



Abstracts

9:30 -10:40

Change**NGO Strategies to Defend and Advocate for Children's Human Rights in Central America and the Caribbean (panel)
Science Center 278**

Analucía Martínez '07, Economics, Rosa Fernández '07, History, Rebeca Tezagüic '06, Psychology and Latin American Studies, and Celeste Owens '05, Sociology and Latin American Studies
ADVISOR: *Alejandra Osorio, History*

Approximately 40 million street children survive in Latin America. If they were all in one place, they would have their own country. Without strong governments, the responsibility of building stronger communities has increasingly fallen on the shoulders of socially responsible citizens and grassroots organizations. During the summer of 2004, Analucía Martínez helped organize a festival with Contexto Foundation that empowered children to voice their concerns about serious issues in El Pueblito, Guatemala. At Casa Alianza, Rosa Fernández researched the role played by the United Nations, NGOs, and local governments in protecting children's rights in Costa Rica. At Fundación Paniamor (Costa Rica), Rebeca Tezagüic helped raise awareness about the Code of Conduct for the Protection of Children and Adolescents from commercial sexual exploitation. Finally, Celeste Owens worked advocating for the rights of working youth with Acción Callejera, an NGO responsible for shaping El Código de la Niñez in the Dominican Republic. (Research supported by the Office of the Dean of the College.)

Literature and the Arts**Expression in the Arts (literary readings) Ferguson Greenhouses****Performing Words**

Sumita Chakraborty '08
ADVISOR: *Michael Lackey, Writing Program*

Throughout history, the spoken word has inspired people to commit acts of unspeakable terror and unparalleled good. But it is not just the content of the words that motivates individuals to act; it is the art of dramatic expression. In this artistic presentation, I will read several pieces of poetry, but my primary focus will be on the power of vocal inflection to express ideas. I will be utilizing the dramatic art of vocalization and using theatrical techniques of modulation accompanied by physical expression to perform poetry as monologues. The goal of this project will be to craft poetry and to study the dramatic art of the monologue, and in the conjoined study of these two art forms, I will recite poetry with the effect and power of performing words.

Dispatches: A Reading from a Collection of Original Short Fiction

Genevieve Brennan '05, English
ADVISOR: *Margaret Cezair-Thompson, English*

A good short story is a strange creature, a taut form where every component must contribute to the whole, a brief immersion in a world that then stays with the reader long after the story is put away. After a brief introduction discussing the beauty and oddity of the short story I will read an excerpt from my collection *Dispatches*. My aim for the reading is, foremost, to engage and entertain, though I should give fair warning that the stories tend to portray urban and suburban disenchantment and disconnect. Thus far stories in the collection deal with the hit and run death of a suburban mother, the experiences of a journalist covering a policeman's sudden descent into violence, and the emotional

journey of a grieving daughter. Though not overtly sharing a theme, the stories explore the varied ways communities form and the surprising results of unlikely connections.

**Identity Undefined: Revelations in Asian American Poetry (panel)
Pendleton West 117**

Jane Vora '08, Priyanka Ramamurthy '07, Economics, Christina Y. Lee '07, English and Asian American Studies, Sandra Choe '07, English and Psychology, and Ashmita Banerjee '08
ADVISOR: *Yoon S. Lee, English*

Identity, alienation, and transnationality are just a few of the obstacles Asian American poets confront in the poems to which we pay tribute. These poems represent a variety of ethnicities, times, and experiences but share the understanding of what it means to be a part of a hyphenated race. While today's struggle is to identify as *Asian American*, yesterday's was to identify as *American-Asian*. We address common questions such as: Where is home?, Am I authentic?, and Do I pass? as we acknowledge the important distinctions between generations, and discover ways in which previous generations' struggles remain applicable to life today.

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Multicultural Research**The Joys and Tribulations of Reading and Translating Classical Japanese (panel) Science Center 277**

Aileen M. Cruz '05, *Comparative Literature*, Kimiko E. Lange '08, *Japanese*, Naoko J. Kogure '08, *Japanese Studies*, Ryssa Miller '08, *Stephanie Chen '06, Japanese and Mathematics*, Vannoroth Imm '05, *Japanese and Biological Sciences*, Yukari Koya '08, *Economics and Japanese Studies*, and Zehra Q. Fazal '05, *Japanese*
 ADVISOR: Carolyn Morley, *Japanese*

The differences between modern and classical Japanese are vast, including grammar, vocabulary, and the style of the poetry and prose. It is almost as if the two were completely different languages. Yet, the complexity and depth of the classical literary texts only add to their appeal. What problems arise in the process of translation? What themes are prevalent? What outside knowledge about the times is necessary? We will discuss such topics as ambiguity in Japanese, the disappearing subject, and the difficulty of preserving the style of the original, using excerpts from *The Pillow Book*, *Manyoshu*, *Kokinshu*, and others.

Political Development**Law of the Border and the Borders of the Law: Citizenship, Due Process, and Illegal Immigration (panel) Jewett Art Center 450**

Julia Powers '05, *International Relations*, Stacy Roalsen '05, *Philosophy*, and Alexandra Barrows '07, *Philosophy and Political Science*
 ADVISOR: Ifeanyi Menkiti, *Philosophy*

What is the legal standing of a noncitizen in the United States? Who is guaranteed rights under the U.S. Constitution? How do we reconcile the clash between our nation's values with the practical application of immigration laws?

We will evaluate the philosophical and legal issues pertaining to how a government defines the people within and without its state, from illegal immigration to "what is personhood." After an introduction to the notions of legal and nonlegal entities, we will present a case in which due process is denied because of ambiguous legal status. And finally, we will look at the reality of the people affected by illegal immigration, with a focus on the U.S.-Mexico border, and how the practical applications may contradict our legal framework.

Science and Technology**Chemical Approach to Treatment of Diabetes (short talks) Science Center 396****Nonpeptide Agonists of Insulin Induction**

Meghan Hogan '06, *Biological Chemistry*
 ADVISOR: David R. Haines, *Chemistry*

Glucagon-like peptide-1(7-36) amide (GLP-1) is an agonist which binds to a pancreatic G protein coupled receptor, initiating insulin production, and thereby mediating the blood glucose levels of the body. The N-terminal histidine residue of GLP-1 is essential for activation of the target receptor (GLP-1R). The CCK inhibitor T-0632 inhibits the binding of GLP-1 to GLP-1R. Binding of T-0632 to GLP-1R involves residues of GLP-1R which are known to be required for activation. We are investigating the use of T-0632 as a nonpeptide delivery agent for small molecule agonists, such as histidine, to the activation site of the receptor. Preliminary results of biological screening will be reported.

Proximities of Peptide Agonist Fragments upon Interaction with a Receptor

Leslie Oesterich '06, *Biochemistry and Music*

ADVISOR: David R. Haines, *Chemistry*

Studies of peptide agonists with cell membrane receptors have shown that, in rare cases, the agonist can be added in two fragments which together produce activation of the receptor. In order to study the mechanism by which this activation occurs, we have prepared fluorescent and quenching amino acids to be incorporated into the agonist fragments. These can be used to detect proximity of the agonist fragments in solution and/or upon interaction with the receptor. Synthesis of the coumarin-based fluorescent amino acid and the quenching amino acid will be discussed, as will the results of biological screening.

A Chemical Approach to the Treatment of Diabetes

Meghan Scobee '05, *Biological Chemistry and English*

ADVISOR: David R. Haines, *Chemistry*

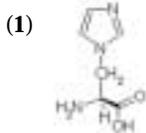
Glucagon-like peptide-1 (GLP-1) is a 30 residue peptide involved in glucose-mediated insulin production. Exendin-4 (Ex-4), a 39 residue peptide found in Gila monster venom, was found to be an agonist of the glucagon-like peptide-1 receptor (GLP-1R). Data from binding and activation assays of GLP-1 point mutants suggest that GLP-1 and Ex-4 have distinct and discrete receptor, activating regions and receptor-binding regions. We are examining the separability of these functions by truncating Ex-4 at the N-terminus and using a nonpeptide attachment to connect model small agonists to the binding region. The first agonists studied use the natural N-terminal tripeptide molecule to show that we can preserve activation with such an attachment. Synthetic strategy and binding and activity data on the model compounds will be presented. (Research supported by NSF REU.)

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A Chemical Approach to the Treatment of Diabetes

Kristin A. Moy '05, *Biological Chemistry*
 ADVISOR: David R. Haines, *Chemistry*

The N-terminal histidine of glucagon-like peptide (GLP-1) and of exendin-4 have been shown to be critical for the activation of the pancreatic receptor (GLP-1R) which initiates insulin production. Previous amino acid substitutions of this histidine with lysine and with alanine have been interpreted to indicate the requirement for a positively charged residue in the N-terminal position. To further develop the structure-activity relationship for the interaction of the N-terminal amino acid of GLP-1 with GLP-1R, histidine analogs such as 1-imidazolyl-alanine (**1**), have been synthesized via Michael addition to an acrylic acid ester. Enantiomeric resolution was achieved enzymatically. The results of binding and activity studies for the incorporation of **1** and other such analogs into GLP-1 will be reported. (Research supported by Staley Grant.)



New Approach to the Synthesis of 3-Triazolylalanine

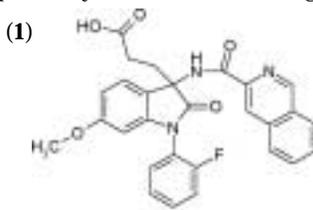
Alisha Weight '05, *Chemistry*
 ADVISOR: David R. Haines, *Chemistry*

The protein polymer glucagon-like peptide-1 (GLP-1) has been shown to indirectly lower blood glucose levels in patients suffering from Type II diabetes. This effect is only observed when GLP-1 is bound to its receptor, GLP-1R. Understanding the molecular level interactions of GLP-1 and GLP-1R will allow for the targeted design of medicinal treatments for Type II diabetes. Synthesis of a histidine analog – a modified component of GLP-1 that acts as a probe – can elucidate specific interactions between GLP-1 and GLP-1R. Challenges and results of this synthesis will be discussed. (Research supported by Staley Grant.)

Synthesis and Strategies for the Enantiomeric Resolution of T-0632

Julia Lin '07, *Chemistry*
 ADVISOR: David R. Haines, *Chemistry*

Studies have shown that peptide GLP-1 induces the production of insulin in the human body as it binds and activates the GLP-1 receptor (GLP-1R), making it a promising method of treatment for diabetes mellitus. However, GLP-1 is short lived *in vivo*, thus it is necessary to find binding, nonpeptide small molecule activators of GLP-1R. Although the nonpeptide antagonist T-0632 (**1**) inhibits the release of insulin, the selective binding of T-0632 to GLP-1R makes T-0632 a potential lead compound for diabetes treatment. We have developed an efficient synthesis of racemic T-0632. The resolution of T-0632 enantiomers has been attempted in two synthetic strategies via reaction with chiral alcohol to form diastereomers. Further details of the synthesis and chiral resolution will be discussed. (Research supported by the Merck SURF Program.)



Explaining the Digital Divide: Topics and Issues from the Rise in New Computer Technology in Education (interactive teaching presentation) Pendleton East 339

Abiola Animashaun '08, Sara Chapman '08, Bai Kamara '08, and Gloria Rosales '08
 ADVISOR: Pattie Orr, *Computer Science*

Students from the 2004 Pathways program will present research and data tables on the "Digital Divide" via basic Web pages from their CS100 student portfolios. The "Digital Divide" is an expression to describe the increasing gap in access to and use of computers in the American education system. During the two-and-a-

half week Pathways program, students learned how to use the Internet as a research tool, create animated graphics, build Web pages and use critical thinking and writing skills to create a final product—their own Web page. Pathways students researched the use of technology, particularly in an educational setting, and derived conclusions about the future of technology in education in the United States. Each of the four presenters will discuss the availability and transformation of computer technology in the past twenty years and the implications it has for education, child development, and society as a whole.

Micro and Molecular (poster session) Science Center

Substrate-Binding Studies of Thimet Oligopeptidase Glycine Mutants

Dhivya Kannabiran '05, *Biochemistry*, Ruby Leong '05, *Biochemistry*, and Chailee Mann-Stadt '05, *Biological Chemistry*
 ADVISOR: Adele Wolfson, *Office of the Dean of the College and Chemistry*

Thimet oligopeptidase (TOP) is an enzyme important in the regulation of blood pressure and neurological processes. It is suspected that TOP can metabolize an unusually wide range of substrates due to a flexible binding loop. In our study, small glycine (Gly) residues in the loop were replaced with larger, less flexible alanines (Ala). The activities of three mutants, Gly599Ala, Gly603Ala, and Gly604Ala, were compared to that of wild-type enzyme. All three enzymes had lower activity than wild-type towards a large substrate. However, towards a smaller substrate, Gly603Ala was the most active, surpassing even wild type. Gly604Ala had little activity towards either substrate. These results are consistent with earlier enzyme unfolding studies. Low concentrations of the denaturant urea led to lower activity of both wild type and mutant enzymes toward the smaller substrate, but increased activity towards the larger substrate. (Supported by HHMI.)

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Altered Ion Channel Activity and the Survival of Animals Exposed to Low Oxygen Stress

Lilian Perez '07 and Natasha Soodoo '06, Biological Sciences

ADVISOR: John S. Cameron, Biological Sciences

Many aquatic vertebrates are capable of enduring prolonged periods with little or no access to environmental oxygen. The goldfish (*Carassius auratus*), for example, can survive and remain active for as long as 5 days in water with no oxygen at all! Our overall hypothesis was that the activation of specific potassium ion channels in critical tissues is one factor that enhances survival under low oxygen (hypoxic) conditions in this species. We used intracellular recording techniques to characterize a hypoxia-induced increase in the activity of ATP-sensitive potassium (KATP) ion channels in the heart, to resolve the mechanism by which this change takes place, and specifically, to assess the role of nitric oxide (NO) in channel activation. During moderate hypoxia in tissue bath, KATP channels on the outer surface of cardiac muscle cells were activated. Our data support a role for NO in channel activation, potentially enhancing the tolerance of this species to environmental stress. (Supported by the Howard Hughes Medical Institute.)

Unnatural Amino Acids: Replacing a Carbonyl Oxygen with a Sulfur Atom

Melissa Suarez '07, Chemistry

ADVISOR: Julia H. Miwa, Chemistry

Our diets are full of natural amino acids, so one might question why we want to modify them. The fact is, nothing is wrong with the 20 "naturally occurring" amino acids, but unnatural amino acids have proven themselves to be extremely useful. When an amino acid is modified by thioxylation, in which the carbonyl oxygen is replaced by a sulfur atom, the resulting peptide may show an increase in enzymatic stability and potency, which would be helpful in designing drugs. We are inserting a thiomide linkage into a

beta-hairpin to gain an understanding of how the secondary structure surrounding the thiomide is affected. This information is essential in order for thioxyated amino acids to be useful as tools in protein design, and in the study of the relationship between structure and function in proteins and peptides. (Research supported by the Mentoring in Sciences Program.)

β -Adrenergic Stimulation Induces Apoptotic and Nonapoptotic Morphological and Metabolic Changes in Rat Cardiomyocytes – Glycogen, a MyHC Protein and a MyHC mRNA Quantification

Magda Stumpfova '05, Biological Chemistry

ADVISOR: Dennis M. Smith, Biological Sciences

Clinical studies have suggested a correlation between long-term use of adrenergic beta-agonists and heart failure. Isoproterenol, an adrenergic beta-agonist used clinically as bronchial dilator was shown to induce apoptosis in rat cardiomyocytes after 24- and 48-hours at 3mg/kg/day. Other non apoptotic morphological and metabolic changes were also evident. The present study was undertaken to quantify these non apoptotic changes that are believed to contribute to the overall decline in cardiac function. In addition, Northern Blot was performed to understand the protein synthesis profile of adrenergically challenged cells as Isoproterenol was shown to induce cardiac hypertrophy. Experimental male Sprague-Dawley rats were implanted with a subcutaneous osmotic pump delivering 3mg/kg/day isoproterenol continuously. After 24- and 72-hour stimulation, hearts were excised. Glycogen, a cardiac myosin heavy chain, and mRNA were quantified or semi quantified. Glycogen depletion was confirmed. Total myosin content decreased, while the mRNA is expected to increase in the experimental animals.

Functional Analysis of Patellin1, a Cell-Plate Localized Protein, in *Arabidopsis Thaliana*

Amy Booth '07, Biological Sciences, Hilaire Leavitt '06, Biochemistry, and Andrea Vallenilla '07

ADVISOR: Kaye Peterman, Biological Sciences

During plant cytokinesis, the last phase of cellular division, membrane trafficking is central to the construction of the cell plate which separates the two daughter cells. Protein function is critical for vesicle trafficking to the developing cell plate. Patellin1 (PATL1) belongs to a family of *Arabidopsis* proteins characterized by a variable N-terminal domain followed by Sec14 and GOLD domains, which are commonly found in other membrane trafficking proteins. Previous research suggests that PATL1 is recruited to the expanding and maturing cell plate, where it is believed to serve a critical function. Approaches being taken to investigate protein interactions of two members of the patellin family, PATL1 and PATL2, include pull-down assays with clathrin and yeast two-hybrid screens. Phenotypes of PATL1 and PATL2 knockout mutants are being studied to determine if these proteins are required for normal cytokinesis and development. (Research supported by the Howard Hughes Medical Institute and NSF-AIRE.)

Preparation and Properties of New Compounds as Potential Antitubercular Agents

Ruth Wang'ondu '07

ADVISOR: Michael J. Hearn, Chemistry

The World Health Organization estimates that there are eight million new cases of tuberculosis (TB) per year, resulting in some two million deaths annually. Given the concurrent HIV epidemic, the situation with TB infection will only get worse in high incidence countries. There is a further complicating problem of Multi-Drug Resistant Tuberculosis (MDRTB) in many parts of the world. Improved therapy for both susceptible TB and

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MDRTB will require the development of new drugs for better treatment. We now report on new compounds that represent attractive leads for development as potential agents for therapy of MDRTB; for example, we have prepared new thioureas derived from meta-aminophenol. These compounds were prepared in good yields and purity, using methods of synthetic organic chemistry and will be tested for their activity against the causative agent of TB infection, *Myobacterium tuberculosis*. (Research supported by a Howard Hughes Medical Institute (HHMI) grant.)

It's Good to Be Flexible: Changes in Substrate Specificity in Thimet Oligopeptidase

Laura Stadelmann '05, Biological Chemistry

ADVISOR: *Adele Wolfson, Office of the Dean of the College and Chemistry*

Thimet oligopeptidase (TOP) hydrolyzes various peptides and regulates several neurological and physiological processes. A cleft separates the two domains of TOP and contains the substrate-binding pocket and active site. A loop region, which is thought to be quite flexible, connects the domains; changes in the loop may lead to modifications in substrate specificity. To trap intermediate conformations of the loop, glycine residues within the active site were replaced with larger, less flexible alanine residues. The activity of the mutants was compared to that of wild-type enzyme towards two quenched fluorescent substrates. All mutants had lower activity than wild type towards a natural substrate analog, but towards a smaller substrate one mutant had higher activity. These results are consistent with data that revealed increases in activity towards the larger substrate when the enzyme is partially denatured, and presumably more flexible, in addition to data revealing conformational changes under denaturing conditions. (Supported by HHMI.)

Toxic Cleanup (poster session) Science Center

Investigating the Potential of Phytoremediation in Lead Contaminated Urban Gardens

Heather Clark '07, Environmental Studies and Rachel Erdil '07, Environmental Chemistry

ADVISOR: *Dan Brabander, Geosciences*

The ability of plants to accumulate materials into their tissues can be utilized to sequester heavy metals from soil. By identifying hyperaccumulating plants, a remediation strategy can be developed for areas that require a low-budget solution. The communities of Roxbury and Dorchester, MA are areas where backyard gardening, a centerpiece of local culture, is plagued by lead contaminated soil. Our goal is to implement a neighborhood-wide phytoremediation scheme to remove lead from soil. In a greenhouse study, we examined the bioavailability of lead to plants and the impact of the initial concentration of lead in soil on uptake. We planted mustards and sunflowers, known hyperaccumulators, in soil with lead concentrations of 1400 to 2200 ppm and we hope to quantify the root and foliar uptake of lead for both species. In a separate study, we plan to measure 207Pb/ 206Pb ratios in size fractionated soil using inductively coupled plasma mass spectroscopy to fingerprint the sources of urban lead contamination.

An Investigation of Bacterial Strains from Paint Shop Pond Soil Rich in Chromate and Lead

Wangezi Eunice Kagucia '05, Biological Sciences and Africana Studies and

Brenda A. Kwambana '05, Biological Sciences and Bioethics

ADVISOR: *Mary M. Allen, Biological Sciences*

This research is based on the relationship between antibiotic resistance and heavy metal resistance in bacteria. Not only are the genes that confer antibiotic resistance and heavy metal resistance often carried on the same plasmid but, the mechanisms

which function in heavy metal resistance are comparable to those in antibiotic resistance. The main objective of this research is to investigate this relationship in bacterial strains isolated from Paint Shop Pond soils contaminated with high levels of lead and chromate for over one hundred years. Current work includes species identification of the isolates by DNA extraction and purification, PCR amplification of an approximately 1300 bp region of 16S rDNA and sequence analysis. Phylogenetic characterization of the isolated bacterial strains is underway. A future goal is to isolate and examine resistance conferring plasmids from several bacterial isolates. (Research Supported by the Howard Hughes Medical Institute and BellSouth Company.)

A Million More Pixels on the Sky (panel) Pendleton East 139

Merideth A. Frey '07, Physics, Alessondra Springmann '07, Astrophysics, Megan E.

Teckman '07, Chinese Language and Literature and Studio Art

ADVISOR: *Stephen Slivan, Astronomy*

As students of Astronomy 206 Basic Astronomical Techniques, we used the 24-in telescope at Wellesley's Whittin Observatory to produce a gallery of color images and to carry out research. We will discuss the fundamentals of imaging the night sky with the astronomical digital camera on the telescope. This year's projects include measuring the mass of Uranus by following its moons, determining the length of an asteroid's "day," studying the pulsations of a star by tracking its brightness throughout the night, and imaging galaxies and star clusters.

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Self and Identity**Behind the Beat: The Spectacle of South Asian Culture (long performance) Jewett Art Center Auditorium**

Sarmili Saha '05, Political Science, Ami A. Pathak '05, International Relations and French, Loveleen Bindra '05, Political Science, Julia C. Meade '05, Biological Sciences and French, Meera Mohan '05, Psychology, Amita Rao '05, English and Economics, Shaheli Guha '06, Computer Science, Meera Sheffrin '06, Chemistry, Srividya V. Narasimhan '07, Economics, Vasumathi S. Raman '07, Computer Science and Mathematics, Kahini K. Ranade '07, Political Science, Saosan H. Sarwahrthy '07, Biotechnology, Mehjabeen Rahman '08, Mrin Tavag '08, and Surekha R. Vuppalla '08
 ADVISOR: *Paul I. Reisberg, Chemistry and Eric Hilt, Economics*

Opening up packed houses, South Asian cultural shows have become an often legendary staple at colleges and universities. Ranging from the obvious (the allure of Bollywood) to the surprising (the fusion of world dances), such shows create an opportunity to promote awareness about South Asian culture. But what types of messages are performers hoping to convey? Perhaps more importantly, why do people choose to perform culture? Find out the answers to these questions as we relive our experience of *Shruti Laya*, the annual cultural show of Wellesley College Association of South Asian Cultures. Join us as we discuss issues related to staging culture, and get an inside look about why we sacrifice our GPAs, sleep, and sanity. Oh – and you'll get to see us dance, too.

Wellesley: Space, Place, and the Self-Assessment Case (short talks) Pendleton East 349**Greening Academia**

Samantha Jones '08, Environmental Studies

ADVISOR: *Marcy E. Thomas, Biological Sciences/Environmental Studies*

Sustainable design or “green building” principles are gaining recognition as both environmentally and economically beneficial. The Leadership in Environmental and Energy Design (LEED) voluntary rating system was created by the U.S. Green Building Council as a standard of measurement for sustainable buildings. In the past nine years, LEED certification has become a focus of government, commercial, and private institutions across the U.S. and the globe. Harvard University, MIT, Mount Holyoke College, Smith College, Tufts University, and Williams College are among the 241 campuses registered with and/or certified by LEED. This project focuses on current implementation of green building principles (with a focus on neighboring campuses), as well as the compelling reasons why Wellesley should become involved.

Kindled with the Flame of Social Passion: Vida Dutton Scudder, Emily Greene Balch and Social Reform at Denison House

Leah Wener '05, History

ADVISOR: *Jerold Auerbach, History*

In the late nineteenth century, Jane Addams became renowned for the establishment of Hull House in Chicago, an experiment in social reform, but she was not alone in the development of the Settlement House movement. On the East Coast, a group of college women was setting up its own houses in New York, Philadelphia, Baltimore, and Boston. Led by Vida Dutton Scudder, these female professors and students settled in slums in an attempt to close the ever-widening social class gap. In 1892, Scudder, with Emily Greene Balch, founded Denison House in Boston's South End. It was not

their intention to become involved in reform politics initially, but after only a few months they could not avoid it. This talk looks at the development of Denison House into a center for female labor reform in Boston, and eventually, the movement of Scudder and Balch into the wider spectrum of reform causes. (Research supported by a Henry Schwarz Fellowship.)

Metacognition at Wellesley: Self-Assessment and Student Learning

Nayantara Mukherji '06, International Relations

ADVISOR: *Verónica Darer, Spanish/Education*

Research in the field of education demonstrates that student self-assessment enhances metacognitive abilities and critical understanding of academic material. However, not much research on this topic has been done on college-level students. For this study, I collected and analyzed surveys from Wellesley students regarding their experiences with self-assessment. The quantitative and qualitative data from these surveys yielded interesting differences between students in classes that include a self-assessment component and those that do not. As Wellesley deals with new grading policies, this study suggests the importance of including students in the evaluative process.

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Social Analysis**Sex and Violence (short talks)
Pendleton East 239****Trafficking in Women and Children:
An Overview and Program Suggestions**

Jennifer Ngo '05, Psychology and Sociology
ADVISOR: *Linda M. Williams, Wellesley
Centers for Women*

It is estimated that 500,000 women and more than 200,000 children are trafficked each year through deception or kidnapping into sexual, domestic, and forced labor. Trafficking in humans has drawn more attention in the last few years as it has become a widespread and highly profitable trade with few legal repercussions for the traffickers. Intricate webs of political, economic, and social conditions in many countries spur the supply of trafficked victims into “demand” countries. Organizations have been created to combat trafficking, but few studies have assessed the effectiveness of these programs. This presentation provides a brief overview of how and why trafficking in women and children occurs and describes some promising programs or methods to combat trafficking. (Research supported by the Class of '67 Internship.)

**Labor Market Consequences of
Incarceration**

*Sarita Frattaroli '05, Economics, Peace and
Justice Studies*
ADVISOR: *Ann Velenchik, Economics*

Imprisonment is not meant to be pleasant. As a deterrent and punishment, jail time was designed to be a negative experience for the offender. However, incarceration may permanently decrease future income and employment prospects. The war on drugs and “tough on crime” sentencing guidelines have caused incarceration rates to grow exponentially. What does this mean for our society as a whole?

If offenders face bad labor market prospects, they may be discouraged from

entering the legitimate economy and become more likely to reoffend. Our criminal justice system may not be rehabilitating people, but creating a culture of cyclical imprisonment – which prevents a significant portion of the population from contributing to our economy and generates infinite incarceration costs for taxpayers.

In this presentation, I will share the policy implications drawn from service work with the ex-offender population and my study of the economic literature on the labor market effects of incarceration.

**Policing Gender: Experiences of
Violence in the Transgender,
Genderqueer, and Transexual
Community**

Clare McBee-Wise '05, Anthropology
ADVISOR: *Sally Merry, Anthropology*

On October 3, 2002, 17-year-old Gwen Araujo was beaten to death by four ex-classmates, who then dumped her body in a deserted area in California. Minutes before the attack, the four perpetrators found out that Gwen had been born male and was transgendered. The discovery of this fact resulted in a violent retaliation that cost Gwen her life. My research seeks to answer why violence and hate is repeatedly aimed at transgendered, genderqueer, and transexual Americans. By sharing the stories of Boston-area trans/genderqueer people who have experienced verbal and physical violence, in tandem with literature on gender violence, I hope to demonstrate that antitransgender violence is part of a more general social hate pattern. These events are extreme manifestations of the gender policing/enforcement that touch all of our lives, everyday.

**Inter/Intra (poster session)
Science Center****The Effect of Culture on Inter- and
Intracultural Negotiation**

Heather Park '05, Psychology
ADVISOR: *R. Steven Schiavo, Psychology*

Cross-cultural psychology indicates that not all cultures construe the self similarly. In collectivistic cultures, there is a strong value placed on connectedness between the self and others, leading to an emphasis on group harmony with in-group members. On the other hand, individuals in individualistic societies consider the self to be autonomous in relation to others where establishing one's independence is strived for. In order to determine whether cultural values affect intracultural and intercultural negotiation processes, 42 cross-cultural empirical studies observing behavior were reviewed. Thirty-five of these studies examined intracultural negotiations, whereas 10 studies examined intercultural negotiations. In most of the studies, behaviors were consistent and correlated with respective cultural values. Interestingly, unpredicted behaviors arose as well, indicating that culture cannot be the sole factor, especially in intercultural negotiation situations. (Research supported by Summer Multicultural Research Program.)

**Effects of Normative Behavior and
Situational Stress on Perceptions and
Attitudes towards Restrictive Eaters**

*Erin Marie Collins '05, Psychology, Julia
Herbert '05, Psychology and Spanish,
Joyce Lo '06, Psychology, and Jennifer
Rodman '05, Psychology*
ADVISOR: *R. Steven Schiavo, Psychology*

Female dieters who maintain a low-fat diet with small portion sizes are generally looked upon favorably. This study examined perceptions of and attitudes towards restrictive-female eaters who either broke their diets or maintained them in a situation in which diet breaking might be acceptable. Additionally, this study investigated the way in which a mediating factor, such as the level of

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stress that the female dieter is under, influenced or changed people's perceptions of the female dieter. Results demonstrated that college females perceived restrictive-female dieters significantly more favorably when they maintained their diets, and were more likely to attribute characteristics to the dieter when a mediating factor was not present.

Learning How Aspects of Ethnic Identity Affect Perceptions of White Privilege

Parul N. Barry '05, Spanish
ADVISOR: *Julie K. Norem, Psychology*

Ethnic identity refers to how strongly you identify with your ethnic group. White privilege refers to social advantages that people of European descent receive solely because of the color of their skin. Since one's identity affects how one views the world, I wanted to see how aspects of ethnic identity influence perception of White privilege. Specifically, I predicted that students whose own ethnic or racial identity was more salient or central to their self-definition would be more likely to perceive White privilege across varied social situations than those for whom ethnic/racial identity was less salient or central. Seventy-five Wellesley women of varied ethnic backgrounds completed questionnaires that measured aspects of their identity as well as their views on White privilege. Discussion of results will focus on the different ways in which identity may influence opinions on current social policies such as affirmative action.

Radiation Effects of Physical Attractiveness and Social Status from Male to Female Partners in Romantic Relationships

Sallie Chung '05, Psychology, Diem Do '05, Psychology and English, Heather Park '05, Psychology, and Brandy Worthington '05, Psychology and French
ADVISOR: *R. Steven Schiavo, Psychology*

Forty-eight female undergraduates were presented with a photograph of a couple and a few paragraphs about them and their relationship, and then were asked to complete a questionnaire. The male's appearance was manipulated in the photograph by changing his clothing and level of grooming and his status was manipulated by his description in the text, while the female and the relationship itself were presented consistently in all conditions. Participants were expected to rate the female more positively on a number of traits related to sociability, competence, and self-concept when paired with the high-status and high-appearance male and to value status most when the two independent variables were in conflict. It was consistently found that only status had an impact on the participants' ratings for each partner. Also, the female was perceived more negatively when her partner was high status and more positively when he was low status. Thus, researchers suggest the operation of a compensation effect between the two partners.

Not in My Backyard: When the Fight against Bioterrorism Is Next Door

Anita Yip '07, Environmental Studies
ADVISOR: *Marcy E. Thomas, Biological Sciences/Environmental Studies*

Before the events of September 11th, the likelihood of a bioattack was not a major public concern. Now with an increasing government impetus to combat bioterrorism, it seems some initiatives have created a sense of distrust. Such is the case with Boston University, which is slated to build a Level 4 Biodefense Laboratory in the South End of Boston. Although the facility is supposed to be one of the safest buildings in the country, it will be researching deadly, incurable diseases such as Ebola. Despite Boston University's claim of having community support, the backlash from the community reflects deep misgivings. For my project, I distributed a survey designed to gauge how the community feels about the biodefense lab. This poster will discuss the politics involved in this national public health agenda and present my results.

11:00 – 12:10

Change**Living in Communities (short talks)
Science Center 396****Fortress Europe***Aleksandra Ossowska '05, International Relations*ADVISOR: *Joel Krieger, Political Science*

Have you ever imagined how it is to be escaping war and prosecution into the xenophobic “Fortress Europe”? Thanks to the Emily Green Balch Peace and Justice Fellowship, I have witnessed asylum systems in Europe, which disillusioned my vision of liberal, democratic and burden sharing values of the European Union. My research involved interviewing refugees, NGOs, UNHCR and various government officials and it was furthered through senior thesis research at the Oxford Refugees Studies Center and Wellesley College. During the presentation, I will share my conclusions from the empirical and academic research and discuss ideas for policy betterment.

European asylum policies that violate human rights cry for our attention; this conference is a chance for you to get involved.

Three Decades of Squatter Dreams - The SIGUS Workshop in Peru*Cristina Greavu '05, Architecture*ADVISOR: *Alice Friedman, Art*

Over the past half century, the process of rapid urbanization, tightly linked to rural to urban migration, has significantly affected the environment of cities around the world. Migrants have come and are still coming to the city, in hopes of a better life. Often they become inhabitants of disadvantaged neighborhoods, squatter settlements, and low-income areas. This winter I participated in the MIT-run SIGUS (Special Interest Group in Urban Settlement) workshop, which brought together a group of Architecture and Planning students from Boston and Lima, Peru, in order to analyze the social and

physical development of four different low-income communities in Lima. We conducted family interviews in order to better understand important steps in the development of the settlements since 1968 when they were surveyed by then MIT professor John Turner. While placing the program in the context of my study abroad experiences, I will share some of our group as well as individual findings. (Research supported by the Office of the Dean of the College.)

The City of Detroit's Rebirth: Mathematical Modeling of Urban Renewal*Garen S. Wolff '07, Neuroscience*ADVISOR: *William F. Coleman, Chemistry*

The city of Detroit is experiencing the nation's largest modern day urban renewal. Since the 1920s, urban planners have drafted visions of the city's future. In the postwar period, their strategies for development, funding, and political leadership led to unanticipated consequences. Detroit's lack of mass transportation and its economic instability are just two examples showing their plans were greatly flawed. Nonetheless, Detroit has emerged from its rut. Campus Martius, the Compuware headquarters, promises to foster commercial growth and bring new light on the nearly forgotten center of the city. The construction of the General Motors World Headquarters is projected to promote more business. Yet, as this city begins to flourish and approach economic stability, its capacity to efficiently “carry” or sustain a population with all its needs met, is a crucial question. This presentation addresses Detroit's carrying capacity by utilizing mathematical modeling to explore its social, political, and economic dynamics.

New Economic Geography: The Economics of Urban Agglomeration*Elizabeth Keiser '05, Economics*ADVISOR: *Karl Case, Economics*

One of the distinguishing characteristics of urban areas is the extent and pattern of land-use density. Some cities, like Boston, have tall buildings and dense residential and employment concentration at the center while others, like Phoenix, are sprawling with a more even and relatively low density of land use everywhere. Over time, many cities have seen growth at the periphery and relatively little in central cities, flattening the observed relationship between distance from the center and density of land use. This paper explores empirically the economic causes of land-use density patterns across a very large set of geographical areas.

Literature and the Arts**Chamber Music in the Romantic Era: Vienna and Berlin (long performance) Jewett Art Center Auditorium***Allison Kao '06, Biological Sciences,**Nimmi Ariyaratne '07, Sarah Chang '07,**American Studies, Jennifer M. Chen '07,**Neuroscience, Ayako Kubodera '08,**Rathika Nimalendran '08, and Ariana**Watson '08*ADVISOR: *Nancy Cirillo, Music*

The Romantic Era, spanning from 1790 to 1910, is characterized by the romance, the imagination, the strange, and the fantastic. The rise of interest in nature and the supernatural led to the range of unique sounds - creating dramatic and emotional melodies.

In Vienna, Franz Schubert (1797-1828) helped to propel the Romantic Movement. He wrote over 600 pieces of work, from simple pieces to miniature dramas. His music is suffused with emotion, encompassing the poetic expression characterizing the Romantic ideal. Although much of Schubert's music is cast in the classical

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form, he stretched the form in many personal ways in the B-flat Piano Trio op. 99, creating a very powerful piece.

Continuing the era in Berlin, Felix Mendelssohn (1809 – 1847) was highly influenced by the works of Bach, Beethoven, and Handel. His works take on similar clarity and classical symmetry in form, yet are infused with a complex and unique depth of melody. The quartet in A minor presents this style, including references to late Beethoven.

Stage, Script, and Salon (short performance, short talk) Pendleton West 220

On the Harmful Effects of Tobacco: Chekhov in Translation

Alexandra Evans '05, *Russian Language and Literature*

ADVISOR: Thomas P. Hodge, *Russian*

Anton Chekhov was a realist, an absurdist, and a master of black comedy. He delighted in the absurd humor of everyday life. His one-person vaudeville “On the Harmful Effects of Tobacco” is unapologetically absurd, and this humor is enhanced by the pathetic believability of its protagonist. For the very reasons they are considered works of beauty and genius, the plays of Anton Chekhov are a challenge both to translate and to perform. Often in translation, the beauty of his prose is sacrificed to render lines as natural and realistic as the originals, or else the speakability is sacrificed to preserve the poetry of the original. Both cases present their own challenges to the performer. In my translation of this play, I have attempted to find a point between realistic and beautiful language that does justice to the brilliant blending of the two in Chekhov’s Russian.

“As Were a Mirror Held to Nature”: Lillian Hellman’s Writings as a Continuous Lens on America

Alison Buchbinder '05, *American Studies and Theatre Studies*

ADVISOR: Lawrence Rosenwald, *English*

Plays are often time capsules of the era in which they are written; they reflect and illuminate a society’s ethos. Great plays, however, transcend their time. Studying how a play changes through different productions, especially removed from its original era, sheds light on how a society has changed or remained static. My research focuses on Lillian Hellman’s plays, specifically looking at her revivals of those plays to gauge America’s shifting views on such issues as slander, lesbianism, fascism, and capitalism.

Temporal Visions (exhibition, interactive teaching presentation) Jewett Art Center Gallery

Impressions in Print

Emily Stokes '05, *Studio Art and English*

ADVISOR: Phyllis McGibbon, *Art*

My thesis work explores the art of printmaking - primarily lithography, monoprint, and linocut. Part of my challenge this year has been in figuring out how best to manipulate the expressive qualities – whether graphic, gestural, or tonal – of each type of print method in order to convey my ideas. My prints consider aspects of the quintessential Midwest that I have both observed and experienced. I attempt to capture the images that have left a lasting impression on me – from traditions and daily rituals, to childhood memories, human interactions, and the evolving landscape. I have loved to draw since my earliest years, and typically have a narrative in mind as I develop each image’s composition and stylistic approach. By experimenting, reworking concepts, researching the work of other artists, and reconsidering my own preferences and curiosities, I am seeking to develop a meaningful portfolio of work.

100 Hues of Mexico

Janis Vogel '06

ADVISOR: Carlos Vega, *Spanish*

Puebla, Mexico – where I studied at the Wellesley’s Program for Mexican Culture and Society – was home for four months. From there, I traveled in all directions, sleeping on buses to reach the calm shores of Puerto Escondido, driving for hours to smell chocolate in Oaxaca, hear the calls of market vendors and feel the cobblestones beneath my feet in Cuetzalen, be warmed by the colors of Guanajuato, wade through the sea of tourism in the Yucatan Peninsula and feel the rushing intensity of life in the cacophonous Mexico City. My constant companions were my cameras, to which Mexico exposed itself. These images, which present the contrasts between the old and the new, the colorful and the bleak, the joyful and the sorrowful, visualize the Mexico I came to know.

Let’s Get Trashed: Disposable Culture

Jennifer Starkey '05, *Studio Art*

ADVISOR: Judith Black, *Art and Elaine Spatz-Rabinowitz, Art*

Through a thesis in studio art I have been investigating disposable culture and the role it plays in our everyday lives. Using various photographic and printmaking formats, I am focusing on the path that our trash takes when we throw it away, as well as the commercial and consumer attitudes which reinforce its ongoing presence in our society. By identifying some of the recurring icons and materials that reflect and shape our attitudes on disposability, I am discovering a few of the basic tenets underlying the culture of “containerism”. The images in the exhibit explore the duality of beauty and repulsion inherent in trash, as well as the iconic graphic nature of the containers. (Research and exhibit supported by the art department and the Dean’s Office.)

11:00 – 12:10

Why Go?: An Exploration of Travel through Art

Dawn Wing '05, Studio Art and Art History, Danielle Eddington '05, Architecture, Bethany Cooper '05, Studio Art, and Caitlin Winner '05, Media Arts and Economics

ADVISOR: *Phyllis McGibbon, Art*

Why do humans always want to go somewhere? The students from the fall ARTS 317 Art and Travel studio seminar have been exploring this question and others through interactive sculpture, ephemera, photography, installation, and mixed media art. From walking to globe-trotting to less immediate notions of travel, we have been considering the political, social, and biological causes and consequences of travel by making art. Our interactive gallery talk will consider how time and space relates to the transformation of a woman's psyche and body.

Political Development**Peace and Reconciliation?
(short talks) Pendleton East 239****Power-Sharing Peace Agreements and Their Effect on Ethnic Identity in Bosnia and Northern Ireland**

Meredith Riley '05, Political Science and Anthropology

ADVISOR: *Sally Merry, Anthropology*

Ethnicity and group identity are important concepts that give people a sense of fulfillment, community, and belonging. However, these ordinarily benign ideas become dangerous when they are manipulated for political purposes, invoked to challenge the security of others, and used to incite conflict. Reification of group boundaries and identities on the one hand and ethnic violence on the other become mutually reinforcing, as alterity promotes violence and violence promotes alterity.

I seek to determine how the peace processes in Bosnia and Northern Ireland affected the character and quantity of alterity framed in terms of ethnic differ-

ence. Did the power-sharing agreements exacerbate ethnic difference and reify formerly fluid ethnic identities? Was clarification and separation of group identity necessary to maintain peace? Ultimately, I seek to examine the intended and unintended effects of these two peace agreements on ethnicity to better understand the limitations and possibilities of ethnic conflict resolution.

The Truth Must Dazzle Gradually: The South African Truth and Reconciliation Commission and the New South Africa

Alexandra Yannias '05, History

ADVISOR: *Lidwien Kapteijns, History*

The end of apartheid in South Africa in the early 1990s was, in many ways, a political miracle, especially considering the horrific political violence of the mid-1980s. In 1995, the South African Truth and Reconciliation Commission (TRC) was created to allow for the "establishment of as complete a picture as possible of the nature, causes and extent of gross violations of human rights" from 1960 to 1994. This presentation will focus on the ways in which South Africans experienced the TRC through testifying, implementing it, reporting on it, or watching national media coverage of it. In the end, what kind of history did the TRC produce and how did these truths affect South Africans? Did the TRC's history conflict with South Africans' experiences under the apartheid regime and, if so, what still needs to be done to promote truth and reconciliation in the new South Africa?

Let Right Be Done: Justice vs. Right in the English Petition of Right and the Archer-Shee Case

Rae Adams '05, History and Classical Civilization

ADVISOR: *Andrew Shennan, Dean of the College*

While England watched and world war loomed, the profound questions of the divine right of kings, Parliament's ascendancy, and the ancient philosophical divide between justice and right, all hinged on whether a boy was innocent of stealing a mere five-shilling postal order and wrongly expelled from the Royal Naval Academy. In 1910, a British court case pitted a 13-year-old English boy against the King of England. Forbidden to sue the Crown, the King was always deemed "just," even though he may not have been "right." Invoked in this historic case, a centuries-old petition acknowledged the distinction. After monumental struggles, the king endorsed the boy's petition stating, "Let Right Be Done," allowing the suit's progression against the Crown. Otherwise insignificant, this case set the stage upon which a nation addressed deeper historical and philosophical matters.

The Political Evolution of the Hong Kong Legislative Council, 1992-2004

Wendy E. Leutert '05, Political Science

ADVISOR: *William Joseph, Political Science*

As a subject for political science, the Hong Kong Legislative Council presents a unique and fascinating opportunity to study a political system in transition. What was once an appointed and solely advisory body under the British colonial system as recently as the 1980s has evolved in the modern context of Chinese sovereignty into today's legislature, which must now address compelling political questions about democratization, sovereignty, representation, and political party development. From the period of Christopher Patten's governorship in 1992-1997 to the recent ruling in April 2004 by the Standing Committee of the National

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People's Congress, key reforms and changes to the powers of the Legislative Council and to the body itself have had the ancillary effect of profoundly transforming Hong Kong's political culture. Since that time, a growing democratization movement has continued to contest the popular assumption that people in Hong Kong are only concerned with "stability and prosperity," and it has challenged the Legislative Council to address a variety of fundamental political issues. (Research supported by a Schiff Fellowship.)

Science and Technology

Chemistry in Small Spaces (short talks) Pendleton West 116

Examining the Phase Transition Behavior of *N*-Isopropylacrylamide Copolymer Hydrogels with *In Situ*-Generated Gold Nanoparticles

Frances Pong '05, Chemistry
ADVISOR: Nolan T. Flynn, Chemistry

Hydrogels are polymer networks that undergo stimuli-responsive volume phase transitions, in which the gels contract and expel their contents into their surroundings. Control of this behavior has prompted much research for use of hydrogels as stimuli-responsive drug-carriers. My research investigates two modifications of gel thermoresponsive phase transition: the variation of gel composition and the addition of *in situ* gold nanoparticles. Gels were synthesized using thermosensitive *N*-isopropylacrylamide as the polymer backbone and using 0.00-3.50% wt. of *N,N'*-methylenebisacrylamide (MBAm) and/or *N,N'*-cystaminebisacrylamide (CBAm) as crosslinking agents, and were then embedded with *in situ* gold nanoparticles. UV spectroscopy revealed that the phase transitions of *in situ* gold samples with high concentrations of CBAm widened the most. Mass and diameter measurements of *in situ* gold gels with high concentrations of CBAm and low concentrations of

MBAm were also substantially larger than gels that had lower concentrations of CBAm and/or higher concentrations of MBAm. (Research supported by NSF REU.)

Electron-Induced Reactions of CF_2Cl_2

Hsiao-lu Denise Lee '05, Chemistry
ADVISOR: Christopher R. Arumainayagam, Chemistry

We have studied the low-energy electron-induced reactions of CF_2Cl_2 and CF_2Cl_2/H_2O thin films. We are motivated by a hypothesis¹, which suggests that cosmic rays bombarding polar stratospheric clouds produce low-energy electrons which interact with chlorofluorocarbons to produce chlorine that destroy the Antarctic ozone. The electron-induced reactions of CF_2Cl_2/H_2O films were designed to simulate CF_2Cl_2 absorbed on ice in the polar stratospheric clouds. Our methods include post-irradiation temperature programmed desorption (TPD) and electron stimulated desorption. Experiments were performed in an ultra-high vacuum chamber, where CF_2Cl_2 thinfilms were grown at 100 K on a clean Mo(110) surface, or a Mo(110) surface with preadsorbed H_2O . A mass spectrometer filament was used to irradiate the thinfilms with low energy (5-100 eV) electrons. Postirradiation TPD experiments were used to identify $C_2F_4Cl_2$, $C_2F_3Cl_3$, C_2F_2Cl , C_2F_3Cl , $C_2F_2Cl_2$, and C_2F_4 as radiolysis products of CF_2Cl_2 .² Preliminary results indicated that electron-induced reactions of CF_2Cl_2/H_2O films produce $C_2F_3Cl_3$, $C_2F_2Cl_4$, C_2F_3Cl , C_2F_4 , and CF_3Cl .

¹Lu, Q. B.; Sanche, L. *Phys. Rev. Lett.* 2001.

²Nakayama, N.; Wilson, S. C.; Stadelmann, L. E.; Lee, H.-L. D.; Cable, C. A.; Arumainayagam, C. R. *J. Phys. Chem. B* 2004, 108, 7950.

Characterization of *N*-Isopropylacrylamide/Acrylic Acid Copolymer Hydrogels Containing Gold Nanostructures

Alissa Agnello '05, Chemistry
ADVISOR: Nolan T. Flynn, Chemistry

Thermosensitive hydrogels are polymer networks that swell and deswell with temperature changes due to polymer-polymer and polymer-water interactions. Hydrogel copolymers of *N*-isopropylacrylamide and acrylic acid, poly(NIPAm-co-AAc), were synthesized with varying concentrations of *N,N'*-cystaminebisacrylamide (CBAm) and *N,N'*-methylenebisacrylamide (MBAm) as crosslinking agents. Gold nanostructures were synthesized within the poly(NIPAm-co-AAc) hydrogels. The phase transition temperatures and swelling properties of both the native and gold-containing poly(NIPAm-co-AAc) hydrogels were studied using mass measurements over a range of temperatures. The results of these studies are compared to those of gels without acrylic acid in the polymer backbone. Dried hydrogels were loaded with a fluorescent-labeled model drug, tetramethylrhodamine (TMR)-labeled dextran. TMR-dextran release profiles for the NIPAm-coAAc hydrogels were studied using fluorometry. The results of this research are applicable to the employment of thermoresponsive hydrogels in drug-delivery systems. (Research supported by the Science Center.)

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Mutant Masters (short talks) Science Center 278

Investigating the Role of Clb2 Subcellular Localization in Cell Cycle Regulation

Cortney Boulton '05, Biochemistry
ADVISOR: Jennifer Hood-DeGrenier,
Biological Sciences

The eukaryotic cell cycle is primarily regulated by cyclin-dependant kinases and the many cyclins that differentially associate with the kinases throughout the cell cycle. Subcellular localization of cyclins is known to be an important part of human cell cycle regulation. Previous work in our lab has suggested that cytoplasmic localization of the primary mitotic cyclin, Clb2, has a significant role in the regulation of the *Saccharomyces cerevisiae* cell cycle. I am interested in the function of Clb2 localization at the mother-bud neck, a site where regulatory proteins, including the kinase Swe1, are known to congregate. Cells depleted of cytoplasmic Clb2 were found to have elongated buds, which is characteristic of disrupted Swe1 regulation. This study is further investigating the role of Clb2 localization in Swe1 regulation and onset of mitosis. (Research supported by the Robert and Karl Staley Fund and an NSF RUI grant to JHD.)

It's Good to Be Flexible: Changes in Substrate Specificity in Thimet Oligopeptidase

Laura Stadelmann '05, Biological
Chemistry

ADVISOR: Adele Wolfson, Office of the Dean
of the College and Chemistry

Thimet oligopeptidase (TOP) hydrolyzes various peptides and regulates several neurological and physiological processes. A cleft separates the two domains of TOP and contains the substrate-binding pocket and active site. A loop region, which is thought to be quite flexible, connects the domains; changes in the loop may lead to modifications in substrate specificity. To trap intermediate conformations of the loop, glycine residues within the active site were replaced with larger, less flexible alanine residues. The activity of the mutants was compared to that of wild-type enzyme towards two quenched fluorescent substrates. All mutants had lower activity than wild type towards a natural substrate analog, but towards a smaller substrate one mutant had higher activity. These results are consistent with data that revealed increases in activity towards the larger substrate when the enzyme is partially denatured, and presumably more flexible, in addition to data revealing conformational changes under denaturing conditions. (Research supported by HHMI.)

Mitotic Manager: The Cytoplasmic Roles of the Yeast Cyclin Clb2

Victoria Lyo '05, Biological Sciences and
Chemistry

ADVISOR: Jennifer Hood-DeGrenier,
Biological Sciences

The cell cycle is the highly regulated sequence of events that allows for proper DNA replication and correct timing of cell division. Clb2 is the primary yeast mitotic cyclin that controls entry into mitosis by binding and activating the cyclin-dependent kinase Cdc28. It resides predominantly in the nucleus with subpopulations at the mitotic spindle, spindle pole bodies, and the bud neck. Clb2 subcellular localization likely contributes to

regulation of Clb2/Cdc28 activity and substrate specificity. I conducted a genetic screen and biochemical assays to elucidate the cytoplasmic roles and genetic interactions of Clb2. Knowing with which proteins cytoplasmic Clb2 interacts, we can extrapolate novel roles for Clb2 and the functional significance of its nuclear export. By delineating the regulatory mechanisms involved in cell division, this research can aid in the understanding and treatment of tumorigenesis and cancer, which stem from dysfunctions in the cell cycle. (Research supported by a Schiff Fellowship, by the Robert and Karl Staley Fund, and by an NSF RUI grant to JHD.)

Cars, Toilets, and Gravity: Looking at the Physics of Everyday Life (panel) Science Center 277

Mawuena Binka '07, Jessica Chen '07,
Cynthia Crosswhite '07, Mahnaz Islam '07,
Rebecca Katzman '07, Nawar Najeib '07,
Elizabeth Wang '07, Isabel Lecompte '08,
Christina Miller '08, Yuki Nakayama '08,
Athena Sasaki '08, Talia Sepersky '08,
and Joanna Wu '08

ADVISOR: George Caplan, Physics

In the world of exploding toilets, spinning machines, collapsing buildings, spiraling tracks, and speeding cars, Physics 107 students are diving in and taking matters into their own hands. Our panel presents a variety of projects based on everyday physical phenomena. Did you ever wonder about the physics of toilets that use no more than 1.6 gallons of water per flush? Or did you ever think about how to create the "artificial gravity" in the Gravitron amusement park ride? Physics students can test the strength of your house; and they can find the mass of a car not only by weighing it, but also by pushing it, sitting on it, and poking it. And, believe it or not, the fastest way to get from point A to point B is not always a straight line. After learning about these projects, you'll never look at a typical day in the same way.

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Chemical Approach to Treatment of Diabetes (poster session) Science Center

Nonpeptide Agonists of Insulin Induction

Meghan Hogan '06, Biological Chemistry
ADVISOR: David R. Haines, Chemistry

Glucagon-like peptide-1(7-36) amide (GLP-1) is an agonist which binds to a pancreatic G protein coupled receptor, initiating insulin production, and thereby mediating the blood glucose levels of the body. The N-terminal histidine residue of GLP-1 is essential for activation of the target receptor (GLP-1R). The CCK inhibitor T-0632 inhibits the binding of GLP-1 to GLP-1R. Binding of T-0632 to GLP-1R involves residues of GLP-1R which are known to be required for activation. We are investigating the use of T-0632 as a nonpeptide delivery agent for small molecule agonists, such as histidine, to the activation site of the receptor. Preliminary results of biological screening will be reported.

Proximities of Peptide Agonist Fragments upon Interaction with a Receptor

Leslie Oesterich '06, Biochemistry and Music

ADVISOR: David R. Haines, Chemistry

Studies of peptide agonists with cell membrane receptors have shown that, in rare cases, the agonist can be added in two fragments which together produce activation of the receptor. In order to study the mechanism by which this activation occurs, we have prepared fluorescent and quenching amino acids to be incorporated into the agonist fragments. These can be used to detect proximity of the agonist fragments in solution and/or upon interaction with the receptor. Synthesis of the coumarin-based fluorescent amino acid and the quenching amino acid will be discussed, as will the results of biological screening.

A Chemical Approach to the Treatment of Diabetes

Meghan Scobee '05, Biological Chemistry and English

ADVISOR: David R. Haines, Chemistry

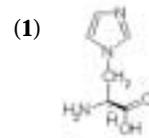
Glucagon-like peptide-1 (GLP-1) is a 30 residue peptide involved in glucose-mediated insulin production. Exendin-4 (Ex-4), a 39 residue peptide found in Gila monster venom, was found to be an agonist of the glucagon-like peptide-1 receptor (GLP-1R). Data from binding and activation assays of GLP-1 point mutants suggest that GLP-1 and Ex-4 have distinct and discrete receptor activating regions and receptor binding regions. We are examining the separability of these functions by truncating Ex-4 at the N-terminus and using a nonpeptide attachment to connect model small agonists to the binding region. The first agonists studied use the natural N-terminal tripeptide molecule to show that we can preserve activation with such an attachment. Synthetic strategy and binding and activity data on the model compounds will be presented. (Research supported by NSF REU.)

A Chemical Approach to the Treatment of Diabetes

Kristin A. Moy '05, Biological Chemistry
ADVISOR: David R. Haines, Chemistry

The N-terminal histidine of glucagon-like peptide (GLP-1) and of exendin-4 have been shown to be critical for the activation of the pancreatic receptor (GLP-1R) which initiates insulin production. Previous amino acid substitutions of this histidine with lysine and with alanine have been interpreted to indicate the requirement for a positively charged residue in the N-terminal position. To further develop the structure-activity relationship for the interaction of the N-terminal amino acid of GLP-1 with GLP-1R, histidine analogs such as 1-imidazolyl-alanine (**1**), have been synthesized via Michael addition to an acrylic acid ester. Enantiomeric resolution was achieved enzymatically. The results

of binding and activity studies for the incorporation of **1** and other such analogs into GLP-1 will be reported. (Research supported by Staley Grant.)



New Approach to the Synthesis of 3-Triazolylalanine

Alisha Weight '05, Chemistry
ADVISOR: David R. Haines, Chemistry

The protein polymer glucagon-like peptide-1 (GLP-1) has been shown to indirectly lower blood glucose levels in patients suffering from Type II diabetes. This effect is only observed when GLP-1 is bound to its receptor, GLP-1R. Understanding the molecular level interactions of GLP-1 and GLP-1R will allow for the targeted design of medicinal treatments for Type II diabetes. Synthesis of a histidine analog – a modified component of GLP-1 that acts as a probe – can elucidate specific interactions between GLP-1 and GLP-1R. Challenges and results of this synthesis will be discussed. (Research supported by Staley Grant.)

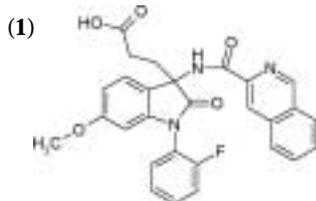
Synthesis and Strategies for the Enantiomeric Resolution of T-0632

Julia Lin '07, Chemistry
ADVISOR: David R. Haines, Chemistry

Studies have shown that peptide GLP-1 induces the production of insulin in the human body as it binds and activates the GLP-1 receptor (GLP-1R), making it a promising method of treatment for diabetes mellitus. However, GLP-1 is short-lived *in vivo*, thus it is necessary to find binding, nonpeptide small molecule activators of GLP-1R. Although the nonpeptide antagonist T-0632 (**1**) inhibits the release of insulin, the selective binding of T-0632 to GLP-1R makes T-0632 a potential lead compound for diabetes treatment. We have developed an efficient synthesis of racemic T-0632. The resolution of T-0632 enantiomers has been attempted in two synthetic strategies via

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reaction with chiral alcohol to form diastereomers. Further details of the synthesis and chiral resolution will be discussed. (Supported by the Merck SURF Program.)



Self and Identity

Language Games (short talks) Pendleton East 339

Plays in a Holy Theater: Religious Language after Wittgenstein

Julia Reed '05, *Philosophy and Comparative Literature*

ADVISOR: Nicolas de Warren, *Philosophy*

The influence of the later philosophy of Ludwig Wittgenstein is profound and pervasive, and has penetrated most areas of philosophy, particularly the philosophy of language, and, more recently, the philosophy of religion. There are a number of distinctive problems of religious language that have emerged and been developed in post- and neo-Wittgensteinian theoretical trajectories: what does Wittgenstein's idea of the plurality of language games have to offer a philosophy of religious language? What is the "logic" of the religious utterance? In what way can the philosopher "lay bare the grammar of religion?" I examine the application of this language game theory to religious language and to the "grammar" of religious discourse by investigating the relationships between 1) the activity or practice which confers meaning within a particular language game, 2) the language through which the practice is expressed, and 3) the rules that govern the practice and its expression. Finally, I evaluate what Wittgenstein contributes to

this critical conversation and whether a Wittgensteinian perspective illuminates a particular *sui generis* character of religious utterances.

Your Left or Mine? How Preschoolers Learn Spatial Words

Amanda Price '05, *Psychology and Spanish*

ADVISOR: Laura Wagner, *Psychology*

While many languages provide multiple ways to describe where objects are located in space, most favor one or two in particular. English-speakers often use words such as *left*, *right*, *north*, and *south*, yet other languages do not even have such words. With so many available options, how do children map the spatial words used in their language onto these complicated concepts? And do the spatial words that children learn in their language affect how they think and perceive the world? Come see how current research is exploring these issues and uncovering more effective methods of teaching children spatial concepts.

Growing up Gendered (panel) Pendleton West 212

Tracy Ahlquist '05, *English and Latin American Studies*, Caitlin Andrews '05, *Psychology and Women's Studies*, Rachel Hodge '05, *Psychology*, Kate Derrick '06, *Political Science and Women's Studies*, Susie Conwell '07, *Spanish and Women's Studies*, Ari Dubin '07, *Neuroscience and Women's Studies*, and Margaret Walkup '07, *Spanish*

ADVISOR: Nancy L. Marshall, *Women's Studies/Center for Research on Women*

The popularity of movies such as *Mean Girls*, and of books such as *Queen Bees* and *Wannabes* has drawn attention to the experiences of girls in high school. Does the popular media image fit with research done in high schools, or with our own experiences? What was it really like? How do high schools vary in their gender cultures? How do the experiences of growing up gendered vary by social class, race/ethnicity, size and type of school?

Based on data from interviews and observations, we present an analysis of the processes by which gender norms are both reinforced and challenged in U.S. high schools.

Social Analysis

Health and Education Policy (short talks) Pendleton West 117

Why We've Got What We've Got: A Comparison of Deaf Politics and Educational Policy in Sweden, Germany, and the U.S.

Susanna Supalla '05, *Political Science*
ADVISOR: Lori Johnson, *Political Science*

In 1880, educators of the deaf excluded deaf adults from an international conference in Vienna and decided to ban sign language from the classroom. Deaf adults, outraged by the decision and their exclusion, began organizing themselves. The deaf communities in Sweden, Germany, and the U.S. have varying levels of organization and involvement in educational policymaking. These countries also differ significantly in their approaches to such key questions as the educational placement of deaf students and the use of sign language in the classroom. Comparing the organizational strength and level of activism of deaf associations across Sweden, Germany, and the United States sheds important light on how these countries came to pursue their current educational policies regarding deaf students. (Research supported by a Schiff Fellowship.)

11:00 – 12:10

Assisted Reproduction in the United States and Italy: Comparing Legislation and Social Outlook

Ashley Hicks '06, *Biological Sciences*
ADVISOR: Flavia Laviosa, *Italian Studies*

Italy has made some of the world's boldest steps for women's rights and reproductive health rights in the past thirty years. Recently, legislation regulating assisted reproduction has generated a profound political controversy relating to the government's ability to control reproduction and to define "family". The United States faces many of the same questions, yet there are no overarching federal regulations placed on assisted reproductive technologies. However, the American people, as well as the legislative and judicial bodies on all levels of government continue to confront challenges presented by the use reproductive technology that has developed without a major change in the social sentiment towards family. This project is centered on field research conducted in Italy and the U.S. A number of experts and professionals in legislative, medical, judicial, and sociological fields were interviewed in order to perform a comparative analysis between the two states and their respective actions and ideas. (Research supported by the Gender and Women's Studies Grant Research Funds Program through Scripps College.)

Blacks and HIV Treatment Trials: Participation Issues and Their Possible Solutions

Wangechi Eunice Kagucia '05, *Africana Studies and Biological Sciences*
ADVISOR: Pashington Obeng, *Africana Studies*

Antiretroviral therapy plays a critical role in the management of HIV/AIDS because of its ability to slow the progression of HIV-related disease. Like other medications, antiretroviral drugs are developed through treatment trials.

Although American Blacks account for approximately 12% of the U.S.'s population, they make up over 40% of the total HIV/AIDS cases in the U.S. Furthermore, it is estimated that Blacks have accounted for 54% of new HIV infections every year since 2001. In spite of their higher HIV infection rates, Blacks constitute only 23% of ART treatment trial participants. A number of practical and attitudinal issues may explain low recruitment and retention of Black participants in HIV/AIDS antiretroviral treatment trials. These issues, explored through an Africana Studies Individual Study, along with their possible solutions, will be discussed.

1:30 – 2:40

Change**Outer Expressions of Inner Lives
(short talks) Pendleton East 139****Maternal Feeling: The Effect of Maternal Depression on Child Development**

Vera Hannush '05, *Latin and German*
 ADVISOR: Wendy Wagner Robeson, *Center for Research on Women*

The links between maternal depression and children's development, specifically, the verbalizations and facial expressions of infants have long been discussed and analyzed. This issue must be viewed from a plethora of developmental perspectives. What, exactly, are the effects of maternal depression on children's development including their speech and behaviors? What is the biological relationship between maternal and child depression, the brain, and depressed behaviors? Are mother-child interactions bidirectional? Is there a synchrony of action and reaction patterns, and if so, does that synchrony break down in interactions in dyads of depressed mothers and their children? What are the stigmatizations of motherhood and how do they affect who is blamed for problematic child development? What kinds of research are proposed for future answers to the remaining questions? (Research supported by the Shirley R. Sherr Research Internship.)

"Jessica Just Got Her Period, Let's Not Be Her Friend": The Relation between Social Aggression and Menarche

Jazmin Reyes '05, *Psychology*
 ADVISOR: Elissa Koff, *Psychology*

This study examined the relation between social aggression and menarche, the first period. Social aggression is a set of behaviors that harm others through damage to their self-esteem, friendships, or social status (Underwood, 2003). While both males and females have been found to engage in social aggression, research evidence suggests that females tend to be more socially aggressive, whereas males tend to be more physically aggressive. Moreover, the use of social aggression seems to increase as girls enter early adolescence. One possible explanation for the increase in social aggression among girls may be the onset of menarche, which can be a stressful and psychologically disruptive time for girls. No research to date has explored the relation between social aggression and menarche. In this study, the relation between social aggression and menarche was examined using a sample of sixth-, seventh-, and eighth-grade girls.

The Realities of Make-Believe: Children's Relationships with Imaginary Companions

Rachel E. White '05, *Psychology*
 ADVISOR: Tracy R. Gleason, *Psychology*

Within relationships, individuals seek out specific characteristics, supports, or types of interaction, known as social provisions. By the time children reach preschool age they have formed relationships with family members and peers, and many have created fantasy relationships with imaginary companions (ICs). Whereas social provisions are inherent in real relationships, children must determine the provisions relationships with ICs will afford. This study investigates the provisions of companionship, conflict, instrumental aid, power, nurturance, and reliable alliance in the relationship between a child and his/her IC. Provisions

are expected to differ based on the child's gender as well as the type of IC created. Data were collected through a diary kept by parents detailing episodes in which the IC appears, as well as through parent and child interviews. (Research supported by the Wellesley College Psychology Department.)

Literature and the Arts**Objects of Revelation (short talks)
Science Center 264****Lee Krasner's Flirtation with Integration: Unraveling *Untitled Mural Study***

Lauren Collalto '05, *Art History*
 ADVISOR: Rebecca Bedell, *Art History*

From 1935 to 1941, Lee Krasner was employed by the Mural Division of the Work Projects Administration's Fine Arts Project in New York City. During what was one of the most fascinating periods in American art history, Krasner, a future abstract expressionist and the future wife of Jackson Pollock, assisted with, supervised, and painted federally-sponsored abstract murals in NYC without any prior mural painting experience. Along with many of her colleagues, Krasner also became a member of the Artists' Union and the American Abstract Artists, both newly founded to protect and promote Depression-era artists. With this particularly fecund artistic climate as a backdrop, I will unravel the mystery behind the Davis Museum and Cultural Center's *Untitled Mural Study* (1940), which I believe was intended to be executed at the New York City radio station WNYC.

1:30 – 2:40

The Black Book: Anti-Fascism in 1940s Mexico

Beth Merfish '05, Art History and Jewish Studies

ADVISOR: *Patricia Berman, Art*

The Black Book of Nazi Terror in Europe: Testimony of Authors and Artists from 19 Nations, published in Mexico in 1943 by Communist intellectuals and artists, is a compelling argument against Fascism and the actions of Fascist governments. In addition to essays, the book contains images which condemn the European Fascist governments for the atrocities carried out during World War II and offer dynamic, often violent, images of resistance meant to inspire anti-Fascist sentiment and resistance to Fascist ideology. Images within the book, many of which were contributed by the Taller de Gráfica Popular, a Mexican print workshop founded in 1937, denounce all aspects of Nazi ideology, including strong condemnations of anti-Semitism, and offer to the Spanish-speaking public a model for resistance and revolution.

Capturing the Traumatic: The Letters of American Missionary W. Plumer Mills during the Nanking Massacre

Katherine Zhao '05, International Relations and Psychology

ADVISOR: *Y. Tak Matsusaka, History*

“Memories crowd in on one, as one sits down to write,” so begins W. Plumer Mills in a letter to his wife in January of 1938. It is Nanjing, China during the Japanese occupation; caught in this traumatic event, how do individuals react and remember through the act of writing? By using the unpublished letters of American missionary W. Plumer Mills to his family, I examine how he tried to make sense of the atrocities that were occurring around him, based on his previous experiences. Ultimately, such primary sources shed light on the documenters of history in the midst of a traumatic event, and how their attitudes and assumptions, as well as other factors, help to shape what they write and, consequently, what we remem-

ber today. (Research supported by Office of the Dean of the College and History Department.)

Virtual Architectures: New Forms (panel) Jewett Art Center 372

Amanda Davidson '05, Architecture and Studio Art, Kimberly Huestis '05, Architecture and French Cultural Studies, Bing Li '05, Media Arts and Sciences, Gowun Kim '06, Computer Science, Leslie Lok '06, Architecture, Kate Tetreault '06, English and Media Arts and Sciences, Yuling Wang '06, Architecture and Economics, and Kara Schimmelfing '07, Architecture
ADVISOR: *Jessica Irish, Art*

This panel will showcase the creative works made using virtual modeling to create artful compositions, imagined spaces, and famed works of architecture. From the composition of a still life to a designed interior, to an abstracted city, we will first demonstrate an overview of the creative process, from research to rendering. The panel will detail three of the final projects based on notable works of architecture in the area. The residence designed by Bauhaus's Walter Gropius, in Lincoln, MA affords an intimate glimpse into this modern house-turned-historic treasure. Le Corbusier's Carpenter Center at Harvard, reveals the contrast of form and unique function of design. Lastly, we unveil the mystery of Wellesley's own Science Center, as the mind-boggling challenge of scale and complexity is complemented by commentary and whimsy.

The Slings and Arrows of Outrageous Fortune (long performance) Jewett Art Center Auditorium

Alison Buchbinder '05, American Studies and Theatre Studies, Zehra Q. Fazal '05, Japanese, Caitlin Graham '05, Cinema and Media Studies and Spanish, Allison Linker '05, Theatre Studies and Psychology, Maia Sharuk '05, Biological Sciences, and Christiana Mollrem '06, American Studies and Theatre Studies

ADVISOR: *Nora Hussey, Theatre Studies*

The Wellesley College theatre community is honored to present a theatrical retrospective of the work created in the 2004-2005 season. The cooperative efforts of Nora Hussey, Director of Theatre and Theatre Studies and the 2004-2005 student directors have created a diverse performance piece highlighting this year's shows. As in the successful performances of previous years, the emphasis will be on the essence of theatre – the relationship between audience and actor. Theatrical and entertaining, the clips take you on a whirlwind dash around the world and the human experience. Song and story abound in this extravaganza.

1:30 – 2:40

But, Oh, the Dreams: Young Women and Their Goals in Twentieth- and Twenty-First-Century American Music (long performance) Pendleton West 220

Caroline K. Poon '05, *Music and Cognitive and Linguistic Sciences*

ADVISOR: Andrea Matthews, *Music*

“Once I thought I’d never go outside this fence; this space was plenty for me. But I looked down that road one day, and just what happened I can’t say, but little by little it came to be that line between the earth and sky came beckoning to me.” (Copland’s *The Tender Land*) Throughout twentieth-century American opera, composers have depicted young women verging on maturity, evaluating their lives, looking to the future, and living the pioneer spirit of their nation. These young women plan, hope, and dream, growing up in what was still an evolving culture. In the first half of the program, I will perform some of the arias from these operas that most personify this trend in American art music. The second half will be devoted to my own music, music that has been my version of that trend, first steps toward a personal hope for the future.

Multicultural Research

Women and Nationalism (short talks) Pendleton West 212

Rethinking the “New Woman” in Colonial Korea, 1920-1930

Jennifer Yum '05, *History*

ADVISOR: Y. Tak Matsusaka, *History*

In the 1920s, emerging paradigms of new women in diverse regional contexts pointed to gender identities in the process of change throughout the world. Colonial Korea, too, witnessed the rise of a discourse on the “new woman” during this decade. A comprehensive examination of the *Sin Yosong* (New Woman) magazine from the 1920s unveils the journalistic construction of the Korean “new woman.” Closely linked to broader agendas such as nationalism, and signaling the onset of colonial modernity, the making of “new womanhood” in Korea illuminates the historical circumstances that prompted women’s identities to change. The main themes of individualism, motherhood, and social backlash that appear in *Sin Yosong* contribute new perspectives to the relationship between nationalism and feminism in colonial societies (Research supported by a Schiff Fellowship and a Schwarz Foundation Grant.)

Iranian Voices Cry Out: Violence against Women in a Muslim Society

Shiveh Reed '07, *History and French*

ADVISOR: Linda M. Williams, *Wellesley Centers for Women*

Across the world, women are plagued by violence and harassment. Due to the sexist bias inherent in Iran’s rigid Muslim society, women often suffer as silent victims of domestic abuse, and institutions to help these victims are only beginning to emerge. When approaching this topic, however, a Westerner must understand that gender inequalities that might be inexcusable in the United States are conventional in Iran. While rejecting the society’s prejudice against women, it is

important to fully grasp the complex role of women in Iranian society today. Westerners often fail to accurately assess the power held by women in the Middle Eastern culture. In addition to recent developments in the realm of domestic violence, this presentation will explore the unique role of women in Iran’s changing society, including their significant achievements over the last few years in politics and education. (Research supported by Sophomore Early Research Stipend.)

Pariah Politics: Hannah Arendt, Jewish Identity, and the Future of National Politics

Rachel Marissa Isaacs '05, *Religion*

ADVISOR: Barbara Geller, *Religion and Frances Malino, History/Jewish Studies*

Political philosopher Hannah Arendt, reflecting upon her experience as a European Jew who fled the Holocaust, famously stated, “If one is attacked as a Jew, one must defend oneself as a Jew. Not as a German, not as a world citizen, not as an upholder of the Rights of Man....” Having born witness to what she believed to be the failure of liberal assimilation, Arendt affirmed the necessity for a Jewish national identity in the modern age. However, because she saw a link between European nationalisms and imperialism, she was resistant to the Jewish nation imitating them. Arendt theorized about a type of Zionism that would provide the Jewish people with a foundation for communal political action without deteriorating into ethnic chauvinism. Arendt’s theory of Jewish national politics not only sheds light upon conflicts in the Jewish world, but brings new insight to debates concerning nationalism and ethnic identity.

1:30 – 2:40

Gender and Poverty in Russia and Brazil: The Impact of Women's Movement on Formulating Social Policy Agenda

Anna Azaryeva '05, *International Relations and Economics*

ADVISOR: Lois Wasserspring, *Political Science*

Since the collapse of the USSR, Russia has experienced a dramatic rise in poverty together with the shrinking of the welfare state. The economic transition placed particular groups of women in a lower income group than men and had the ancillary effect of weakening their political representation. Women's movements are only starting to develop in Russia. To gain a deeper understanding of the situation, the Russian case must be put in international comparative perspective. In addition to Russia, I examine how women have reacted to poverty and social exclusion in Brazil where women's organizations have successfully utilized the mechanisms offered by civil society and democracy to promote their beliefs and highlight issues. In comparing Russia and Brazil, I aim to evaluate what impact the voice of women has had on the lives of the poorest women, those with little access to income, power, and democratic representation. (Research supported by a Schiff Fellowship.)

Science and Technology

Electrifying Biology or Zap! (short talks) Pendleton East 339

Cardioprotective Effects of K_{ATP} Channel Activation during Hypoxia in Goldfish

Jerri Chen '05, *Neuroscience*

ADVISOR: John S. Cameron, *Biological Sciences*

Previous studies have shown that ATP-sensitive potassium (K_{ATP}) channels in vertebrate cardiac muscle are activated during periods of decreased oxygen availability through a nitric oxide (NO) and cyclic-GMP (cGMP) mediated pathway. The purpose of my study was to determine whether activation of this ion channel in the heart plays a protective role in a species highly tolerant of low oxygen environments, the goldfish (*Carassius auratus*). A cellular model of environmental hypoxia was used to examine the effects of altered channel activity on isolated myocytes. Channel activation, via the presumed agonists diazoxide, SNAP, and 8-Br-cGMP, increased the survival rate of the cells under hypoxic conditions. In addition, patch-clamp experiments are currently being used to study the effects of these drugs on single channels in an effort to distinguish the cardioprotective effects of activating K_{ATP} channels at two different locations in the cell: the sarcolemma and the mitochondrial inner membrane. (Research supported by the Committee on Faculty Awards.)

Role of Active Dendrites in a Model of the Neural Correlate of Short-Term Memory

Keri Tochiki '05, *Neuroscience*

ADVISOR: Mark S. Goldman, *Physics*

Persistent neural activity, a sustained level of neuronal response following the presentation of a transient stimulus, is thought to be the neural correlate of short-term memory. Most previous models assume that single cells are incapable of intrinsically maintaining persistence and require implausibly fine-tuned positive feedback provided by a neural network. We propose that the fine tuning is not necessary if a cell contains a bistable mechanism distributed across multiple individual dendritic compartments. I am using the program NEURON to construct a model cell capable of generating action potentials and receiving input through individual dendritic compartments. These compartments contain bistable properties mediated by ionic channels shown to underlie dendritic plateau potentials. Once these bistable properties have been established in individual dendrites, I will test whether coupling dendrites will allow the neuron to exhibit multiple levels of persistent neural activity. (Research supported by NSF REU.)

Optimization of an Optical Fibre Probe for Early Cancer Detection

Paulina Ponce de Leon Barido '05, *Physics and International Relations*

ADVISOR: William Quivers, *Physics*

Over 85% of all cancers begin in the epithelium, and are often preceded by a precancerous state known as dysplasia. This makes the identification of dysplasia very important as it allows for treatment of lesions when they are still in a noninvasive stage. An alternative to current detection methods is to use optical techniques to identify the changes characteristic of dysplasia and make a minimally invasive, real-time diagnosis. These optical techniques are based on spectroscopy. Light is delivered and collected via an optical fibre probe that is small enough to

1:30 – 2:40

be placed in the accessory channel of an endoscope. The goal of my thesis research project is to optimize the design of the optical fibre probe which is a critical component of this system. (Research supported by a Schiff Fellowship.)

Surfing Science (short talks)

Science Center 396

Communicating Cancer: How the Internet Has Modified the Doctor/Patient Power Dynamic

Anna Swartz '05, Anthropology
ADVISOR: Philip Kohl, Anthropology

Information technology has made an everlasting impact in the field of medical anthropology. With the advent of the Internet, the power of the doctor/patient relationship has changed, giving patients much more power and control over their health care needs in a field where doctors' authority had always reigned supreme. Patient's access to online doctors, message board support groups, clinical trial information, etc. will be explored as well as the history of health care and doctor/patient relationships, precyber age. This research also raises important concerns for the inevitable collision of new media and the field of anthropology such as how does one represent "self" in cyber-space? How does one conduct participant observation in such a venue? Moreover, what are the issue of validity and credibility of such research in the anthropology discipline?

Little Red Riding Hood and the Big Bad Web

Meredith Beaton '05, Computer Science
ADVISOR: Panagiotis Metaxas, Computer Science

How do we know what information to trust on the World Wide Web? With the enormous size of the Web, companies have developed sophisticated search engines to aid their search for relevant information. Certain Web sites "spam" the search engines, that is, they intentionally manipulate their link structures and HTML contents in order to mislead search engines and boost their ranking in search

results. Are these sites trustworthy? That is for each user to decide. However, there is a need for an efficient algorithm to identify such sites in order to aid users in efficiently finding useful results. My thesis focuses on implementing an algorithm to discover dense neighborhoods of Web sites that are similar in content to a starting Web site. If the starting Web site is spam then we hypothesize that the surrounding neighborhood is also spam. I will discuss the theory and development of the algorithm and future research.

Efficiency, Secrecy, and Error Detection: Encoding Made Easy

Candice Manatsa '07, Mathematics
ADVISOR: Ann Trenk, Mathematics

The Germans in World War II used an encryption scheme based on a polyalphabetic cipher. They built "Enigma" machines to do the encryption, considered their code to be unbreakable, and relied on it to communicate with their U-boats in the North Atlantic. The British managed to steal one of the machines and top mathematicians succeeded in "cracking the code" through careful analysis of the transmissions. This was a major turning point in the war, and the Allies went to enormous effort and sacrifice to conceal the fact that they had cracked the code. To this day, mathematicians and computer scientists are working on finding ways to construct codes which will be efficient, secret, and whose errors will be easy to detect, without being easily decipherable by outsiders. Discovering mathematical laws governing systems designed to communicate or manipulate information is key in such work, and I plan on discussing some of these general mathematical concepts.

Learning through Designing: Programmable Blocks

Irene Velez '07
ADVISOR: Robert Berg, Physics

The Playful Invention Company (PICO) is a company that develops new digital craft materials to help children explore, experiment, and express themselves. Their first product, to be released this summer, is called PICO Crickets. By connecting lights, sensors and other programmable parts to a PICO Cricket, children can create musical sculptures, interactive jewelry, communicating creatures, and other playful inventions. The integration of science with arts, the gender neutrality, and active learning of PICO Blocks allow all children to be playfully creative people who are constantly inventing new possibilities for themselves and their communities.

Throughout the school year I have provided an outside perspective, opinions and evaluation during the final stages of the PICO Crickets. I have tested out several projects and contributed to their developments, and also reported confusion and problems. I have taken the PICO Crickets to the Wellesley Middle School to allow children to play with them and to put the theory behind PICO Crickets into action. Their feedback has played an essential part in the final stages of the development of PICO Crickets. We hope that this new kind of electronic construction kit will help reintroduce a creative and playful dimension into the designing of electronic inventions through the blending of arts and crafts, science, and technology.

1:30 – 2:40

Another Green Hall?: An Assessment of the Ecological Footprint of Wellesley's Next Residence Hall (panel) Science Center 277

Jessica Buno '05, *Environmental Studies and Psychology*, Vida Chavez-Garcia '05, *Environmental Studies and Latin American Studies*, Lisa Damon '06, *Environmental Studies*, Ariel Diamond '05, *Environmental Studies*, Kate Doiron '05, *Environmental Studies*, Stacey Eady '06, *Environmental Studies*, Christine Grant '06, *Environmental Studies*, Vanessa Jimenez '06, *Environmental Studies*, Katie (Cathryn) Johnson '05, *Environmental Studies*, Lisa McDonald '06, *Environmental Studies*, April Rouleau '06, *Environmental Studies*, Marissa Sue '05, *Environmental Studies*, Jessica Van Houten '05, *Environmental Studies*, Laure-Anne Ventouras '05, *Biological Chemistry*, and Brenna Vredevelde '05, *Environmental Studies*
 ADVISOR: Elizabeth R. DeSombre, *Political Science/Environmental Studies*

The next new building on campus will be a residence hall – should we take steps to reduce its environmental impact? Other top colleges have built “green buildings” on their campuses – why not Wellesley? We, the students of ES 300, believe that Wellesley women should make a difference in preserving the natural world. In accordance with this belief, we have undertaken a semester-long study to determine the environmental impacts from different aspects of residence hall design and operation. Focusing on water conservation, energy use, indoor environmental quality, building materials, and landscape issues, we have conducted an analysis of the environmental effects from these facets of campus buildings. We will present our recommendation about how Wellesley can take the most cost-effective steps to minimize environmental damages from building this new residence hall.

Chemistry in Small Spaces (poster session) Science Center

Examining the Phase Transition Behavior of *N*-Isopropylacrylamide Copolymer Hydrogels with *In Situ*-Generated Gold Nanoparticles

Frances Pong '05, *Chemistry*
 ADVISOR: Nolan T. Flynn, *Chemistry*

Hydrogels are polymer networks that undergo stimuli-responsive volume phase transitions, in which the gels contract and expel their contents into their surroundings. Control of this behavior has prompted much research for use of hydrogels as stimuli-responsive drug-carriers. My research investigates two modifications of gel thermoresponsive phase transition: the variation of gel composition and the addition of *in situ* gold nanoparticles. Gels were synthesized using thermosensitive *N*-isopropylacrylamide as the polymer backbone and using 0.00-3.50% wt. of *N,N'*-methylenebisacrylamide (MBAm) and/or *N,N'*-cystaminebisacrylamide (CBAm) as crosslinking agents, and were then embedded with *in situ* gold nanoparticles. UV spectroscopy revealed that the phase transitions of *in situ* gold samples with high concentrations of CBAm widened the most. Mass and diameter measurements of *in situ* gold gels with high concentrations of CBAm and low concentrations of MBAm were also substantially larger than gels that had lower concentrations of CBAm and/or higher concentrations of MBAm. (Research supported by NSF REU.)

Electron-Induced Reactions of CF₂Cl₂

Hsiao-lu Denise Lee '05, *Chemistry*
 ADVISOR: Christopher R. Arumainayagam, *Chemistry*

We have studied the low-energy electron-induced reactions of CF₂Cl₂ and CF₂Cl₂/H₂O thin films. We are motivated by a hypothesis¹, which suggests that cosmic rays bombarding polar stratospheric clouds produce low-energy electrons which interact with chlorofluorocarbons to produce chlorine that destroy the Antarctic ozone. The electron-induced reactions of CF₂Cl₂/H₂O films were designed to simulate CF₂Cl₂ absorbed on ice in the polar stratospheric clouds. Our methods include post-irradiation temperature programmed desorption (TPD) and electron stimulated desorption. Experiments were performed in an ultrahigh vacuum chamber, where CF₂Cl₂ thinfilms were grown at 100 K on a clean Mo(110) surface, or a Mo(110) surface with pre-adsorbed H₂O. A mass spectrometer filament was used to irradiate the thinfilms with low energy (5-100 eV) electrons. Post-irradiation TPD experiments were used to identify C₂F₄Cl₂, C₂F₃Cl₃, C₂F₂Cl, C₂F₃Cl, C₂F₂Cl₂, and C₂F₄ as radiolysis products of CF₂Cl₂.² Preliminary results indicated that electron-induced reactions of CF₂Cl₂/H₂O films produce C₂F₃Cl₃, C₂F₂Cl₄, C₂F₃Cl, C₂F₄, and CF₃Cl.

¹Lu, Q. B.; Sanche, L. *Phys. Rev. Lett.* 2001.

²Nakayama, N.; Wilson, S. C.; Stadelmann, L. E.; Lee, H.-L. D.; Cable, C. A.; Arumainayagam, C. R. *J. Phys. Chem. B* 2004, 108, 7950.

1:30 – 2:40

Characterization of *N*-Isopropylacrylamide/Acrylic Acid Copolymer Hydrogels Containing Gold Nanostructures

Alissa Agnello '05, Chemistry

ADVISOR: Nolan T. Flynn, Chemistry

Thermosensitive hydrogels are polymer networks that swell and deswell with temperature changes due to polymer-polymer and polymer-water interactions. Hydrogel copolymers of *N*-isopropylacrylamide and acrylic acid, poly(NIPAm-co-AAc), were synthesized with varying concentrations of *N,N'*-cystaminebisacrylamide (CBAm) and *N,N'*-methylenebisacrylamide (MBAm) as crosslinking agents. Gold nanostructures were synthesized within the poly (NIPAm-co-AAc) hydrogels. The phase transition temperatures and swelling properties of both the native and gold-containing poly(NIPAm-co-AAc) hydrogels were studied using mass measurements over a range of temperatures. The results of these studies are compared to those of gels without acrylic acid in the polymer backbone. Dried hydrogels were loaded with a fluorescent-labeled model drug, tetramethylrhodamine (TMR)-labeled dextran. TMR-dextran release profiles for the NIPAm-coAAc hydrogels were studied using fluorometry. The results of this research are applicable to the employment of thermoresponsive hydrogels in drug-delivery systems. (Research supported by the Science Center.)

Self and Identity

Birth, Girth, and Sex (short talks) Pendleton East 239

Radiation Effects of Physical Attractiveness and Social Status from Male to Female Partners in Romantic Relationships

Sallie Chung '05, Psychology, Diem Do '05, Psychology and English, Heather Park '05, Psychology, and Brandy Worthington '05, Psychology and French
ADVISOR: R. Steven Schiavo, Psychology

Forty-eight female undergraduates were presented with a photograph of a couple and a few paragraphs about them and their relationship, and then were asked to complete a questionnaire. The male's appearance was manipulated in the photograph by changing his clothing and level of grooming and his status was manipulated by his description in the text, while the female and the relationship itself were presented consistently in all conditions. Participants were expected to rate the female more positively on a number of traits related to sociability, competence, and self-concept when paired with the high-status and high appearance male and to value status most when the two independent variables were in conflict. It was consistently found that only status had an impact on the participants' ratings for each partner. Also, the female was perceived more negatively when her partner was high status and more positively when he was low status. Thus, researchers suggest the operation of a compensation effect between the two partners.

Female Body Esteem and Disordered Eating: A Comparative Analysis of College Athletes and Nonathletes

Erinn Crane '05, Psychology

ADVISOR: Julie K. Norem, Psychology

Female athletic participation and body image are two important aspects of life today. Female athletic participation has been increasing and so has awareness of body image, especially because of the media. This study examined female college athletes and nonathletes with regard to body esteem and disordered eating tendencies. Using the Body Esteem Scale (BES), and the Eating Disorder Inventory (EDI), it was found that there were no significant differences between female athletes and nonathletes in terms of body esteem or disordered eating tendencies. Both groups, overall, tended to have good body esteem, little drive for thinness, good body satisfaction and demonstrated little evidence of potential disordered eating patterns. However, both groups did show a drive for high personal perfectionism, a condition that is considered related to anorexia nervosa and bulimia nervosa.

The Influence of Birth Order on Personality

Kathryn Knouf '05, Psychology and French
ADVISOR: Julie K. Norem, Psychology

The effect of birth order on personality has been a highly debated topic in psychology. Certain researchers have found substantial differences between firstborns and later-borns, while others have found no relationship between the two variables. In order to expand upon this research, I conducted a study of Wellesley students that examined the relationships between birth order, parenting styles, and concepts of self. Because many parents have higher expectations for their firstborn children, I hypothesized that firstborns may develop stronger self-guides, or ideas about the kind of person they want to or should be. Furthermore, I examined differences in self-discrepancy, or the degree to which one's actual self

1:30 – 2:40

differs from the type of person one wishes to be, and differences in emotional responses to this self-discrepancy. My results provided limited support for differences between birth groups; however, additional research could provide more evidence for the relationship between birth order and personality.

Social Analysis

Market Structures and Controls (short talks) Science Center 278

The Medium-Term Impact of Capital Controls: Who Gains?

Ee Cheng Ong '05, Economics
ADVISOR: Akila Weerapana, Economics

The response to the 1997 East Asian crisis differed across countries. Some countries, like South Korea, Indonesia, and Thailand, responded with increased financial liberalization in order to obtain IMF approved bailouts and loans. On the other hand Malaysia chose to restrict capital mobility by establishing controls on outflows of “hot” money. I present the results of a study that examines both the impact of capital controls over time as well as their distributional impact. The hypothesis is that a financial crisis exposes cronyism, which can then be eliminated by increased liberalization. On the other hand, the use of capital controls provides cover for continued cronyism and allows companies to delay much-needed restructuring. I test this hypothesis using an econometric analysis comparing the performance of politically connected Malaysian and Indonesian firms and Korean chaebols against one another and against their nonconnected counterparts. (Research supported by a Schiff Fellowship.)

One Country, Two Currencies or Two Countries, One Currency? Political, Economic, and Monetary Unification of China and Hong Kong

Bonnie Yan-chi Sit '05, International Relations and Economics
ADVISOR: Akila Weerapana, Economics

In 1984, the Chinese and British Governments agreed on a Basic Law that granted Hong Kong a high degree of autonomy over its monetary and currency exchange system. Currently the Hong Kong Dollar (HKD) and the Chinese Renminbi (RMB) continue to circulate as distinct official currencies in Hong Kong and China respectively. This status quo will not last indefinitely. As China and Hong Kong move toward closer political and economic integration, the HKD and the RMB will eventually merge into one currency. This project investigates how the progression toward future currency union should be undertaken, paying particular attention to intermediate steps such as when Hong Kong's currency board should be abandoned in favor of a currency union. I will draw on studies by political scientists who study China as well as studies by economists on the choice of an appropriate exchange rate regime.

The Changing Face of the Japanese Corporation

Sara Parker '05, International Relations
ADVISOR: Y. Tak Matsusaka, History

The prolonged slump of the Japanese economy has once again brought to the forefront questions about the unique system of Japanese capitalism. With Japan's recovery halting at best, and many Japanese business practices uncompetitive in increasingly globalized markets, pundits and academics alike are pondering whether Japanese corporations will begin to converge on a Western model.

By analyzing the discourse within Japan on the subject, paying particular attention to the stated goals and policies of the Japanese Business Federation, the evolving relationship between the Japanese

corporation and society, both domestic and international, can be used as an indicator for whether Western convergence is really proceeding, or whether they are simply empty words.

Gambling, Social Policy, and State Revenue: Indian Casinos and State Lotteries

Maeve E. Gearing '05, Economics
ADVISOR: Phillip Levine, Economics

A variety of gambling options, from lottos to horse racing to commercial casinos, are available in many states today. Swelling these ranks recently are Indian casinos, some of which are both larger and more profitable than the casinos in Las Vegas. Though Indian casinos are sometimes described as agents of economic development, many state governments worry not only about their effects on employment and crime, but also on the potential competition they present to state-run lotteries. I examine here, through econometric analysis, whether Indian casinos and lotteries represent substitute gambling products to consumers. I also analyze whether any cannibalization of lottery revenues by Indian casinos might be offset by the potentially positive impact of such casinos on sales tax revenue. I hope that the results of this study help clarify important questions surrounding the use of Indian casinos to enhance state economies. (Research supported by a Schiff Fellowship.)

3:00 – 4:10

Change**Imagined Communities: Gender and Ethnicity in Social Privilege (short talks) Pendleton East 239****Learning How Aspects of Ethnic Identity Affect Perceptions of White Privilege***Parul N. Barry '05, Spanish*ADVISOR: *Julie K. Norem, Psychology*

Ethnic identity refers to how strongly you identify with your ethnic group. White privilege refers to social advantages that people of European descent receive solely because of the color of their skin. Since one's identity affects how one views the world, I wanted to see how aspects of ethnic identity influence perception of White privilege. Specifically, I predicted that students whose own ethnic or racial identity was more salient or central to their self-definition would be more likely to perceive White privilege across varied social situations than those for whom ethnic/racial identity was less salient or central. Seventy-five Wellesley women of varied ethnic backgrounds, completed questionnaires that measured aspects of their identity as well as their views on White privilege. Discussion of results will focus on the different ways in which identity may influence opinions on current social policies such as affirmative action.

"Living between Cultures": Latina College Students and Acculturation Support*Courtney Gomez '05, Psychology and Economics*ADVISOR: *Nancy P. Genero, Psychology*

This study seeks to explore the sources and quality of acculturation social support from family, peers, and community members among a sample of Latina Wellesley students. It is predicted that students with higher levels of acculturation social support will report lower levels of depressive symptoms, anxiety, acculturation stress, and minority student stress as well as higher levels of bicultural efficacy,

self-esteem, and positive self-image. Findings will be discussed in relation to previous work in the areas of acculturation stress, social support, and coping.

All Things *Chino* in Mexico*Jeannie Kim '05, Latin American Studies*ADVISOR: *Carlos Vega, Spanish*

The Spanish word *chino* simply translates into English as "Chinese" or "Chinese man." However, a closer examination of Mexican culture reveals several other meanings for the term – from describing curly hair to a colloquial expression indicating that one is free for the evening. My research for a Spanish seminar ("Topics in Cross-Cultural Hispanic Studies") explores the various dimensions of these and other oddities in the use of *chino* that would seem unrelated to Chinese heritage, but which pose important questions as to how Asian cultures have historically been perceived in one Latin American country.

Discourses of Modern Korean Identity on *Han**Kiwon Sue '05, East Asian Studies*ADVISOR: *Y. Tak Matsusaka, History*

In today's modernizing world, Korea maintains one of the strongest economies in Asia and boasts a successful integration into the mainstream global culture of democracy and capitalism, despite the hardships of the past. The concept of *han*, however, remains a familiar one to the Korean public, and its importance permeates throughout society, often leading to the perception that it is a cultural characteristic unique to the Korean people. Expressed as a fusion of two polar opposite emotive concepts, sadness and hope, it remains an elusive concept difficult to define, leaving room for open interpretation and a continuous reinvention of its meanings throughout time and across a variety of situations. Introducing *han* with a West Wing episode, questions addressed by the talk will include, "What is *han*?" "Is it a distinctly Korean term?," and "How and what does it mean to the Korean people?" and "What keeps it alive today?"

Literature and the Arts**Literary and Artistic Journeys (short talks) Pendleton East 349****Writing before and after the Mast: Authority and Authenticity in Journal-Based Sea Narratives***Erin Aileen Flannery '05, English*ADVISOR: *Paul Fisher, English*

The authority to write an authentic maritime narrative is best gained by using one's own sea journal to recreate the experience. Even so, a seafaring writer's background places constraints on the ultimate authenticity of the narrative. In creating a literary work from a sea journal, and thus transitioning from a private to public genre, authors infuse social commentary with their personal reflections. The journal-based sea narratives of Richard Henry Dana, Jr., Herman Melville, and John Steinbeck reflect each author's efforts to authentically recreate the social and natural dimensions of life at sea. My research, inspired by my own journal kept at sea, evaluates the authority and authenticity of Dana's *Two Years Before the Mast*, Melville's *Redburn* and *Moby-Dick*, and Steinbeck's *Log from the Sea of Cortez* and *Cannery Row*. (Research funded by the Pamela K. Daniels '59 Fellowship.)

Deconstructing Emersonian Transcendentalism through Melville: The Conflation of Self, Society, and the Romantic Quest in *Moby-Dick**Farida Habeeb '05, English*ADVISOR: *William Cain, English*

More than just an exceedingly long novel about whales, Herman Melville's *Moby-Dick* explores themes that span human experience as a whole, from the limits of freedom to the struggle of individuality against society. Behind these themes lies a rich American Romantic tradition, of which the leading figure is Ralph Waldo Emerson. In his early essays, Emerson stresses the importance of the isolating romantic quest in order to transcend the limitations of Nature, self, and society,

3:00 – 4:10

radically invoking the divinity of man. Melville strikes a very different chord from Emerson in *Moby-Dick*, depicting the fall of a tragic hero who stubbornly believes in transgressing the boundaries of self and society. By doing so, Melville emphasizes the dangers of Emerson's faith in the divinity of man, for destruction and death are the only fruits of Captain Ahab's hubris. (Research supported by a Schiff Fellowship.)

Pilgrims' Progress: Travel and Hospitality in the Holy Land in Late Antiquity

Marlena E. Whiting '05, Religion
 ADVISOR: *Peter Fergusson, Art*

The rise in status of Christianity to state religion of the Roman Empire in the fourth century CE resulted in an explosion of pilgrim travel to the Holy Land. Men and women from as far afield as France and Spain braved harsh conditions and arduous travel in an alien land in their fervent desire to "see the place where these things were taught and done." These early pilgrims left for posterity wonderful texts and fabulous monuments, recording the experience of their quest for the sacred and the holy. But what of the mundane? Of the practical aspects of their journey these holy travelers made little mention, the inns and hostels in which they stayed were consumed by the sands of time. Modern scholarship, too, has tended to overlook the mundane aspects of the pilgrims' progress. However, through a combination of rereading the original written sources, and examining archaeological data in a new light, the ancient pilgrimage routes and the complex system of hospitality that existed along them begin to re-emerge.

Design by Architecture (exhibit, poster)

Jewett Art Center Sculpture Court

Building in a Landscape: Architectural Design for the Wellesley College Landscape

Gary Atkins '06, MIT, Architecture, Christine Beever '05, Architecture, Ramon Cavazos '05, MIT, Architecture, Alena Delacruz '06, MIT, Architecture, Cristina Greavu '05, Architecture, Soo Kyung Kim '05, Architecture and Art History, and Catherine Weng '05, MIT, Architecture

ADVISOR: *Phyllis McGibbon, Art*

The Wellesley College campus is a carefully cultivated landscape with over 130 years of history. It embodies an articulate set of landscape principles related to a specific educational mission. With the current architecture and landscape design developments on campus, the Wellesley landscape is going through more significant change and progress than it has since the college was established in 1875. It is a privilege to study the premise of architectural design in the landscape on such an exciting site. During the fall of 2004, a group of seven MIT and Wellesley students, participants in the third undergraduate architecture design studio at MIT, developed design projects sited on the Wellesley College campus.

Understanding the history and present-day operations of the place, each student proposed designs for a bus-stop shelter, a boathouse, and a boathouse day-lighting study. The exhibition will document the design process and present drawings and three-dimensional models of the projects.

Redesigning Pendleton: Computer-Aided Design

Amanda Davidson '05, Architecture and Studio Art, Kimberly Huestis '05, Architecture and French Cultural Studies, Soo Kyung Kim '05, Architecture and Art History, Kara Schimmelfing '07, Architecture, and Yuling Wang '06, Architecture and Economics
 ADVISOR: *Lesa Pierce, Wellesley College Project Manager*

As architecture majors here at Wellesley College, we lack a department home. Our objective for the Architecture 350 class offered in the fall semester of 2004 was to learn AutoCAD as a tool for architectural design and utilize it to design a proposal for an Architecture department for Wellesley College. After building up a foundation in AutoCAD, each student was given the third floor plans for Pendleton, as prospective location for the department, and a list of specifications for what our architecture department was to have. From there, each person brought to the table her own unique design, working in two dimensional plans and sections.

3:00 – 4:10

Woodwind Music in the Twentieth Century (long performance) Jewett Art Center Auditorium

Victoria Lo '07, *Music and Mathematics*, Elizabeth Keiser '05, *Economics*, JooHee Kim '08, Jennifer Kunzendorf '06, *Music*, Kathleen Scorza '07, *History*, Joanna Swafford '06, *Music and English*, Sarah Swanbeck '07, *Economics and Italian Studies*, Agnes Hahn '07, *Psychology*, Barbara Geoghegan '07, *Emily Vardel '05, Biological Sciences and German Studies*, ShinBin Tan '07, *Sociology*, and Janet Tsai (Olin College '06),
ADVISOR: Isabelle Plaster, *Music*

Woodwind music encountered new possibilities in the twentieth century. Whereas previous eras placed emphasis on realizing the musical potential of the stringed instruments, the twentieth century saw composers who not only tested the vast and previously unexplored capabilities of the woodwind family, but also the virtuosity of the musicians. Our presentation aims to impart the essential and also exceptional qualities of the woodwind instruments through performances of solo works and ensemble pieces.

Multicultural Research

Colonialism and Indigenous Representations (short talks) Science Center 278

The Mo'olelo of History: Understanding Land and Peoplehood in the Hawaiian Sovereignty Movement

Alice K. Chen '05, *History*
ADVISOR: Sally Merry, *Anthropology and Lidwien Kapteijns, History*

Over a century after the 1893 overthrow of the Hawaiian monarchy by a group of American businessmen, Native Hawaiians are rallying together in a move for cultural recognition and political sovereignty. Central to their discourse is the question of Hawaiian identity. My thesis examines the varied understandings of land and peoplehood that play into this notion of

identity and consequently shape the move for Hawaiian sovereignty. I juxtapose the legal maneuverings of the political organization *Ka Lahui Hawai'i* with the agricultural restoration of independent taro farmers. Both factions mobilize history to invoke very specific understandings of "traditional" identity relationships. While *Ka Lahui* centers its bid for sovereignty around a revisionist reading of political events and their role in the transformation of society, agriculturists worry less about contestation within an academic framework; instead their calls for sovereignty are based on metaphors of cultivation and fertility passed down from generation to generation.

The Search for Sacred Power: The Narragansetts and the Great Awakening

Robyn Worthington '05, *History*
ADVISOR: Nathaniel J. Sheidley, *History*

In 1745, many of the Narragansett Indians living on reservation lands in the Rhode Island colony adopted Christianity. Although this once powerful and influential population had been introduced decades earlier to Christian principles by visiting missionaries and colonists, it was not until a series of religious revivals that gripped the American colonies during the middle of the eighteenth century that the Narragansetts chose Christian conversion. The Great Awakening, as the revivals came to be known, challenged traditional forms of Protestant worship and church hierarchy, encouraging some members to create an alternate vision of their religious traditions within "separate" congregations. Like many of their English neighbors, the Narragansetts were also affected by the Awakening's evangelical message of personal empowerment. In response, the Narragansetts were prompted to creatively interpret "New Light" worship within their own religious framework, shaping a Christian identity that derived sacred power from a new source: The Englishman's God. (Research supported by a Schiff Fellowship.)

Ethical Representations of Minorities in Sumii Sue's *The River with No Bridge* and Rosario Castellanos' *Balun-Canan*

Aileen M. Cruz '05, *Comparative Literature*
ADVISOR: Eve Zimmerman, *East Asian Languages and Literatures*

Discrimination and marginalization are not themes unique to any particular culture, but in fact have been pervasive throughout history in all parts of the world. In Japan, Sumii Sue wrote about the struggles of a *burakumin* or "outcaste" family in her novel *The River with No Bridge* (1957) reacting to the unfair treatment she had witnessed towards this group. Meanwhile in Mexico, Rosario Castellanos presented the interracial tensions between the Maya Indian minority and the white landowners of Chiapas through her novel, *The Nine Guardians* (1961). Although the novels come from different literary traditions, both writers were committed to presenting the struggles of both minorities to promote social change. The ethical representations of these minorities are evident within common themes such as the struggle for education, the unity of family and the strong ties to nature. (Research supported by a Schiff Fellowship.)

Political Development

Religious Identities and Politics in a New World Order (short talks) Pendleton West 212

Family Ties: Culture and Organization among Ukrainian Catholics in America

Bernadette Nadya Jaworsky '05, *Sociology and American Studies*
ADVISOR: Peggy Levitt, *Sociology*

Aldous Huxley once said, "Culture is like the sum of special knowledge that accumulates in any large united family and is the common property of all its members." Using cultural and cognitive sociology, I have gone back and studied the "large united family" in which I was raised, the Ukrainian Catholic Church. My

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case study of two neighboring churches examines two of the biggest phenomena affecting any organization – change and conflict. Like many ethnic or specialized churches that face issues of declining membership and fiscal instability, they have spent two decades in a struggle for their very survival. One of them has fared significantly better in doing so, and this research offers a window into the why of their relative success - the key is in their culture. (Research supported by a fellowship from the Jerome A. Schiff Fund.)

Masters of Return: The Resurgence of Newly Orthodox Jewish Women

Jordan Namerow '05, Sociology and Women's Studies

ADVISOR: *Rosanna Hertz, Women's Studies*

Recent decades have witnessed a rejuvenation of religious fervor within patriarchal traditions. Since the 1960s, *ba'alot teshuvah* ("Masters of Return"), newly Orthodox Jews who have abandoned secular lives and "returned" to sex-segregated, ritually insular veins of Judaism, have attracted women in their 20s and 30s and are rapidly increasing in numbers. For many of these women, notions of individualism spawned by the Women's Liberation Movement, have led to a decline of moral discourse and acute social estrangement. Subsequently, *ba'alot teshuvah* claim a "postfeminist" consciousness believing that "return" validates their sexuality and instills a feminine ethos of nurturance and spirituality. From the laws of family purity to the dignity accorded them as mothers, *ba'alot teshuvah* regard Orthodoxy as institutional protection. Are these women religious traditionalists or reactionary postfeminists? This presentation will explore the social conditions under which the *ba'al teshuvah* community has evolved and the interplay between religious resurgence and feminist discourse.

Al Qaeda-Apocalyptic Islamic Fundamentalism in the Twenty-First Century

Karen Andrews '05, Peace and Justice Studies

ADVISOR: *Sally Merry, Anthropology and Peace and Justice Studies*

On September 11, 2001, the world was forever changed when introduced to Al Qaeda's apocalyptic Islamic fundamentalism. Al Qaeda, with its religiously motivated political movement has changed the way Islam is perceived around the world. This presentation will examine how Al Qaeda misuses Islam for political gain, and especially how Al Qaeda misuses the concept of Jihad, by referring to religious texts, such as in the Qur'an and Hadith. It will also examine how religious scholars worldwide feel about how Al Qaeda's deception of Islam is destroying the true message of this religion.

Authoritarianism and Religion: Fact or Fiction?

Adrienne A. Prettyman '05, Psychology

ADVISOR: *Paul Wink, Psychology*

The message of most world religions is one of compassion, understanding, and forgiveness but, paradoxically, psychologists have found a robust connection between religiousness and authoritarianism, prejudice, and intolerance. We used a sample of older age, mostly White and Mainline Protestants to investigate the relation between religiousness (traditional or institutionalized religious belief) and spirituality (nontraditional or noninstitutionalized religious belief) and authoritarianism or submission to authority, conventionalism, and hostility toward minority groups. In late adulthood, religiousness was related positively and spirituality was related negatively to authoritarianism. These relations were present even after controlling for religious fundamentalism, social class, intelligence, gender, age cohort, and personality characteristics. Religiousness and spirituality in early adulthood predicted authori-

tarianism in late adulthood, a time interval of close to 40 years. The implication of our findings for the "culture wars" debate will be discussed.

Science and Technology

Waves and Particles (short talks) Pendleton East 139

Let's Break It Down: Wavelet Analysis and Its Applications

Christine Simpson '05, Mathematics
ADVISOR: *Fred Shultz, Mathematics*

The digital revolution of the past twenty years has fundamentally changed the way we analyze and store information.

Wavelets are a powerful mathematical tool that has transformed the way we process, compress, and analyze digital signals and images. Wavelets allow us to decompose a signal or image into simpler components that can then be used by mathematicians, scientists, or engineers to alter the original data. A unique feature of wavelet analysis is the wide variety of different wavelets that can be applied to different types of problems. Everyone from the FBI to the telephone company use wavelets in a wide array of applications. We will describe some of the basic concepts behind wavelet analysis and demonstrate some of what wavelets can do in image analysis.

Electrical Properties of Silica Suspensions

Paula F. Popescu '07, Physics and Economics
ADVISOR: *Yue Hu, Physics*

Gels containing silica are widely used in industry in paints, inks, and tooth pastes. However, the physical properties of these gels are not fully understood.

In the research I have conducted this year for the physics department, we focused our attention on the electrical properties of particular gels. The gels we used were obtained from suspending silica particles in silicone oil. After only a couple of weeks, the suspensions exhibited an

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unexpected behavior, turning from gels into fluids. The explanation for the ageing of the gels rests on the formation of hydrogen-bonds between the silanol groups present on the silica particles and the silicone oil.

Our goal was to measure the electrical properties of these systems, more specifically the conductivity and dielectric constant. As the samples age, we recorded the electric characteristics and used them to explain the behavior of the suspensions.

I shall present our results, the correlations between the electrical and viscoelastic properties of the samples, and our hypothesis for the reasons behind the ageing behavior.

Being Homer Simpson: Working at the MIT Nuclear Reactor

Xan Chacko '05, Physics and Women's Studies

ADVISOR: *Glenn Stark, Physics*

The Wellesley-MIT cross-registration program allows students to take advantage of unique resources at each school. One such resource at MIT is the Nuclear Reactor Lab, where students and faculty from several departments, as well as from local hospitals and radiological centers, conduct research. I visited the facility in my sophomore year and discovered that undergraduates are given the responsibility of operating the reactor, which seemed both alarming and thrilling. And so began the year-long training process of becoming a Reactor Operator. Judging by the fact that I had to take a licensing exam with the U.S. Nuclear Regulatory Commission, and that the job involves nuclear safety in both normal and emergency conditions, I found that the responsibilities of this campus job are a little different from the others that I've had, be it washing dishes in the Davis cafeteria or tutoring physics. I would like to share some of my experiences of working and being a part of this eclectic nuclear community.

It's Not Easy Being Blue-Green (poster session) Science Center

Acid Tolerance Response in Cyanobacteria?

Donna Deng '05, Biological Sciences

ADVISOR: *Mary M. Allen, Biological Sciences*

Cyanobacteria or blue-green algae, are the only prokaryotic organisms that carry out oxygenic photosynthesis. They appear to be highly adaptable because they exist in environments with high temperatures or high salt concentrations. However they are not found in many acidic conditions because they grow best at alkaline pH. This study focuses on whether cyanobacteria can build up an acid tolerance response in order to survive in an acidic environment. The organisms were pre-exposed to mildly acidic media buffered at pH 6.3 and provided with 5% carbon dioxide and air. After the initial adaptation period, the cells were then transferred into media buffered at pH 5.5. The results showed that cyanobacteria were able to grow at the mildly acidic environment, but did not exhibit an acid tolerance response when placed into a lower pH because there was no growth. The trials were performed using different cell densities, but the pattern of growth was the same for each density. (Research supported by the Howard Hughes Medical Institute and the National Institutes of Health.)

Acid Stress Proteins of Cyanobacterium *Synechocystis* sp. Strain PCC 6803

Jing Chen '05, Biological Chemistry

ADVISOR: *Mary M. Allen, Biological Sciences*

Cyanobacterium *Synechocystis* sp. strain PCC 6803 has been shown to grow optimally at pH 7.5-10. However, little research has been performed on the effect of acid stress on any cyanobacterium. My goal was to characterize the acid stress response of strain 6803 cells, the first cyanobacterium to have its DNA sequenced. Growth and viability studies showed that cells grown in medium buffered at pH 5.2 stopped growing and

lost viability. To identify the acid stress proteins of strain 6803, cells were incubated in medium buffered at different acidic pHs and then broken. Proteins were then separated by 2-D gel electrophoresis and trypsin digested to be identified by a MALDI-TOF mass spectrometer. Protein analyses showed that 8 to 30% of the total cell proteins were upregulated or downregulated, 19 to 23% disappeared and 23 to 30% were newly induced upon acid stress. (Research supported by the National Institutes of Health and the Howard Hughes Medical Institute.)

Regulation of Nitrate Reductase Activity in a Strain of Cyanobacteria

Sogole Moin '05, Biological Sciences and Deborah Park '06, Biological Chemistry
ADVISOR: *Mary M. Allen, Biological Sciences and Adele J. Wolfson, Chemistry*

Cyanobacteria are found in a wide variety of habitats due to their ability to survive in extreme and stressful conditions. The research in this laboratory on bacterial biochemistry and physiology aims to understand the relationship between environmental changes and stress on the structure and function of cyanobacteria. Our research investigates the effects of different nitrogen sources and nitrogen starvation on the enzyme, nitrate reductase, in a strain of nonnitrogen-fixing cyanobacteria. The enzyme catalyzes the reduction of nitrate to nitrite, an integral step in nitrate assimilation. This research explores nitrogen control in cyanobacteria, a common phenomenon among microorganisms, through which the assimilatory pathways of some nitrogen sources is repressed when a more easily assimilated nitrogen source is available. (Research supported by the Arnold & Mabel Beckman Foundation.)

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Using NMR Spectroscopy to Study Nitrogen Metabolism in Cyanobacteria

Valeria Riguero '06, Biological Sciences and Jane M. Rodgers '06, Neuroscience
 ADVISOR: Mary M. Allen, Biological Sciences and Nancy H. Kolodny, Chemistry

Cyanobacteria are ancient, prokaryotic organisms that have adapted to their environment for three billion years. Cyanophycin and phycocyanobilin are nitrogen storage molecules within cyanobacteria. Both storage molecules are depleted during nitrogen starvation. When cells are starved for, and then refed nitrogen, cyanophycin reappears within minutes, while phycocyanobilin resynthesis takes 1-2 days. We, therefore, hypothesize that nitrogen cycles through cyanophycin into phycocyanobilin. Because the protons interact with ^{14}N and ^{15}N differently in the presence of a strong magnetic field due to their different nuclear spins, ^1H -NMR spectroscopy can be used to decipher whether nitrogen from the medium (^{15}N) or from breakdown of intracellular proteins (^{14}N) is incorporated into cyanophycin and phycocyanin. It was found that the ratio of ^{14}N to ^{15}N decreased in cyanophycin over time. All new phycocyanobilins were completely made up of ^{15}N . (Supported by Howard Hughes Medical Institute, the Brachman Hoffman Fund, and the Roberta and Karl Staley Fund.)

Is a Na^+/H^+ Antiporter Involved in Response to Acid Stress in Cyanobacteria?

Lydia Ho '05, Biological Sciences
 ADVISOR: Mary M. Allen, Biological Sciences and Nancy H. Kolodny, Chemistry

How do cyanobacteria survive in lakes and ponds made increasingly acid by air pollution? Some studies have shown that one of the acid stress coping mechanisms of microorganisms is to maintain a neutral or slightly alkaline internal pH, also known as pH homeostasis. Moreover, studies on *E. coli* have suggested that the use of a sodium/proton antiporter, a protein embedded in the cell membrane

that carries one substance in one direction (into the cell) and a second substance in the opposite direction (out of the cell), is involved in maintaining pH homeostasis under alkaline conditions. Do cyanobacteria share a similar coping mechanism under stress? By using ^{31}P NMR and ^{23}Na spectroscopy, I am investigating whether a cyanobacterial strain, *Synechocystis* sp. strain PCC 6803, maintains pH homeostasis and employs a Na^+/H^+ antiporter as a part of the homeostasis system under acid stress. (Research supported by the Janina A. Longtine Fund, the Howard Hughes Medical Institute, and the National Institutes of Health.)

Effects of Nitrogen Stress on Phycocyanin and Cyanophycin in the Cyanobacterium *Synechocystis* sp. Strain PCC 6308

Chikoti Mibenge '07, Biological Chemistry, Maua Herme '06, Biological Sciences, and Maria Banica '06 Biological Sciences
 ADVISOR: Mary M. Allen, Biological Sciences and Nancy H. Kolodny, Chemistry

Cyanobacteria are aquatic and photosynthetic microorganisms which are often unicellular, though they may grow in colonies large enough to be seen. Most cyanobacteria contain nitrogen storage molecules to guard against nitrogen starvation. In some strains of cyanobacteria, the main nitrogen storage polymer is multi-L-arginine-poly (L-aspartic acid), or cyanophycin granule polypeptide (CGP). Cyanobacteria also contain a second nitrogen storage molecule known as phycocyanin. Studying the relationship between these two types of nitrogen storage molecules under conditions of nutrient stress illustrates the adaptation of cyanobacteria to a range of environmental conditions in which the levels of nitrogen available to them vary widely. Using cyanobacterium *Synechocystis* sp. strain PCC 6308, we compared the uptake of two different nitrogen isotopes in cyanophycin during nitrogen starvation and after refeeding. With the use of ^1H NMR and UV-Visible Spectroscopy, we observed a correlation between an increase in the

amount of phycocyanin and the presence of both ^{14}N and ^{15}N in the cyanophycin. (Research support from the Howard Hughes Medical Institute.)

How Do Cyanobacteria Make Their Environment Less Acidic?

Michelle Nguyen '07, Biological Chemistry and Caitlin Pesout '07, Biological Sciences
 ADVISOR: Mary M. Allen, Biological Sciences

Cyanobacteria are able to cope with many environmental stresses, one of which is acid stress. *Synechocystis* sp. strain PCC 6308 has been shown to increase the pH of its growth medium when placed in a low pH medium. We are looking specifically for amino acid decarboxylases, which would break down certain amino acids in the external environment to a more basic form. It was found that cyanobacteria cells are able to grow well in amino acid supplemented media. In addition, assays to determine whether or not decarboxylases are present showed that the cells in all growth conditions with amino acid supplements, as well as in the control which did not have any amino acid in its external environment, contained decarboxylases. (Research supported by the Howard Hughes Medical Institute and the National Institutes of Health.)

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Geoarcheology (poster session) Science Center

Deciphering the Geochemical History of Lake Waban

Elizabeth A. Abbey '06, *Geosciences*,
Cynara Cannatella '05, *Geosciences*,
Heather Clark '07, *Environmental Science*,
Rachel M. Erdil '07, *Environmental
Chemistry*, Emily Knurek '07, and
Anna M. Wall '05, *Geosciences*
ADVISOR: Dan Brabander, *Geosciences*

Located downstream from Henry Wood's Sons paint factory, sediments from Lake Waban have the potential to record the industrial history of the watershed. Lake Waban was the receiving body for much of the factory's effluent from 1848 to 1928, therefore it is likely that lake sediments contain significant waste from pigment production, namely lead chromate. To unravel the industrial history, we analyzed sediment freeze cores from the deepest portion of the lake and used the data collected to identify geochemically unique stratigraphic horizons. We also investigated current sedimentation processes through surface dredging and sediment coring at the inlet and outlet of the lake. Chemical analyses of sediments were conducted using x-ray fluorescence. Preliminary analyses show elevated lead and chromium levels in surface sediment and a geochemical stratigraphy that correlates with industrial activity on the watershed.

WTC Geochemical Fingerprint Preservation in New York Harbor Sediments

Cynara Cannatella '06, *Geosciences*
ADVISOR: Dan Brabander, *Geosciences*

The World Trade Center (WTC) collapse in New York City on September 11, 2001 released a considerable amount of dust and debris into New York Harbor (NYH). A geochemical fingerprint of WTC material was identified through distinctive Cu/Al and Zn/Al weight ratios and ⁷Be dating techniques in sediment cores from NYH pier 32 in 2001 (Oktay et al., 2003). The goal of this project was to determine

if the WTC fingerprint was preserved in a sediment core collected from pier 32 in 2002. Bulk elemental compositions were obtained using polarized energy-dispersive X-ray fluorescence (EDXRF) and depth profiles were compared with cores known to contain the original WTC fingerprint material. Though depth profile correlations exist between the two cores, the WTC fingerprint does not appear to be preserved. These results indicate short-term episodic mixing and particle resuspension, followed by rapid sedimentation totaling 22.5 cm in one year. Further analysis can characterize sediment transport processes and current inputs into NYH.

Are You Game? (interactive teaching presentation) Pendleton East 129

Wenjun Jing '05, *Economics and Media Arts and Sciences*, Gowun Kim '06, *Computer Science*, and Mala Sarkar '06, *Media Arts and Sciences and Economics*
ADVISOR: Panagiotis Metaxas, *Computer Science*

Design, both visual and structural, plays an integral role in the appeal of any computer game, from classics such as Pong to the animation-intensive Myst. In the CS 215 course ("Multimedia Design and Programming"), we explored a variety of themes to create from scratch our own versions of known games and puzzles. Using a multimedia programming environment called Director MX and our knowledge of game design, we set out to give existing game implementations a new twist, either through visual design or strategy design. In our presentation, we will discuss the challenges and considerations we faced when programming a computer game from scratch and designing an interactive graphical interface.

We will present three games. In "Back to Yesterday", Gowun Kim has implemented a strategic puzzle game inspired by Sokoban, in which the object of the game is to push boxes into their correct positions in various maze-like environ-

ments. In "Fashion Show", Wenjun Jing has designed an RGB color-matching game in the context of the fashion industry. In "Metro Mix-up", Mala Sarkar uses the theme connectivity of subway lines to give a spin on a traditional puzzle. Our audience is invited to test our games afterwards.

Game URLs:

Gowun Kim: "Back to Yesterday"
<http://www.wellesley.edu/CS/courses/CS215/Puzzles2004/backtoyesterday.html>

Wenjun Jing: "Fashion Show"
<http://www.wellesley.edu/CS/courses/CS215/Puzzles2004/fashionshow.html>

Mala Sarkar: "Metro Mix-up"
<http://www.wellesley.edu/CS/courses/CS215/Puzzles2004/metromixup.html>

Of Mind and Manner: Understanding Brain and Behavior (panel) Science Center 396

Can Chemistry Answer Questions about Neurological Disorders? Applying Magnetic Resonance to Rett Syndrome

Meera Sheffrin '06, *Chemistry and
Brittany Yerby '05, Chemistry*
ADVISOR: Nancy H. Kolodny, *Chemistry*

Magnetic Resonance Spectroscopy (MRS) and Magnetic Resonance Imaging (MRI) can provide chemical, physiological, anatomical and functional information about living tissue without surgery or other invasive procedures. Thus MRI and MRS are uniquely useful tools in developmental studies because we can monitor the progress of a single subject over a period of time. Our project incorporates the study of biochemistry and neurological disease as we apply MRS to monitor neurochemistry during postnatal development in the search for early indicators of Rett Syndrome, a developmental disorder of young girls, in a mouse model. By observing variations in the concentrations of neurochemicals associated with Rett Syndrome and comparing them to abnormalities related to other diseases, we may gain insight into the chemical mechanisms

3:00 – 4:10

of this devastating disorder, how it can be detected early and possible avenues of treatment, as well as into the roles of the neurochemicals themselves. (Research supported by The Staley Fund for Cancer-Related Research and the Howard Hughes Medical Institute.)

Using Contrast-Enhanced Magnetic Resonance Imaging (MRI) for the Investigation of Serotonin Synthesis

JaeYoung (Jane) You '05, Chemistry
 ADVISOR: Nancy H. Kolodny, Chemistry

Serotonin plays a crucial role in neurological activities. In particular, it has been demonstrated to be important in neurogenesis and neurodevelopmental diseases. This study aims to investigate the production of serotonin in lobster and mouse brain using contrast-enhanced Magnetic Resonance Imaging (MRI). We have designed a targeted contrast agent that visualizes the activity of 5-tryptophan hydroxylase (TPH), a competent marker of serotonin production. The contrast agent will indicate the presence of TPH by chemical interactions with the TPH in its environment. The designed molecule was synthesized and characterized using various techniques, such as fluorescence spectroscopy, mass spectrometry, NMR spectroscopy and MRI. A further study will focus on its efficacy in *in vivo* system. (Research supported by the Howard Hughes Medical Institute and the Roberta and Karl Staley Fund.)

Using Volumetric Magnetic Resonance Imaging to Monitor Neurodevelopmental Brain Changes in a Mouse Model of Rett Syndrome

Shivani Agarwal '05, Neuroscience and Kathy Wang '06, Chemistry
 ADVISOR: Nancy H. Kolodny, Chemistry

Rett (RTT) Syndrome is a neurodevelopmental disease, striking mostly girls, that is rapidly gaining attention. Volumetric MRI has proven to be beneficial in the study of RTT in humans by providing opportunities to track the abnormal brain development associated with the disease. A mouse model of Rett Syndrome is now

available at Wellesley College. Using Wellesley's micro-MRI system, volumetric MRI has been implemented on RTT mice in order to gain a more complete picture of what goes awry in the first postnatal month. Ultimately, longitudinal volumetric comparisons will be made between RTT and wildtype mice. The implication of this study is that significant brain volumetric changes early in development may be used as a new marker for the diagnosis of Rett Syndrome. (Research supported by the Howard Hughes Medical Institute and the Robert and Karl Staley Fund.)

In Vivo Tracing of the Crayfish Brain Using Manganese-Enhanced Magnetic Resonance Imaging (MEMRI)

Jo R. Hunter '05, History, Erik D. Johnson, MIT '05, Nuclear Engineering, Sheena S. Mehta, '06, Chemistry, Jane M. Rodgers, '06, Neuroscience, and Do-Quyen Pham, '06, Neuroscience
 ADVISOR: Nancy H. Kolodny, Chemistry and Barbara S. Beltz, Biological Sciences

MEMRI is a technique that uses the natural properties of manganese ions to enhance images of the nervous system. Due to the relative simplicity of the nervous systems of invertebrates, our research is conducted on the crayfish species *Cherax destructor*. While most contrast agents produce improved images that still reflect only anatomical structure, manganese ions can produce contrast that is contingent upon their active uptake by neurons, offering the possibility of activity-dependent imaging of neural tracts and pathways.

Our project takes two approaches. Firstly, the use of manganese, and its application, is being refined to the point where the resulting images could approach the resolution shown in histological studies, enabling longitudinal studies where the crayfish is unharmed by the low dosages of manganese used. Secondly, by correlating electroretinography (ERG) recordings with MEMRI results we could produce functional images of the crayfish visual system. (Research supported by the Howard Hughes Medical Institute.)

Volumetric Alterations in the Striatum of MeCP2-Null Mice

Kathryn Swann '05, Neuroscience
 ADVISOR: Joanne Berger-Sweeney, Biological Sciences

Rett Syndrome (RTT) is a neurodevelopmental disorder that causes a range of debilitating symptoms in females and still-birth or early death in males. Over 75% of RTT cases are due to mutations in the X chromosome-linked gene that encodes the transcription repressor protein, methyl-CpG-binding protein 2 (MeCP2). Compared to healthy brains, RTT brains appear to have a 30% volume reduction, however, this decrease is not uniform throughout the brain. One region showing a marked volume reduction is the striatum, a structure involved in motor control. This study quantifies volumes of MeCP2-null mice compared to their wild-type littermates. AMIRA software will be used to trace manually the striatum and calculate striatal volumes. Changes in striatum volume may help to explain the degeneration of purposeful movement observed in the MeCP2-null mice and in RTT patients. (Research supported by the Howard Hughes Medical Institute and the International Rett Syndrome Association.)

References:

- Bauman ML, Kemper TL, Arin DM. Pervasive neuroanatomic abnormalities of the brain in three cases of Rett syndrome. *Neurology* 1995; 45(8):1581-6.
- Reiss AL, Farque F, Naidu S, Abrams M, Beaty T, Bryan RN, Moser H. Neuroanatomy of Rett syndrome: a volumetric imaging study. *Ann Neurol*. 1993; 34(2): 227-34.

3:00 – 4:10

Effects of Choline Supplementation on the Behavioral Phenotype of MeCP2 Mutant Mice

Rebecca Yang '05, *Biological Sciences*
 ADVISOR: Joanne Berger-Sweeney,
Biological Sciences

Mutations in the X-linked gene encoding MeCP2 are responsible for over 75% of all cases of Rett Syndrome (RTT): a neurodevelopmental disorder debilitating 1 in 10,000-22,000 females. RTT individuals display moderate to severe mental retardation and neuropathological evidence indicates abnormal development of the cholinergic neurotransmitter system. In normal individuals, choline supplementation during development alters the cholinergic system and facilitates improvements in adult memory. We hypothesize that choline supplementation of MeCP2 mutant mice, an animal model of RTT, will improve cognitive deficits. MeCP2 mutant and wildtype mice were supplemented with either 25 mM choline / 50 mM saccharin (test) or 50 mM saccharin alone (control) from embryonic day (ED) 10 to weaning (3 weeks). At approximately 4 weeks, reflexes, locomotion, and associative learning were assessed. These results may provide a potential pharmaceutical intervention to reverse the cognitive impairments observed in RTT. (Research supported by National Institutes of Health and the International Rett Syndrome Association.)

Flora and Fauna (poster session) Science Center

Cardioprotective Effects of K_{ATP} Channel Activation during Hypoxia in Goldfish

Jerri Chen '05, *Neuroscience*
 ADVISOR: John S. Cameron, *Biological Sciences*

Previous studies have shown that ATP-sensitive potassium (K_{ATP}) channels in vertebrate cardiac muscle are activated during periods of decreased oxygen availability through a nitric oxide (NO) and cyclic-GMP (cGMP) mediated pathway. The purpose of my study was to determine whether activation of this ion channel in the heart plays a protective role in a species highly tolerant of low oxygen environments, the goldfish (*Carassius auratus*). A cellular model of environmental hypoxia was used to examine the effects of altered channel activity on isolated myocytes. Channel activation, via the presumed agonists diazoxide, SNAP, and 8-Br-cGMP, increased the survival rate of the cells under hypoxic conditions. In addition, patch-clamp experiments are currently being used to study the effects of these drugs on single channels in an effort to distinguish the cardioprotective effects of activating K_{ATP} channels at two different locations in the cell: the sarcolemma and the mitochondrial inner membrane. (Research supported by the Committee on Faculty Awards.)

Architecture or Alchemy: An Exploration into the Water-Shedding Properties of the Pink-Plumed Poppy

Katy Silverstein '05, *Chemistry*
 ADVISOR: Jean Fuller-Stanley, *Chemistry*

The Pink-Plumed Poppy (*Macleaya cordata*) is an invasive weed that quickly dominates unsuspecting gardens with its imposing six-foot tall, leggy presence. However, despite its reputation as a gardener's worst nightmare, the plant remains an intriguing oddity, due to its unusual ability to completely shed water (much like the most expensive of raincoats). While previous studies have determined that the hydrophobicity of

many plants is a physical property of surface roughness, as well as microscopic waxy crystals on the surface of the leaves, there is evidence that suggests that the chemical constituents of a plant may affect the physical integrity of its surface. This presentation will discuss how one determines the chemical constituents in a plant, as well as the different characteristics that make something waterproof. (Research supported by a Pamela Daniels '59 Fellowship.)

"Cry for Me, 'Argentina' ": Vocal Discrimination in Penguins

Logan Schmidt '05, *Biological Sciences and Classical Civilizations*
 ADVISOR: Emily A. Buchholtz, *Biological Sciences*

"Argentina" and other Rockhopper and African penguins at the New England Aquarium communicate using bray and contact calls. Penguins and many species that breed in large colonies use sound as a means of recognizing individuals and conspecifics. Are different call characteristics used in discrimination at the individual, subspecies, or species level?

Over a period of three months I recorded contact and bray calls of 65 individuals from three species of penguins at the New England Aquarium. Calls were displayed as sonograms and a variety of sound variables were measured. Using discriminant analysis, I showed that main frequency and the average length of the syllable were most important in distinguishing among species, but that syllable amplitude and frequency patterns appear to be necessary to discriminate among individuals. The ability of species level cues to discriminate between subspecies of Rockhoppers supports their separation at the species level. (Research supported by Howard Hughes Medical Institute.)

3:00 – 4:10

Life in Cyberspace (poster session) Science Center

Little Red Riding Hood and the Big Bad Web

Meredith Beaton '05, Computer Science
ADVISOR: *Panagiotis Metaxas, Computer Science*

How do we know what information to trust on the World Wide Web? With the enormous size of the Web, companies have developed sophisticated search engines to aid their search for relevant information. Certain Web sites “spam” the search engines, that is, they intentionally manipulate their link structures and HTML contents in order to mislead search engines and boost their ranking in search results. Are these sites trustworthy? That is for each user to decide. However, there is a need for an efficient algorithm to identify such sites in order to aid users in efficiently finding useful results. My thesis focuses on implementing an algorithm to discover dense neighborhoods of Web sites that are similar in content to a starting Web site. If the starting Web site is spam then we hypothesize that the surrounding neighborhood is also spam. I will discuss the theory and development of the algorithm and future research.

Learning through Designing: Programmable Blocks

Irene Velez '07
ADVISOR: *Robert Berg, Physics*

The Playful Invention Company (PICO) is a company that develops new digital craft materials to help children explore, experiment, and express themselves. Their first product, to be released this summer, is called PICO Crickets. By connecting lights, sensors, and other programmable parts to a PICO Cricket, children can create musical sculptures, interactive jewelry, communicating creatures, and other playful inventions. The integration of science with arts, the gender neutrality, and active learning of PICO Blocks allow all children to be playfully creative people who are constantly inventing new possibilities for themselves and their communities.

Throughout the school year I have provided an outside perspective, opinions, and evaluation during the final stages of the PICO Crickets. I have tested out several projects and contributed to their developments, and also reported confusion and problems. I have taken the PICO Crickets to the Wellesley Middle School to allow children to play with them and to put the theory behind PICO Crickets into action. Their feedback has played an essential part in the final stages of the development of PICO Crickets. We hope that this new kind of electronic construction kit will help reintroduce a creative and playful dimension into the designing of electronic inventions through the blending of arts and crafts, science, and technology.

Social Analysis

Appropriate Technologies for International Development: Using Science to Improve the Quality of Life (panel) Pendleton East 339

Debbie Waung '06, Biochemistry, Petrina Chan '07, International Relations, and Jessi Shor '07
ADVISOR: *Lauri L. Wardell, Physics*

Development, Dialog and Delivery (D-lab) is a course at MIT that presents problems that third-world countries face, introduces us to possible solutions and gives us the opportunity to gain firsthand experience through an optional site-specific visit. Billions of people in nations all over the world are living in underdeveloped, rural areas far below the poverty line. Living from day to day, many lack connectivity to the outside world, proper health care, electricity, and the availability of a basic education. We will share our experiences in the third world communities of Brazil and Honduras. Our projects focused on the application of appropriate technologies including grey water recycling, water quality analysis, and computer application. We will talk about our own, personal encounters with the simplest of technologies that can improve the quality of life for individuals all over the world. (Research supported by Office of the Dean of the College Student Research Grant and Office of Equal Opportunity Grant.)

4:30 – 5:40

Change

**Papyrus to Print to Pixel:
An Odyssey through the History
of Written Communication
(interactive teaching presentation)
Clapp Library Book Arts Lab**

Jerri Chen '05, Neuroscience,
Jamie M. Lausch '05, Art History,
JiaJing Liu '05, Political Science
and French, Allie L. Thompson '06,
Cognitive Science (Linguistics
concentration), and Tori J. Walters '06,
Russian Literature and Language
ADVISOR: Ruth R. Rogers, Special
Collections and Katherine McCanless
Ruffin, Book Arts Program

The class of Experimental 240, “Papyrus to Print to Pixel,” spent the fall semester taking a unique look at the history of written communication. Starting with Babylonian clay tablets and moving through papyrus scrolls, codices, medieval manuscripts, early printing methods, mechanical printing, and the digital present, the class examined the evolution of these different technologies and the many connections between them. The class received a truly multifaceted, hands-on education through a combination of working with the original material culture, group discussions, re-creating the original processes and products in a lab setting, and learning from numerous expert lecturers. Our interactive presentation will share with the Wellesley community the exciting experience that we have had, and we hope that others will gain from it as well.

Literature and the Arts

**Through a Greek Lens (short talks)
Pendleton West 116**

**Ancient Greek Tragedy and African
American Writers**

Lauren Brownlee '05, *Classical
Civilizations and Greek*
ADVISOR: Mary Lefkowitz, *Classical Studies*

Fifth-century Greek sophist Gorgias describes the ideal man as one who “helps one’s friends and harms one’s enemies.” This model of heroism, which is found in Greek myth and tragedy, is dangerous because it firmly defines people either as friend or as enemy. The enemy is regarded as a dehumanized Other against whom one is not expected to show restraint. Similar “us vs. them” tensions have taken different forms in America, and African American writers have turned to both historical and literary tragedies of the past to reflect upon today’s realities. Toni Morrison’s *Beloved* and Rita Dove’s *Darker Face of the Earth* use the Greek stories of Oedipus and Medea as a demonstration of the cyclic nature of dehumanization and a warning against fighting evil with evil. These works suggest that Greek literature and mythology still deserve to play a significant role in America today.

**“Reuled by the Sichte Above”: The
Hierarchy of Power in Chaucer’s
“Knight’s Tale”**

Simran Thadani '05, *English and Spanish*
ADVISOR: Kathryn Lynch, *English*

The first of Chaucer’s *Canterbury Tales* is narrated by a Christian, set in the time of the legendary Greek hero Theseus, and tells of the contest between two Theban knights for the hand of a beautiful Amazon. My thesis unravels the tale’s twisted equations of power, as each character – the two knights, Theseus, the beautiful Emilia, her sister Hippolyta, the gods – and the narrator, Chaucer’s “parfit gentil knyght,” shares a space within the complex, diverse power structure of the

tale. In addition to Honors work, I studied medieval England *in situ*, and attended a conference on “Chaucer and Vision” in March. My senior year has been a “pilgrimage” that has helped synthesize my life experiences with my study of medieval language and literature. During this presentation I will address both the “Knight’s Tale” and also my experiences in medieval/Renaissance England and modern-day academia. (Research supported by a Schiff Fellowship.)

**Reconciling the Prime Mover with God:
Thomas Aquinas Looks at Aristotle’s
Metaphysics**

Rebecca Suarez '05, *Philosophy*
ADVISOR: Maud Chaplin, *Philosophy*

In Book XII of the *Metaphysics*, Aristotle presents his theory of origins, providing a careful description regarding motion and its initiation by the Prime Mover. One of the most striking things about this section is its possible compatibility with a Christian idea of God. This did not escape the attention of the Christian thinker St. Thomas Aquinas, who took an interest in Aristotle and wrote a number of commentaries on his works, including one on the *Metaphysics*. In reading this commentary it is evident that Aquinas’ cautious interpretation of Aristotle’s text resulted in his belief that Aristotle’s account was compatible with aspects of Christianity. Aquinas attempts an unbiased and neutral look at Aristotle’s discussion, and it is evident that his interpretations of this text lead to the reconciliation of perceived conflicts between the existing forms of Christianity and Aristotelian teleology.

4:30 – 5:40

Putting Eighteenth-Century Literature in Context (panel) Science Center 264

Lauren Price '05, English, Linda A. Gautie '05, English, Christina Baer '05, Physics and English, and Laura Bethany Samuelsson '05, English
 ADVISOR: *Yoon S. Lee, English*

This panel explores the ways in which the literature of the late eighteenth century both reflected and shaped its social and political contexts. Some novels show us how women's behavior was supposed to be governed by the ideal of modesty. At the same time, however, women played an important role in the public culture of the time, modelling "polite conversation" and participating in collaborative writing, philanthropic projects, and publishing ventures. The Bluestocking society, for example, included numerous women intellectuals, and well-known writers such as Frances Burney. Even the Gothic novel, which was widely regarded to be a "feminine" genre, shows a complex nature. On the one hand, it reflects the rationalism and scientific curiosity of the period. On the other hand, it embodies counter-revolutionary fears of religious and cultural difference.

Multicultural Research

How Do We Teach What We Teach? Curriculum Development in Girls' LEAP (panel) Pendleton East 349

Casey Bieberich '05, Latin American Studies

ADVISOR: *Deborah Weaver, Physical Education and Kenneth Hawes, Education*

The presentation addresses the process of curriculum development and writing, as well as issues specific to the Girls' LEAP program and the communities in which we teach.

Girls' LEAP (Lifetime Empowerment & Awareness Program) is a nonprofit safety and awareness organization dedicated to developing confidence and personal awareness in girls. The curriculum uses an innovative combination of self-reflective skills and physical self-defense techniques. Wellesley College women serve in leadership roles within the organization; in each program they serve as mentors, role models, and teaching assistants for girls throughout Greater Boston.

To formalize the curriculum for the Girls' LEAP program, a team of internal program content experts and an outside writer have worked to quantify lesson plans and illuminate teachers' perspectives. Targeted research enhances developmentally appropriate modifications, training strategies, and best teaching practices. The development of this curriculum will facilitate the replication of the program for outside agencies.

Political Development

The Media, Religion, and Politics (short talks) Science Center 277

Al-Jazeera and the Future of Satellite Media in the Arab World

Rebecca Adelman '05, Middle Eastern Studies

ADVISOR: *Barbara Geller, Religion/Middle Eastern Studies*

The creation of Al-Jazeera in 1996 revolutionized the satellite media in the Arab world. Approximately 35 million people worldwide regularly watch it. On March 26, 2003, the network received an award for the "most courageous defense of freedom of expression" at the Index on Censorship in London. Earlier that day, however, Lt. Gen. John Abizaid, then Deputy Commander, U.S. Central Command in Qatar, sharply criticized the network for showing footage of American soldiers killed by Iraqi insurgents. Although Al-Jazeera has become an important international network, it continues to face major challenges from both Arab and Western governments. Has Al-Jazeera been unfairly criticized? Is Al-Jazeera a praiseworthy, independent news network, or as its detractors claim, is it primarily an advocate and promulgator of anti-Western views with insufficient attention to accurate news information? My presentation will explore some of the complex issues surrounding these questions.

4:30 – 5:40

The Future of Corruption in North Korea

May Kim '05, *International Relations and French Language and Literature*
 ADVISOR: Katharine H. Moon, *Political Science*

Amid the predictions and prescriptions for regime change or reform in the Democratic People's Republic of Korea (DPRK), studies on North Korea fail to consider the prospects for corruption in reforming the communist state. Historical examples illustrate the dangers of pressing for change while overlooking the potential for greater or different types of corruption that emerge during the time of transition. Each of the three prospective reform paths that the DPRK can take – the rapid, “shock therapy” reform path of central and eastern European countries like Romania, the Chinese path of economic liberalization under communism, and the South Korean path following the East Asian developmental state model – is rife with a particular form of corruption. If the DPRK adopts any of these reform models, North Korea, as well as the international community, must consider the likelihood of the country reproducing Romania's large unofficial economy, China's bureaucratic corruption, or South Korea's crony capitalist system. (Research supported by a Schiff Fellowship.)

Moving Past Red and Blue: Making the Most of Religion and Civic Participation

Bailey Childers '05, *Political Science*
 ADVISOR: Maud Chaplin, *Philosophy*

Using Elisabeth Sifton's *The Serenity Prayer* and an assortment of personal experiences on the Kerry campaign trail, I will discuss the current role of religion in American politics, specifically the effects of faith and “moral values” voters on the outcome of Election 2004. More importantly, how are certain faith-based issues altering and influencing the quality of discourse and the range of policy issues up for debate in the United States? To what extent are churches and religious leaders responsible for providing political education to their congregations, and are

those leaders adequately promoting the Christian message through their policy positions? With such a polarized “red” and “blue” electorate, what should political leaders and church leaders be doing to promote a healthier form of civic participation in the country?

Science and Technology**Exotica (short talks) Science Center 278****Architecture or Alchemy: An Exploration into the Water-Shedding Properties of the Pink-Plumed Poppy**

Katy Silverstein '05, *Chemistry*
 ADVISOR: Jean Fuller-Stanley, *Chemistry*

The Pink-Plumed Poppy (*Macleaya cordata*) is an invasive weed that quickly dominates unsuspecting gardens with its imposing six-foot tall, leggy presence. However, despite its reputation as a gardener's worst nightmare, the plant remains an intriguing oddity, due to its unusual ability to completely shed water (much like the most expensive of raincoats). While previous studies have determined that the hydrophobicity of many plants is a physical property of surface roughness, as well as microscopic waxy crystals on the surface of the leaves, there is evidence that suggests that the chemical constituents of a plant may affect the physical integrity of its surface. This presentation will discuss how one determines the chemical constituents in a plant, as well as the different characteristics that make something waterproof. (Research supported by a Pamela Daniels '59 Fellowship.)

What Can DNA Sequences Teach Us about Evolution and Formation of New Species in the Galapagos Archipelago?

Sayantani Bhattacharya '06, *Biological Sciences*

ADVISOR: Andrea Sequeira, *Biological Sciences*

Island archipelagos provide excellent model systems within which to study evolving populations and the processes that influence their evolution. Isolation from the mainland provides opportunity for reduced gene exchange promoting differentiation and potential formation of new species. Larger islands provide topographic and ecological diversity that foster further differentiation between populations. The Galapagos archipelago is the largest, most complex and most diverse archipelago remaining in the world, making it an ideal environment for study. Patterns of population differentiation were compared between endemic weevils from one of the youngest islands (Floreana) and from the oldest island of the archipelago (San Cristóbal). DNA sequences for several rapidly evolving mitochondrial gene regions were used to produce phylogenetic trees for all populations and species. Through the analysis of the DNA sequences and their resulting patterns we will address specific hypothesis and questions about mechanisms and promoters of population differentiation and speciation in these weevils.

The Affects of Song on Breeding Site Selection of Bluebirds

Leslie Hill '07 and Hiywete Solomon '07
 ADVISOR: Nicholas L. Rodenhouse, *Biological Sciences*

Study of habitat selection has a long history in avian ecology, and much of what we “know” may be wrong. The purpose of this project was to test the hypothesis that birds select neighborhoods of conspecifics in which to breed rather than as has been traditionally thought by assessing habitat features. As a first step in testing this hypothesis, we determined whether Eastern Bluebirds (*Sialia sialis*)

4:30 – 5:40

used public information – conspecific song – to select breeding territories. We predicted that bluebirds would settle and nest at higher density where playback of conspecific song was provided. To test this prediction, we provided song during the period of territory settlement to one of two sets of three boxes placed in each of six replicate meadows. Results of this ongoing study will contribute to basic understanding of avian habitat selection and will add to the tools needed for songbird conservation. (Research supported by the Howard Hughes Medical Institute.)

“Cry For Me, ‘Argentina’ ”: Vocal Discrimination in Penguins

Logan Schmidt '05, Biological Sciences and Classical Civilizations
 ADVISOR: *Emily A. Buchholtz, Biological Sciences*

“Argentina” and other Rockhopper and African penguins at the New England Aquarium communicate using bray and contact calls. Penguins and many species that breed in large colonies use sound as a means of recognizing individuals and conspecifics. Are different call characteristics used in discrimination at the individual, sub-species, or species level?

Over a period of three months I recorded contact and bray calls of 65 individuals from three species of penguins at the New England Aquarium. Calls were displayed as sonograms and a variety of sound variables were measured. Using discriminant analysis, I showed that main frequency and the average length of the syllable were most important in distinguishing among species, but that syllable amplitude and frequency patterns appear to be necessary to discriminate among individuals. The ability of species level cues to discriminate between sub-species of Rockhoppers supports their separation at the species level. (Research supported by Howard Hughes Medical Institute.)

How Plants See Blue Light (panel) **Pendleton West 117**

Joy Delamaide '05, Biological Sciences, Daiva Nevidomskytė '05, Biochemistry, and Lisa Ng '07, Biological Sciences
 ADVISOR: *Martina Königer, Biological Sciences*

Plants sense their surrounding light environment and adapt to changes in light quality, quantity, and direction. For example, plants can move their chloroplasts into or out of the light in order to maximize their photosynthetic behavior. Two phototropins (phot1 and phot2) perceive blue light signals and initiate a signal transduction pathway resulting in a change in chloroplast position and orientation. We will present data showing how chloroplast number and size influence the ability of chloroplasts to move in response to changes in light intensity, and how that in turn impacts the photosynthetic behavior of leaves. We will present results of a proteomic approach that hopes to yield information about the downstream members of the signaling cascade of the photoreceptors phot1 and phot2. Finally, we will show evidence that blue light does not only trigger chloroplast movement but also impacts mitochondrial shape and movement. (Research of Joy Delamaide is supported by a Shiff Fellowship, research of Lisa Ng is supported by a Howard Hughes Grant.)

Social Analysis

Bugs, Rivers, and Other Environmental Issues (short talks) **Science Center 396**

The Future of Global Environmental Governance: To Centralize or Not to Centralize?

Hana Scheetz Freymiller '07, Economics
 ADVISOR: *Elizabeth DeSombre, Political Science/Environmental Studies*

Over the past thirty years, the United Nations has generated novel institutions aimed at spawning intergovernmental and international cooperation to creatively solve environmental problems of great consequence to the world. From an incredible spirit of international cooperation, the United Nations created the United Nations Environment Program (UNEP) to serve as the locus for international environmental cooperation. Designed as a decentralized body, the overall effectiveness of UNEP is heavily debated. To fill the governance gap, the international community produced environmental conventions, witnessed the growth of NGOs and generated the Global Environment Facility (GEF), an innovative funding mechanism. However, with environmental crises multiplying, the future of environmental governance is uncertain. Through investigating the international environmental institutions, NGOs and the debate surrounding a centralized body, I am striving to discern if centralization is the future of environmental governance. (Research supported by the Sophomore Early Research Program.)

4:30 – 5:40

A River Runs Through It: International Agreements on Transboundary Rivers

Anne LaRue '05, *International Relations*
 ADVISOR: Elizabeth DeSombre, *Political Science/Environmental Studies*

It is said that the study of international relations revolves around power. When dealing with an environmental problem, states often have equal power to either solve the problem or worsen it. This power relationship changes when the problem centers on a transboundary river. An upstream state has greater power to worsen the problem and less interest in solving the problem. In such an asymmetrical relationship, what form do international agreements take and how are obligations distributed amongst states? This project examines the international treaties written about the world's greatest rivers and finds that, despite asymmetrical power, the norm of equality is still surprisingly strong. Given the strength of this norm, it also analyzes what factors cause treaties to deviate from distributing obligations equally and assume a more unequal form.

Globalization and the Superbug: Controlling Antibiotic Resistance through International Pharmaceutical Regulation

Abigail L. Carlson '05, *International Relations*
 ADVISOR: Ann Velenchik, *Economics*

The issues that surround the development of antibiotic resistance are often best addressed at the level of individuals and institutions, for reasons both biological and political. Although there are many who call for international policies to aid in preventing the development of resistance, few of these policies could be effectively enacted above the local level. It can be argued, however, that antibiotic resistance is a global issue, and that there are aspects of resistance for which an international-level approach may prove useful. In particular, agricultural antibiotic use and the distribution of antibiotics without a prescription are significant contributors to resistance development that may be

controlled through international instruments. The possibility of using international pharmaceutical regulation as a means of combating resistance is examined, as well as the likely political obstacles to this method of prevention and the biological issues that must be considered.

Not in My Backyard: When the Fight against Bioterrorism Is Next Door

Anita Yip '07, *Environmental Studies*
 ADVISOR: Marcy E. Thomas, *Biological Sciences*

Before the events of September 11th, the likelihood of a bioattack was not a major public concern. Now with an increasing government impetus to combat bioterrorism, it seems some initiatives have created a sense of distrust. Such is the case with Boston University, which is slated to build a Level 4 Biodefense Laboratory in the South End of Boston. Although the facility is supposed to be one of the safest buildings in the country, it will be researching deadly, incurable diseases such as Ebola. Despite Boston University's claim of having community support, the backlash from the community reflects deep misgivings. For my project, I distributed a survey designed to gauge how the community feels about the biodefense lab. This poster will discuss the politics involved in this national public health agenda and present my results.

Is Morality Worth Saving? (panel) **Jewett Art Center 450**

Sumita Chakraborty '08, *Stephanie De Groot '08, Mattie Fitch '08, and Rachel Goldstein '08*
 ADVISOR: Michael Lackey, *Writing Program*

Morality has been used as a weapon against people. In this panel, students will examine how morality has been consistently utilized to justify marginalizing and dehumanizing groups like women, racial minorities, and homosexuals. We will begin this session by discussing literary texts that take a critical look at the function of morality. Through our analysis

of these texts, we will identify and define some of the social structures that make this violation possible. Given that morality has been exploited in this way, we will entertain various possibilities for the future of morality: whether it needs to be rehabilitated, reconceived, or abandoned. Our focus will be on the rich period from the 1880s until the 1920s when morality was beginning to be defined as a problem. Texts will include Mark Twain's *Adventures of Huckleberry Finn*, Henrik Ibsen's *A Doll's House*, E.M. Forster's *Maurice*, and other historical and philosophical works.

Words as Weapons: Racist and Sexist Speech Acts (performance plus talk) **Pendleton West 212**

Shantel Dobbins '05, *Spanish and Philosophy*, Elizabeth Herrera '05, *Women's Studies*, Jennifer Kim '08, and Allison Lee '06, *Cognitive Science*.
 ADVISOR: Lynne Tirrell, *Philosophy*

Language is the medium in which we live; although it sometimes seems transparent, it is significant in our daily lives. Join us as we examine the power of racist and sexist speech. How does this type of language wield its power? What is its purpose? Is it to erase, oppress, enforce hierarchy, or all of the above? Through the use of skits and an in-depth analysis of various speech act theories, we hope to give you a better understanding of how language and its hidden implications can be used as weapons.