vera* and *A. catechu* brought from Nepal. Further research in this subject will help our understanding of the biological activities of these natural substances and their modes of action.

Sara Green '06

Analysis of the Surface Etching of Si(100)

Poster session deriving from special studies with Professor Kate Queeney

The quality of the interface between a silicon surface and SiO₂ is important in the manufacture of microelectronic devices and dependent on the cleaning and oxidation of the silicon substrate. Surface impurities and the native oxide are removed from the silicon, resulting in a hydrogen terminated surface that is somewhat stable to ambient environments though subject to oxidation in aqueous solutions. This work uses surface infrared spectroscopy to examine the fate of surface hydrogen species when Si(100) is immersed in deoxygenated water. Selective isotopic labeling using D₂O reveals that an exchange of hydrogen species occurs between the surface hydrogen water. Complete etching of the initial hydrogen terminated surface occurs within the first 10 minutes of immersion and thus should compete with oxidation in the presence of dissolved O₂. Long-term etching of the H:Si(100) surface without the presence of dissolved oxygen results in a surface that is

more homogeneous than the initial one, terminated in a combination of {111} facets and (100) terraces.

LaToya Norman '06

Plant Pigments (Carotenoids): Nature's Paint Palette

Poster session deriving from special studies with Professor Lâle Burk

In preliminary work toward her upcoming summer research on pigment production in light-stressed plants, LaToya Norman investigated the distribution, biosynthesis and function of carotenoid pigments in nature. In plants, carotenoids are involved in light harvesting and photoregulation during photosynthetic processes. Other functions beneficial to the plant include photoprotection, radical quenching and color signaling.

Lindsay Hatch '06

Bacterial Digestion of Toxic Disinfection By-Products from Water Purification

Poster session deriving from work with Professor Maureen Fagan

Haloacetic acids are toxic compounds often formed in chlorinated drinking water. Lindsay Hatch has studied how and how fast bacteria can degrade haloacetic acids into nontoxic products.

Teresa L. Jacques '06

Synthesizing Palladium Enolates

Poster session deriving from work with Professor Maureen Fagan

Teresa Jacques has worked on the synthesis of elusive palladium enolates, compounds that are proposed but unobserved intermediates in reactions catalyzed by palladium. Palladium is a workhorse in the fine chemicals industry and one of the most heavily utilized elements for catalyzing organic reactions. Jacques' palladium enolates will be used to probe how such reactions really work and how they can be made more selective for the desired product.

Kristina Closser '07 and Amanda Freeman '06J

Making New Molecules Using Organic Chemistry

Poster session deriving from STRIDE research and senior honors thesis with Professor Kevin Shea

Kristi Closser has spent the past two years working in Kevin Shea's lab. Along with Miriam Quintal '04, she has worked on combining the Nicolas and Pauson-Khand reactions (both mediated by Co₂(CO)₈) to enable quick and efficient construction of tricyclic products. The focus of this research was on the successful synthesis of oxygen-containing tricycles of various sizes as well as the production of targets incorporating nitrogen and carboxylic acid nu-

cleophiles. Amanda Freeman, who has just joined Shea's lab this semester, will be exploring the stereochemistry of the Pauson-Khand reaction and the role that promoters play in it. Future research in this area includes exploring how different chiral promoters affect the enantioselectivity of the reaction.

Elizabeth Crawford '06 and Florina Voica '07
Reactivity of a Novel Diene in the Diels-Alder Reaction
Poster session deriving from work with Professor Kevin Shea

This project focused on the reactivity of dienes in the Diels-Alder reaction. Crawford, Voica and Shea predicted that a cobalt-complexed triple bond adjacent to a diene system would increase the reactivity of this compound in the cycloaddition reaction. To prove this, they used various dienophiles and showed that the Diels-Alder reaction takes place as they expected. The best result was using methyl vinyl ketone as a dienophile. With other substances they encountered problems that may be due to steric effects on the diene or polymerization of the dienophile. Trying to solve the steric problems, they decided to synthesize a new diene with a similar structure. They are currently investigating the synthesis of this diene and hope to explore its behavior in the Diels-Alder reaction shortly.

Jennifer Clemens '05
What Happens When Silicon Gets Wet?
Poster session deriving from honors thesis with Professor Kate Queeney

For her honors thesis in the chemistry department, Jennifer Clemens studied how exposure to water affects the surface morphology of silicon. Understanding how silicon surfaces react during manufacturing processes is necessary in the preparation of integrated circuits, which allow electronic devices to function. As consumers demand smaller and sleeker products, it becomes necessary to control the silicon surface on an atomic level. This work focuses specifically on the interplay between etching of the surface by minority OH⁻ species and oxidation by dissolved oxygen. A combination of Atomic Force Microscopy (AFM) and surface infrared spectroscopy was used to generate both topographical and chemical portraits of the surface as it evolves in aqueous solutions.

Jennifer Chan '05
A Comparison of Surface Chemistry of Nanophase and Conventional Al₂O₃
Poster session deriving from work with Professor Kate Queeney and Linda Schadler, Rensselaer Polytechnic Institute

With their improved osseointegrative properties, nanophase ceramics show great promise in the orthopedic and dental implant industry. Past studies that looked at nanophase and conventional Al₂O₃ revealed that the nanophase type demonstrated a better integration with human bone and protein than did the conventional type. Using infrared-spectroscopy, Jennifer Chan compared the surface chemical properties of nanophase and conventional Al₂O₃ samples that were prepared by the Materials Science Department at RPI. She found that differences in the surface chemistry existed between the nanophase and conventional forms that could help to explain why the nanophase exhibits greater bone-cell interaction.

Namrata S. Chandhok '05
Surface Interactions of Biopolymers: Role of Polysaccharide Adsorption in Biofilm Formation
Poster session deriving from work with Professor Kate Queeney

The key surface interactions that contribute to the adhesion of bacteria to solid surfaces, thereby leading to biofilm growth, are a result of protein and polysaccharide interactions with the surface. The objective of this study was to determine the adsorption process of polysaccharides to surfaces using transmission infrared spectroscopy. Alginic acid was used as a model polysaccharide for experimentation. The results of this experiment highlight the importance of the protein impurity in the polysaccharide solution for alginate adsorption. Based on experimental results, it is postulated that protein in solution adsorbs to the silicon surface, thereby conditioning it for adsorption of polysaccharides such as alginic acid.

Khanh-Van Tran '05
A Mechanistic Study of the Dakin-West Reaction
Poster session deriving from thesis with Professor David Bickar

The Dakin-West reaction is a simple and useful acid-ketone transformation tool. It is generally accepted that this reaction is a base-catalyzed condensation of anhydrides. Khanh-Van Tran and David Bickar found that 1-methylimidazole and triethylamine can efficiently catalyze the conversion of phenylacetic acid into ketones at room temperature. However, the catalysts favored the formation of two different major products. Triethylamine promotes the formation of dibenzyl ketone, while 1-methylimidazole promotes the formation of phenylacetone. The aldol-type mechanism proposed cannot account for the formation of two different major products by the base catalysts. They proposed that 1-methylimidazole forms an acyl-imidazolium intermediate while triethylamine acts as a base to catalyze the reaction.

Previously, it was reported that an ‘activated’ C-H group next to the carboxylic acid is needed for the reaction to undergo (Buchanan, G. L. *Chem. Soc. Rev.* 1988, 17, 91–109). This limits the practical application of the reaction. Van Tran and Bickar tested organic acids to expand the range of reactants and discovered that hydrocinnamic acid can undergo the Dakin-West reaction. The catalysis of hydrocinnamic acid to benzyl acetone by 1-methylimidazole implies that the carboxylic acid next to the C-H group is sufficiently activating to promote the extraction of the proton even by a weak base—1-methylimidazole.

Dezerie Smith '08

Polysaccharide Adsorption onto Water Loving Surfaces

Poster session deriving from work with Professor Kate Queeney

Examining potential hydrogen-bonding interactions between polysaccharides and surfaces is complicated by electrostatic interactions between acid groups on many bacterial polysaccharides and the negative charge on hydroxylated silica at neutral pH. Smith and Queeney are using the approach developed by Kozlov et al. (M. Kozlov and T. J. McCarthy, *Langmuir* 2004, 20, 9170–9176; M. Koslov, M. Quarmyne, W. Chen and T. J. McCarthy, *Macromolecules* 2003, 36, 6054–6059) to prepare hydrophilic, uncharged surfaces by the adsorption and crystallization of poly (vinyl alcohol) onto highly hydrophobic monolayers on silicon. Adsorption of both charged and uncharged polysaccharides will be examined on these surfaces.

Annamarie Harmon '08

The Effect of pH on Si(100) Etching in Water

Poster session deriving from STRIDE research with Professor Kate Queeney

Deoxygenated neutral water has been shown in Queeney's lab to etch hydrogen-terminated Si(100) to create a unique surface morphology characterized by {111} facets and regions of as-yet unspecified (100) termination. This work explores the hypothesis that hydroxide ions, OH⁻, are responsible for the observed etching by comparing etching in neutral water to etching in ammonium hydroxide of pH 8. Their results show that, as expected, etching is much faster with a higher concentration of OH⁻. What is somewhat surprising is that, even at this relatively low basic pH, the surface morphology achieved is slightly different from that produced in neutral water for longer times. They interpret these results in light of their current models of the (100) termination.

Linjuan Qian '05

Modern Computing Languages as a Toolbox for Mathematical Statistics Experimentation

Poster session deriving from work with Professor Nicholas Horton

Linjuan Qian and colleagues at Smith College and the University of Washington described how R, an environment for statistical computation, could be used in a mathematical statistics course as a toolbox for experimentation. They presented three case studies and activities: the calculation of a running average; sampling from multivariate normal distribution; and bootstrapping of a sample statistic. These activities, often requiring only a few dozen lines of code, offered students the opportunity to explore statistics concepts and experiment. In addition, these example topics provided an introduction to R syntax, capabilities and idioms, and the power of this environment. Their paper was published in the November 2004 issue of *The American Statistician*.

Alexandria Miller '05

File Me Under A!: How Anonymous Is the Icelandic Health Sector Database?

Poster session deriving from Kahn Institute Project “Biotechnology and World Health”

Laura Haynes '05

Chemistry Fairies: An Accessible Visual Language for Chemical Phenomena?

Poster session deriving from Kahn Institute Project “Visual Languages”

As part of the Kahn Institute's “Visual Languages” project, Laura Haynes investigated the images of Lucy Rider Meyer's “chemistry fairies.” Sparked by the enthusiasm of other fellows of this Kahn project, she explored how the use of such images could be used to express more complicated chemical phenomena. In her work, she noted the difficulties that can arise from creating a new system of notation, even if the fundamental concept is easy to grasp. Specifically, in representing the reaction of hydrogen with oxygen to generate water, she became aware of the difficulties in creating a dynamical notation when limited to two-dimensional space.

Abigail Gambrell '05

Behavioral Flexibility and Intelligence in Two Crow Species: The Indian House Crow (*Corvus splendens*) and the American Crow (*Corvus brachyrhynchos*)

Poster session deriving from Kahn Institute Project “Visual Languages”

Abigail Gambrell examined how behavioral flexibility in free-living Indian house crows (*Corvus splendens*) and

American crows (*Corvus brachyrhynchos*) in foraging method may be an observable demonstration of intelligence. Crows were systematically offered food in a number of different settings in an attempt to generate variation in time taken to recognize, respond to and access the item. Frequencies of the motor patterns used to access the item were also recorded. Significant differences were found in these latencies and the motor pattern frequencies. Crow recognition of food resources varied significantly by setting for both Indian house crows ($F = 3.12$; $P = 0.014$) and American crows ($F = 31.06$; $P < 0.00'05$). Latency of crow access also varied by food setting ($F = 23.52$, $P = 0.008$ for Indian house crows; $F = 4.99$; $P = 0.01$ for American crows). Both Indian house crows ($*2 = 246.79$; $P < 0.00'05$) and American crows ($*2 = 843.10$; $P < 0.00'05$) were also distinct in which motor patterns were used to access specific food settings.

PSYCHOLOGY, SOCIOLOGY AND IDENTITY

CHILD DEVELOPMENT

Chie Kotake '05

Children Drawing Human Action: Putting Time and Motion in a Static Image

Poster session deriving from work with Professor Peter Pufall

Chie Kotake studied how children depict humans and human actions and focused on the individual and normative development of the use of profile, kinematics and linear convention as artistic devices to depict human movement.

Robey Champine '07 and Maria French '07

Approaching a Paradox: How Do Children Preserve Their Individual Style While Drawing Pictures to Look Different?

Poster session deriving from work with Professor Peter Pufall

As part of a STRIDE project, second-, fourth- and sixth-grade children were asked to draw three different houses representing three different genres: a house as it might appear on a sign directing people to an open house (*signage*), as it might be illustrated in a magazine (*illustration*) and as art in a museum (*museum*). Would children preserve their individual drawing styles within drawings in which they are trying to create different genres? Children preserve individual style even though their drawings captured differences in genre, and did so at all three grade levels. Individual style appears to be preserved by the man-

ner in which children manipulate the quality and type of line as well as their use of depth. By contrast, they achieve genre differences by changing the shape and size of houses as well as by drawing houses on signs and within frames.

Sally Miller '05

A Study of Non-medical Treatment for Children With Mild to Moderate ADHD

PowerPoint presentation deriving from project work with Professor Benita Jackson

There is an increasing call for the development of non-pharmacological treatments for childhood Attention Deficit Hyperactive Disorder (ADHD). Some parents have noted that their children appear tranquilized when medicated with current standard stimulant medication, their personalities dulled along with the ADHD. Little is known about the mechanisms of popular treatments, including the levels of stimulant medication that may be toxic to children and the long-term effects of those medications. Sally Miller proposed a study to examine the effectiveness of exercise therapy and behavioral therapy in treating mild to moderate childhood ADHD. Miller hypothesized that the combination of exercise therapy and behavioral therapy would be as effective in the reduction/control of ADHD symptoms as stimulant medication treatment.

Jessica Bean '07 and Julie Goshe '07

Children's Understanding of the 2004 Presidential Elections: Why They Think Bush Won and Kerry Lost

Poster session deriving from work with Professor Peter Pufall

Third- and sixth-grade children answered questions about why they thought voters supported or did not support Bush and Kerry in the election of 2004. The younger and older children differed in their views about what candidate factors led voters to support or not support Bush, but they did not differ in their views about voter attitudes toward Kerry. The younger children suggested presidential experience was the basis for voters to support Bush, but his stance on the issues guided those who did not support him. Older children emphasized Bush's stance on the issues as reason for voter support and opposition. Children at both ages thought voters' views of Kerry included presidential readiness and personal characteristics as well as his stance on the issues. Children at both ages alluded to the negative tone of the electorate, suggesting that they perceived the emotional reactions of voters to their choices.

Jesse Leins '05**Stress and the Parent-Child Relationship**

Poster session deriving from work with Professors Peter Pufall and Charlotte Wilson, University of Cambridge

Katherine McCarthy '05**The Relationship Between Compulsive Buying and Depression, Self-Ambivalence, and Early Developmental Influences**

Poster session deriving from special studies with Professor Randy Frost

Katherine McCarthy studied compulsive buying and compulsive acquisition in a college population. She learned that compulsive buyers have tended to report a range of cognitive issues including having deficits in decision-making, emotional attachments to objects, erroneous beliefs about possessions and other maladaptive beliefs (Kyrios, Frost and Steketee, 2004). These deficits may be affected by their early developmental influences, such as overprotective and highly demanding parents (Kyrios et al., 2004). McCarthy hypothesized that compulsive buying and compulsive acquisition of free things would be correlated with depression, early developmental influences and self-ambivalence. The findings of her study indicated that compulsive buying and compulsive acquisition of free things were highly correlated with depression, and depression may have mediated the relationship between compulsive buying and having experienced feelings of uncertainty about oneself and others in early attachment relationships. She also found that when depression was controlled for, self-ambivalence and fears about decision-making were no longer related to compulsive buying.

EARLY CHILDHOOD EDUCATION**Justin DiMatteo Ed.M. '05, Hallie Godshall Ed.M. '05, Meredith Golding '06, Heidi Keirstead '06, Elizabeth Moeykens '05 and Abigail Vaughn Ed.M. '05**

Childhood: Potential, Possibilities and Promise in Reggio Emilia, Italy

Panel presentation deriving from work with Professor Susan Etheredge and Martha Lees, Director of the Center for Early Childhood Education at Fort Hill

In February 2005, six Smith College students, together with faculty, participated in an international student/faculty pilot project focusing on a study of the philosophy and pedagogical approaches in the world-famous early

childhood schools of Reggio Emilia, Italy. Reggio Emilia, a city of 140,000 outside Milan, has become known for its commitment to high-quality, city-subsidized education and care for children ages zero to six. Inspired by the educational reforms in Europe during the 1950s and 1960s, these well-regarded schools have become a source of inspiration for scholars and educators from many countries all over the world. The Smith students produced a multimedia presentation that documents their journey in the pilot study tour, focusing specifically on an overview of the philosophy and pedagogy of the Reggio Emilia Approach. Included are students' observations and reflections of their experiences in Reggio Emilia and implications for practice in American schools.

Catherine Lewis '05**To Pop or Not to Pop: Elementary Teachers Explore Engineering Design with Pop-up Books**

PowerPoint presentation deriving from work with Professor Susan Etheredge

What is engineering? What do engineers do? What is the engineering design process? What is the relationship between engineering and the liberal arts? Why should we teach engineering in the elementary school classroom? What should engineering education look like in the elementary school classroom?

This research project described how a group of elementary school teachers pursued and answered these questions by exploring, experimenting with, and engineering pop-up books during a two-week professional development summer institute held at Smith College in 2004. A team of faculty and students from the college's departments of engineering and education and a secondary school technology education teacher led the project-based institute. The power and potential of pop-up books to teach elementary school teachers about engineering principles and design was the primary focus of the project. Included are examples of the pedagogical methods, models and materials used to engage the teachers in paper engineering through an immersion into the world of pop-up books.

Ashley Barton '07, Andrea Gouy '05 and Carolyn Trench '07**Connections, Curriculum and Construction: Early Childhood Environments**

Poster and video presentation deriving from special studies with Professor Susan Etheredge

This special studies project focused on a study of the construction of space and place in early childhood environments. The student researchers were participant-observers in the preschool classrooms at the Smith College Center for Early Childhood Education at Fort Hill,

specifically exploring how teachers and children have been preparing for their move to a newly constructed early childhood center, to be opened on the Fort Hill campus in September 2005. This study offered a documentation and analysis of words, thoughts and images from each preschool classroom, as teachers and children engaged in project-based curriculum that explored the building construction process.

HEALTH

Victoria Churchill '07 and Jessica Chiang '07

HIV/AIDS: Social Stigma and Personal Liberation

[PowerPoint presentation deriving from a class project with Professor Benita Jackson](#)

Victoria Churchill and Jessica Chiang studied issues surrounding disclosure of HIV-status. Given that society tends to blame victims for their chronic condition and tends to hold false beliefs about contracting the virus, many HIV-positive individuals avoid disclosing their status. They fear the social rejection, abandonment, discrimination and stigma that they perceive will be associated with disclosure. However, nondisclosure worsens psychological well-being, as victims become more depressed, stressed and anxious. On the other hand, disclosure allows victims to cope and find meaning in their illness, which may lead to increased well-being. Furthermore, disclosure serves to educate society about the realities of HIV, which in turn is linked to decreased discrimination against those who are HIV-positive. Interventions and implications of such findings are discussed.

Sophie Kerszberg '05

Treating Male Bulimia with CBT, Meditation or Both: A Controlled Blinded Study

[PowerPoint presentation deriving from a seminar project with Professor Benita Jackson](#)

Although cognitive behavioral therapy (CBT) is the most successful form of treatment for bulimia nervosa, less than half of those treated fully recover. The objectives of this study are to (1) test the effectiveness of mindfulness meditation instruction in treating bulimia, particularly in boys, and (2) to gain a more thorough understanding of bulimic pathology in boys, who represent about 10 percent of eating disorder cases. Sophie Kerszberg proposed that mindfulness meditation may increase the effectiveness of CBT by lowering stress and negative affect and increasing sense of control and positive emotions.

Jess Kulig '05

Investigating the Effectiveness of Abstinence-Only vs. Comprehensive Sex Education

[PowerPoint presentation deriving from special studies with Professor Benita Jackson](#)

Recent reports indicate that the areas of the United States in which abstinence-only sex education is taught are also the regions with the highest rates of teenage pregnancy and sexually transmitted infections (STIs). Jess Kulig evaluated the effectiveness of this approach as well as other more comprehensive sexual education programs. While abstinence-only sexual education may be appropriate for students who have yet to initiate sexual intercourse, comprehensive sexual education provides information about contraceptive options that are vital to STI and pregnancy prevention for those who choose not to abstain. Kulig proposed a continuum model of sexual education that begins with an abstinence-only approach and incrementally transitions across childhood and adolescence into a comprehensive program.

Jessica Chiang '07, Victoria Churchill '07, Sophie Kerszberg '05 and Jessica Kulig '05

What Is Health Psychology?: Hot Topics and New Research

[Panel presentation deriving from work with Professor Benita Jackson](#)

INTERSECTIONALITY

Jennifer Liberty '05

Comparing Life Goals in Women of Different Ages

[Poster session deriving from special studies with Professor Bill Peterson](#)

In this special study, 115 college women were polled to compare life goals and feelings about life. This was done using 51 subjects who were traditional-age college students, and 64 who were nontraditional-age Ada Comstock Scholars. Findings yielded that family members and friends were more influential in the traditional-aged students' lives regarding the decision to attend Smith, while professors and mentors were more influential in the lives of Ada Comstock Scholars. Out of four psychosocial feelings about life (identity certainty, generativity, confident power and concerns with aging) there was a significant effect for confident power. Ada Comstock Scholars had more confident power. For generative feelings and identity certainty, there were trends. Traditional students felt more certain of their identity. Older Ada students had more generative feelings than younger Ada and traditional students.

Aditi Desai '05

Differences in Generativity and Activism Amongst a Sample of Younger and Older Ada Comstock Scholars

Poster session deriving from special studies with Professor Bill Peterson

Aditi Desai studied the effect of age on generativity and activism amongst younger and older Ada Comstock Scholars. The sample of 65 Ada students was split into two groups. Group one had 41 Ada students under the age of 39 and group two had 24 Ada students over the age of 39. The mean age of the younger Ada students was 30.78 (range of 22–38) and the mean age of the older Ada students was 48.58 (range of 40–58). Older students scored significantly higher on generativity than did younger. Older Ada students also scored significantly higher on participating in activist activities categorized as 1960s movements and as contemporary movements. The relationship between age and the variables of generativity and activism raises questions about social and individual impetus for activist behavior.

Kristine Molina '05

The Effects of Stereotype Threat on the Test Performance of Latina College Students

Poster session deriving from special studies with Professor Lauren Duncan

Stereotype threat is the threat of being negatively stereotyped in a domain that one strongly identifies with (e.g., academics; Steele, 1997). This theory has mostly been tested on African Americans and women. However, since Latinos are the fastest growing ethnic minority group in the United States, it is important that researchers look at the effects of stereotype threat on their test performance. Kristine Molina and Lauren Duncan developed this empirical study as part of Molina's special studies literature review during her junior year. Molina examined the effects of stereotype threat on performance on an advanced verbal test in 88 Latina college students. Participants were randomly assigned to one of four conditions: (1) no threat, (2) gender threat only, (3) ethnicity threat only and (4) ethnicity and gender threat. Molina found no statistically significant differences between the four conditions on test performance. Moreover, she found no differences in GRE scores by ethnic or gender identity.

SOCIOLOGY AND IDENTITY

Nevena Zhelyazkova '05

Does the Development of Feminist Identity Prevent Women from Experiencing the Negative Effects of Stereotype Threat?

PowerPoint presentation deriving from work with Professor Lauren Duncan

This research was carried out as part of Nevena Zhelyazkova's honors project in the psychology department and built upon the work of Lauren Duncan and Maryjane Wraga. They had previously shown that the experience of stereotype threat could impair women's performance on standardized assessment measures involving visio-spatial skills if the widely known stereotype of male superiority in the domain was made salient immediately before such a task. Zhelyazkova's research focused on exploring whether the performance of a special group of women—strongly identified feminists—would also be negatively influenced. It was expected that the feminist perspective of such women would allow them to interpret gender stereotypes in alternative ways, which might have made them less susceptible to their negative influence. It appeared, however, that in this particular study the stereotype did not hinder the performance of any of the Smith College participants and therefore reliable conclusions could not be drawn.

Sarbani Hazra '05

Acculturation and Family Environment Influences on Gender Ideology in South Asians in the United States

PowerPoint presentation deriving from work with Professor Lauren Duncan

Sarbani Hazra examined the influence of acculturation on gender and political beliefs in college-aged South Asian women at Smith College and the University of Massachusetts/Amherst. The participants were asked to complete a questionnaire that included items assessing acculturation, gender role beliefs and political beliefs. The results showed a main effect for identification with American culture in gender role egalitarianism, that is, highly identified participants were more egalitarian about gender roles. There was also a main effect for identification with American culture in importance placed on American events, with highly identified participants placing more importance on American events. There were no differences in identification with feminism, importance of South Asian events or overall political events with acculturation. Additional studies are needed in this area because there is little known about the well-being and political beliefs of South Asians in America.

Emily Dunsmore '05

Consumption and Identity for Online First Person Shooter Computer Gamers: An Ethnographic Study of a Technologically Mediated Community

PowerPoint presentation deriving from work with Professor Nancy Whittier

Emily Dunsmore's special studies project was a yearlong ethnographic study of the technologically mediated community of multiplayer first person shooter (FPS) computer gamers. She analyzed how gamers use the consumption of technological gaming products to construct social relationships. Her research allowed her to locate fascinating parallels among the social identities of gamers, their consumer demands and product advancements in the gaming industry. She employed the sociological concept of a "compulsion of proximity" (Boden, Molotch, 1994) to locate the nexus between changing consumer culture and gamer identity.

Sara B. Pierotti '05

The Relationship Between Perfectionism and Goal-Setting in Elementary School Students

Paper presentation deriving from honors thesis with Professor Patricia DiBartolo

Sara Pierotti's honors thesis examined the phenomenology of goal-setting in perfectionist and nonperfectionist elementary school children. Perfectionism is a risk factor for a host of psychological problems in adults, including anxiety, depression and eating disorders, but little research has centered on perfectionism in children. Moreover, a central component in the construct of perfectionism is the setting of excessively high standards. However, in her study of 104 third- through sixth-grade students, Pierotti found that perfectionist children did not set higher goals for performance on a laboratory task than their nonperfectionist counterparts, although they evidenced distinct cognitive and affective patterns. This study was one of the first to examine standard-setting in children, and its results will be integrated into a preliminary model of how perfectionism affects children's responses to novel tasks.

Heather Neal '05

The Effects of Massage on Self-Reported and Physiological Measures of Stress

Poster session deriving from work with Professor Patricia DiBartolo

Heather Neal measured the effects of massage on self-reported and physiological measures of stress in a sample of female college students. The study took place one day before the beginning of exam period to ensure high stress levels. For each student, heart rate, salivary cortisol, blood pressure, oxygen, anxiety, mood and perceived stress levels

were measured before and after one of two conditions: sitting in a massage chair receiving massage for 20 minutes or simply sitting in a massage chair for 20 minutes. Although there were no significant group differences on physiological measures of stress, the massage group showed a significant decrease in stated anxiety scores post-condition relative to the no-massage group.

Kristine Molina '05

A Comparison of Public Speaking Anxiety and Fear of Negative Evaluation in First-Year College Females

Poster session deriving from work with Professor Patricia DiBartolo

Public speaking anxiety is the most common fear in the general population (Mannuzza et al., 1995 as cited in Hofmann and DiBartolo, 2000). Kristine Molina and Patricia DiBartolo examined whether students in a first-year seminar emphasizing public speaking skills and practice would have lower scores on measures of social anxiety and fear of negative evaluation over the course of a semester when compared to a control group of first-year students. They also examined whether time spent on actual presentation preparation and how well prepared one felt for giving a talk predicted scores on these measures for the first year seminar students. There were 66 participants: 26 in the first-year seminar and 40 in the control group. They found that their Mixed-Model Repeated-Measures MANOVAs showed an interaction effect for time and type of group for FNE, SSPS-N and SSPS-P scores at the two different times, such that those in the First-Year Seminar group showed a significant decrease in FNE and SSPS-N scores and an increase in SSPS-P scores at the end of the semester in comparison to those in the control group. Furthermore, they found that time spent preparing for a presentation and level of preparedness one felt for giving a talk did not predict end-of-semester scores on any of the measures. This project was developed as part of Molina's work as a research assistant with DiBartolo.

Sanden Averett '05, Chia Yen Li '06, Chris MacMillen HC, Carise Raney '05, Suzanne Skotheim '05 and Lisa Smith '05

How Do Perfectionists Look at the World? An Investigation of the Cognitions of Perfectionists in Response to Hypothetical Scenarios

Poster session deriving from work with Professor Patricia DiBartolo

Kristine Molina '05**Ethnic Identity and Its Relation to Race-Related Stress****Poster session deriving from work with Professor Patricia DiBartolo**

Recently, there has been an increase in research that looks at race-related stressors, as well as the conceptualization of the influence these stressors have on psychological distress and health status (Neville, Heppner, Ji and Thye, 2004). Kristine Molina and Patricia DiBartolo examined the relation between time spent thinking about how one's life is affected by one's ethnic group membership and race-related stress. They investigated whether white women and women of color differed on race-related stress and ethnic identification. Additionally, they wanted to see whether the level of ethnic identity and the level of attachment to one's ethnic group predicted race-related stress. Their sample consisted of 53 participants: 30 women of color and 23 white women. Their results showed that thinking about how one's life is affected by ethnic group membership did not relate to the amount of race-related stress experienced. They also did not find that level of attachment toward one's ethnic group predicted race-related stress. They did find that women of color experienced more race-related stress than white women but did not differ on ethnic identification. This study stemmed from another project Molina completed with classmates in DiBartolo's PSY 358 Experimental Investigations course during fall 2002.

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