

# SENIOR PROJECT CELEBRATION



ALLEGHENY COLLEGE

APRIL 25, 2008

In keeping with Allegheny's commitment to provide students with a liberal arts education of high standards, the Senior Project is not a mere report or semester paper, but a significant piece of independent study, research or creative work conducted under the supervision of one or more faculty members. **The outcome of a Senior Project is more than a grade or a written document;** for the student it often results in a new way of looking at complex problems and inspires an appreciation for the power of ideas that might previously have seemed like abstract concepts in a textbook. Often it can be a pivotal moment where a student realizes his or her own abilities and potential.

#### HISTORY

Since the College's first commencement in 1821, Allegheny students have showcased their exceptional academic achievements through a senior capstone experience of one kind or another. At times it involved an oral defense, at others a written thesis. The notion of a written Senior Project coupled with a comprehensive oral examination first appeared in the 1942 College Catalogue. In the 1970s, oral examinations shifted from a general defense of disciplinary expertise to a more focused verbal presentation of the Senior Project findings.

#### PREPARATION

The Senior Project provides students with an opportunity to integrate discipline-specific scholarship with the communication and research skills necessary for professionals in the 21st century. During their first year at Allegheny, students write, speak, and research frequently in their first-year seminars. By the sophomore year they are ready to undertake the complexities of writing and speaking in a specific discipline. They further hone these disciplinary communication skills in a junior seminar, the final preparatory phase for the Senior Project. By the senior year students are sufficiently prepared to undertake a scholarly endeavor approximating those experiences they will face as professionals in their field.

#### REALIZATION

The culminating experiences of the Senior Project are as varied as the disciplines that produce them, from recitals, performances, and exhibits to written and oral presentations on laboratory research. Many illustrate unusual combinations of disciplines, interests and skills. The Senior Project Celebration offers an open forum for students to present their projects, allowing seniors to refine their skills in presenting to a broad audience and share ideas with other students and the campus community.

# QUICK SCHEDULE



## Oral Presentations

**10:15 A.M.**

**Recommendations for an Allegheny College Partnership with the City of Meadville for Community Revitalization**

**Meghan Perry**

Major: Environmental Studies / Minor: Religious Studies  
Shafer Auditorium

**El sueño incompleto de “El país bajo mi piel”: La retórica contra la práctica de los derechos humanos en la Revolución sandinista (The Incomplete Dream of “El país bajo mi piel”: The Rhetoric versus the Practice of Human Rights in the Sandinista Revolution)**

**Hillary Kosnac**

Majors: Spanish, Political Science  
CC 302

**10:30 A.M.**

**The Militarization of the Border and Undocumented Immigration: A Comparative Analysis**

**LeeAnn Corsi**

Majors: Political Science, Spanish  
CC 302

**Studies towards the synthesis of chiral amino alcohols through boron mediated transfer approaches to enamines**

**Glenna Kramer**

Major: Chemistry / Minor: Music  
Arnold M111

**A Comparison of Bacteria Population and Antibiotic Resistance of Locally Grown, USDA Organic and Conventional Spinach and Lettuce purchased in Crawford County, PA**

**Sara J Curtiss**

Major: Biology / Minor: Theatre  
CC 206

**The Use of Benzyne in a Boron-Mediated Transfer**

**Olivia Lobaugh**

Major: Chemistry / Minor: Psychology  
CC 206

**Fishing Kills Me Exactly as It Keeps Me Alive: A Humanistic Look at Common Pool Resource Tensions in the Lake Erie Fishery**

**Justine Law**

Major: Environmental Science / Minor: Studio Art  
Arnold M111

**Money versus Morals: Sensation and Censorship in Pre-Code Hollywood and the Case of Baby Face**

**Kim Luperi**

Majors: History, English  
CC 303

**Balancing Ethnicity with Identity: First and Second Generation Filipino Americans**

**Hope Marijan**

Major: Communication Arts / Minor: Psychology  
Doane A103

**The Stakeholder Model of Corporate Governance as the Solution to Pressure from the Principal-Agent Dilemma in the Form of Stock Options**

**Matt Salera**

Major: Managerial Economics / Minor: Communication Arts  
CC 301

**The Determinants of Real Investment Growth**

**Robert Rodgers**

Major: Economics / Minor: Communication Arts  
CC 303

**11:10 A.M.**

**Forcing Its Hand: How Outside and Competitive Pressures Forced the Reintegration of the NFL**

**Curt Anderson**

Major: History / Minor: Religious Studies  
CC 206

**From Turf Wars to Terrorism: The U.S. Intelligence Community After 9/11**

**Richard Wozniak**

Major: Political Science / Minors: Chemistry, English  
CC 301

**The neuroprotective effects of caffeine, nicotine, and minocyclin against an AF64A rodent model of Alzheimer's disease**

**Krystal Baldwin**

Majors: Neuroscience, Psychology  
Doane A103

**10:50 A.M.**

**Binding Affinity of bacteriophage Felix O1 to Salmonella**

**Ryan Farmer**

Major: Biochemistry / Minor: Economics  
Doane A103

**A Dichotomy of Words and Actions: A Comprehensive Analysis of Anti-Americanism in Contemporary Chile and Venezuela**

**Matthew Lackey**

Majors: International Studies, Spanish  
CC 302

**Changes in Ecosystem Processes as a Result of Fluctuating Densities of Detritivores**

**Amanda Klemmer**

Major: Biology / Minor: Psychology  
Arnold M106

**Just Like That**

**Dara Levendosky**

Major: Theatre / Minors: History, Writing  
CC 301

# QUICK SCHEDULE



## Oral Presentations

### 11:10 A.M., CONTINUED

#### **An Examination of the Student Movement's Impact on the Greens in West Germany**

**Ashley Macari**

Major: International Studies, German  
*Arnold M106*

#### **A Theoretical and Empirical Examination of the Determinants of Growth in the Residential Construction Industry**

**Eric Rich**

Major: Managerial Economics / Minor: Communication Arts  
*Arnold M111*

#### **A Parallel Genetic Knapsack Problem Solver Implemented with the CUDA Graphics Architecture**

**David Wagner**

Major: Computer Science / Minor: Economics  
*CC 303*

#### **Wavelength Dependence of Photo-Induced Gliding of Liquid Crystals**

**Yusufu Sulai**

Major: Physics / Minor: English  
*CC 303*

#### **Using Grammatical Evolution to Evolve Robot Controls**

**John Mark Swafford**

Major: Computer Science / Minor: Spanish  
*CC 206*

#### **Have Gun, Will Travel: Private Military Firms in the Developing World**

**Benjamin Swanekamp**

Major: Political Science / Minor: Philosophy  
*Doane A103*

#### **The Other Campaign: Hagan Smith's Third Party Gubernatorial Candidacy in Two-Party Pennsylvania**

**Cody Switzer**

Major: English (Journalism) / Minors: Communication Arts, History  
*Tippie Alumni Center Board Room*

#### **A Case Study in the Application of Industrial Ecology: Woodcraft Industries Inc. CHP Feasibility Study**

**Mateo Villa**

Major: Economics / Minor: Mathematics  
*CC 301*

### 11:30 A.M.

#### **Varied Voices: The American Founders and Their Conceptualizations of the Proper Relationship Between Religion and Government**

**John Brumberg**

Major: Political Science / Minor: Religious Studies  
*Arnold M111*

#### **Further Characterization of Dictyostelium Protein FbiA: Ubiquitination via FbxA**

**Jonathan Buggey**

Major: Biochemistry / Minor: Psychology  
*Arnold M111*

#### **An Analysis of Formant Frequencies and Voice Classification in Female Singers**

**Christina Dastolfo**

Major: Music / Minor: Biology  
*Doane A103*

#### **A Breakfast Meal: Examining the Interaction Between Humans and Food**

**Jackie Dunkelman**

Major: Community and Culture (student-designed) / Minors: Dance & Movement Studies, Psychology  
*CC 302*

#### **The Possible Relationship Between Estrogen Levels and Respiration Rates in Female Sprague-Dawley Rats**

**Amanda Ohnmeiss**

Major: Neuroscience / Minor: Spanish  
*Carnegie Hall 100*

### 11:50 A.M.

#### **La notion de rêve : le conflit entre les fantaisies et la réalité dans la vie d'Emma Bovary**

**Megan Augustine**

Major: French / Minor: Political Science  
*CC 302*

#### **Bounds for Norms of Composition Operators on the Hardy Space**

**Peter Fill**

Major: Mathematics / Minor: Political Science  
*CC 303*

#### **Crisis and Rebirth: A New Ethic for Public Health**

**Danielle Gray**

Majors: Political Science, Philosophy / Minors: Values, Ethics & Social Action; Psychology & Science; Health & Society  
*CC 301*

#### **Organized Crime in Cleveland, 1920–1940**

**Kristen Lane**

Majors: History, Psychology / Minor: German  
*CC 206*

# QUICK SCHEDULE



## Poster Presentations

**11:30 A.M.—12:30 P.M.**

### Campus Center Lobby

**The neuroprotective effects of caffeine, nicotine, and minocyclin against an AF64A rodent model of Alzheimer's disease**

**Krystal Baldwin**

Major: Neuroscience, Psychology

**Characterization of an annexin 1 containing protein complex displaying peroxidase activity in *Brassica rapa***

**Sarah Botti**

Major: Biology / Minor: Psychology

**A Humanistic Approach to the Middle East Water Crisis Through Personal Accounts**

**Lana Cannon**

Major: Environmental Studies / Minor: Art & the Environment

**The Construction of a Multicultural State: An Examination of Multicultural Reforms in Bolivia**

**Melissa Geer**

Major: International Studies, Spanish

**The Accessibility of the Meadville Market House to Local Low-Income Individuals and Families: Problems and Solutions**

**Sarah Goetz**

Major: Values, Ethics & Social Action / Minor: Psychology

**Teacher Incentive Pay and the Effects on Student Achievement**

**Brandon Heckman**

Major: Economics / Minor: Communications

**Midwives to Malpractice: An Introduction to Childbirth Politics in Pennsylvania**

**Haley Hoenke**

Major: Women's Studies / Minor: Dance & Movement Studies

**Boeing vs. Airbus: A Theoretical and Empirical Analysis of Government Involvement in the Aircraft Manufacturing Industry**

**Amanda Jones**

Major: Economics / Minor: Music

**A Thermodynamic Study of Multiple Single-Adenosine Bulge Loops in RNA Duplexes**

**Laura Jones**

Major: Chemistry / Minor: Economics

**The Subprime American Dream: An Analysis of the Subprime Mortgage Market and Regulatory Approaches to Curb Predatory Lending**

**Andrea Kessler**

Major: Economics / Minors: Spanish, Women's Studies

**The Revitalization of Freudian Theory: The Psychoanalytic Analysis of John Henry Fuseli and The Nightmare**

**Jennifer Parry**

Major: Art History / Minors: Psychology, Economics

**In the Solitude of a Hermit: Thomas Jefferson's Poplar Forest**

**Crystal Ptacek**

Major: History / Minor: Music History

**Impacts of Agriculture on Levels and Heterogeneity of Soil Carbon and Nitrogen Content in Crawford County, PA**

**Jeffrey Rutter**

Major: Environmental Science / Minor: Psychology

**Manipulating Reality**

**Lacey Scott**

Major: Art & Technology / Minor: German Studies

**An Extended Hydrophobic Surface Submerged in Water: The Formation of a Depletion Layer**

**Corey Shemelya**

Major: Physics / Minors: Chemistry, Economics

**Creating a GIS-Based Suitability Index of Wetland Creation in the French Creek Watershed**

**Evan Sheppard**

Major: Environmental Science / Minor: Psychology

**Eudaimonia**

**Jude Shingle**

Major: Studio Art / Minor: American Studies

**Have Gun, Will Travel: Private Military Firms in the Developing World**

**Benjamin Swanekamp**

Major: Political Science / Minor: Philosophy



## Senior Art Show

**12:30–5 P.M., THROUGH MAY 10**

### Bowman, Penelec & Megahan Galleries

The Art Department will present its Senior Projects Exhibit in the galleries through Saturday, May 10.

This show is an opportunity for graduating studio art majors and art & technology majors to present to the public their senior projects.

This semester's Senior Projects Exhibit will feature the work of five artists: Jena Robbins, Alma Mantua, Meghan Collins, Kristyn Paone, and Nicole Winkle.

# A B S T R A C T S

**Curt Anderson**

## **Forcing Its Hand: How Outside and Competitive Pressures Forced the Reintegration of the NFL**

My presentation examines the reintegration process in the National Football League. When the NFL was formed in 1920, it was originally racially integrated. However, starting in 1934 there was a twelve-year color ban in the league until it was reintegrated in 1946. My presentation discusses the players who reintegrated pro football and the factors that forced the reintegration of the league. I will look specifically at the influences of the media, other leagues, and the government.

**Major: History / Minor: Religious Studies**

**Senior Project Advisor(s): Ian Binnington**

**11:10 a.m., CC 206**

**Megan Augustine**

## **La notion de rêve : le conflit entre les fantaisies et la réalité dans la vie d'Emma Bovary**

Gustave Flaubert's masterpiece, *Madame Bovary*, has continually surprised its readers since its publication in 1857. The novel's protagonist, Emma Bovary, becomes obsessed with romantic literature throughout her adolescence. She is infected by this literature and ultimately lives a life that can never compare to that of the romantic heroines she adores. In order to evaluate the depth of this infection and the literary dependency in her life, the authors of romantic fiction that Emma admires and their works are studied and critiqued. Then, Emma's reactions to two specific events from *Madame Bovary* are studied along with the influence of romantic literature on these reactions. Both the exoticism in romantic literature and the many futile attempts that Emma makes to seize such exoticism in her own life are evaluated. I conclude that Emma's faulted convent education and the lack of direction in her adolescence is to blame for this false perception of reality as a result of her fantasies derived from romantic literature.

**Major: French / Minor: Political Science**

**Senior Project Advisor(s): Phillip Wolfe**

**11:50 a.m., CC 302**

**Krystal Baldwin**

## **The neuroprotective effects of caffeine, nicotine, and minocyclin against an AF64A rodent model of Alzheimer's disease**

Recent research has shown that there are a variety of drugs that have the potential to prevent symptoms of Alzheimer's disease (AD). The focus of present research has been on prospective treatments that will maintain memory and learning processes in people afflicted with AD. These treatments can act on the system in a variety of ways-including the increase of acetylcholine or reducing the activity of microglia. Caffeine and Nicotine act on the activity of acetylcholine while minocycline is thought to have an affect on microglia. This study (n=20) compared the neuroprotective effects of caffeine, nicotine, and minocycline against a rodent model of AD in tasks involving the following: spatial memory via the Morris Water maze, object preference, and the ability to learn IRT>t schedules by pressing a lever in

the operant chamber. The rodents were surgically administered AF64A bilaterally into the nucleus basalis of the brain to create AD-like symptoms. Histology was used to confirm cell death in the brain. The results showed that there were a variety of effects in the study between the AD group and the treatments in the behavioral tasks assessing spatial memory, object preference, and the ability to learn an IRT>t schedule.

**Majors: Neuroscience, Psychology**

**Senior Project Advisor(s): Jeffrey Cross, Jeffrey Hollerman**

**11:10 a.m., Doane A103**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Sarah Botti**

## **Characterization of an annexin 1 containing protein complex displaying peroxidase activity in *Brassica rapa***

A protein complex displaying acidic peroxidase activity has been discovered in unopened flower buds of plants in the Brassicaceae family. Flower buds from wild type, and two cytoplasmic male sterile lines of *Brassica rapa* were sectioned and stained for peroxidase activity and annexin 1 protein. The results showed overlapping peroxidase activity and annexin 1 immunostaining in the tapetal layer and pollen grains of wild type flower buds. In the mst-1 line, staining for peroxidase activity occurred in the tapetal layer; however, no annexin 1 immunostaining was observed. In the mst-2 line, staining for peroxidase activity occurred in the tapetal layer and the pollen grains; however, annexin 1 immunostaining was present in the pollen grains. These results indicate a connection between presence of annexin 1, the upregulation of the peroxidase activity, and fertility. The male sterility may be attributed to the absence of the annexin 1 which leads to abnormalities such as premature programmed cell death of the tapetum thus causing the destruction of the pollen grains.

**Major: Biology / Minor: Psychology**

**Senior Project Advisor(s): Ann Kleinschmit, Catharina Coenen**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**John Brumberg**

## **Varied Voices: The American Founders and Their Conceptualizations of the Proper Relationship Between Religion and Government**

There are three loci in the colloquy regarding the proper relationship between government and religion that we turn to for guidance. The church-and-State separation alliance of James Madison and Thomas Jefferson is one, and perhaps the foremost perspective to understand because of the preeminence of its advocates and the familiarity it has with the finished governmental documents of the era – the American and Virginia constitutions. Another vantage point to examine is that of John Adams, who valued religious freedom highly like Madison and Jefferson yet espoused a New England appreciation for the worth of religious mores to the proper functioning of society and thus government. A third group of Founders envisioned religion – specifically Christianity – as a more positive force than did Madison or



# A B S T R A C T S

Jefferson, in the moral functioning of society and in the proper working of republican government. They too valued religious freedom, although for them the watchword was “toleration.”

**Major: Political Science / Minor: Religious Studies**  
**Senior Project Advisor(s): Robert Seddig, Bruce Smith**  
**11:30 a.m., Arnold M111**

**Jonathan Buggey**

## **Further Characterization of Dictyostelium Protein FbiA: Ubiquitination via FbxA**

The FbiA protein is a protein within *Dictyostelium discoideum*. It is highly conserved among many organisms, but its function remains unknown. Recent studies suggest FbiA may interact with the F-box protein FbxA. Based on FbxA's known role as part of an SCF complex that targets RegA for ubiquitin-mediated degradation, FbiA may also be a target of FbxA. Using immunopurification and Western blot analysis, an FbiA-GFP fusion protein was purified from cells in the vegetative, stream, mound, and first finger stages, and checked for ubiquitination. The protein was successfully recovered; however, it was not found to be ubiquitinated. Cells were created that over-expressed the FbiA-GFP and FbxA proteins, in order to saturate the proteasome with ubiquitinated FbiA-GFP. The FbiA-GFP protein was recovered from the vegetative stage but it was not ubiquitinated. These results suggest the FbiA-GFP fusion protein used cannot be ubiquitinated in vivo and future research still needs to be done to characterize the possible FbiA ubiquitination process.

**Major: Biochemistry / Minor: Psychology**  
**Senior Project Advisor(s): Margaret Nelson**  
**11:50 a.m., Arnold M111**

**Lana Cannon**

## **A Humanistic Approach to the Middle East Water Crisis Through Personal Accounts**

Water scarcity is a compounding factor in the Middle East conflict and affects various cultural and political groups differently, depending on nationality, religion, and location. This study was conducted in order to uncover the human-enviro relationship and varying international experiences with the water crisis in the Middle East region through individual personal accounts. General and tailored interview questions were administered to individuals with experience living with with the water crisis in the Middle East. Each cultural and political group expresses narratives unique to their national identity with similar opinions and lifestyles, as well as views of the current status and relevance of water to the Middle East conflict. The interviews presented in this project are valuable qualitative data representing the importance of the water crisis on the socio-political situation in the Middle East.

**Major: Environmental Studies / Minor: Art & the Environment**  
**Senior Project Advisor(s): Eric Pallant, Caryl Waggett**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**LeeAnn Corsi**

## **The Militarization of the Border and Undocumented Immigration: A Comparative Analysis**

Undocumented immigration is a salient concern for the United States and Spain. Mexicans have migrated and continue to cross the border today for a variety of reasons. Similarly, undocumented Moroccans traverse the Strait of Gibraltar in order to gain access to Spain. The composition describes contemporary immigration history, governmental policies and the advancement of the militarization of each border. The U.S. and Spain implemented several major immigration policies largely designed to reduce the flow of immigrants. In the absence of any substantial reduction, both governments militarized their borders. An analysis is made to measure the success of heightened Border Patrol operations in both countries. Enhanced border security in the U.S. and Spain have served no real deterrent effect on the number of individuals crossing the border. Instead, the militarization of the border has prompted a variety of unintended consequences, including an increase in deaths, a geographic dispersion of entry points and a rise in prices paid to human smugglers.

**Majors: Political Science, Spanish**  
**Senior Project Advisor(s): Shannan Mattiace, Teresa Herrera de la Muela**  
**10:30 a.m., CC 302**

**Sara J Curtiss**

## **A Comparison of Bacteria Population and Antibiotic Resistance of Locally Grown, USDA Organic and Conventional Spinach and Lettuce Purchased in Crawford County, PA**

This experiment was a comparison of the microbiological differences between locally grown, USDA Organic and conventionally grown spinach and lettuce. The populations of total bacteria and coliform colonies were recorded and the antibiotic resistance of any potentially harmful bacteria was also tested. These experiments can help aid in determining whether there is a farming method best at minimizing food-borne pathogens, since leafy produce can be susceptible to contamination. Locally grown produce overall had lower amounts of bacteria present yet displayed the most antibiotic resistance.

**Major: Biology / Minor: Theatre**  
**Senior Project Advisor(s): Brandi Baros, Ronald Mumme**  
**10:30 a.m., CC 206**

**Christina Dastolfo**

## **An Analysis of Formant Frequencies and Voice Classification in Female Singers**

Scientific understanding of the voice has become increasingly important to vocal pedagogy, unfortunately this science is sometimes rejected. Through understanding the vocal mechanism, one may protect the voice from damage. Formant frequencies are the natural resonating frequencies of the vocal tract, responsible for vowel formation and personal voice timbre. This study investigates the differences between formant frequencies in six different singers. Each singer performed various exer-

# A B S T R A C T S

cises that were rated based on voice classification by a blind panel of voice professionals. These samples were analyzed through power spectra and spectrograms in order to observe the frequencies sung by each voice. A negative correlation was found between soprano voice quality and the third and fourth formant frequencies, and the results suggest further investigation into spacing between formant frequencies as a possible indicator of voice category. In conclusion, voice category should be determined on multiple factors, not only voice timbre.

**Major: Music / Minor: Biology**  
**Senior Project Advisor(s): Ward Jamison**  
**11:50 a.m., Doane A103**

**Jackie Dunkelman**

## **A Breakfast Meal: Examining the Interaction Between Humans and Food**

Are you really what you eat? On March 7th and 8th Allegheny students, local teens and children and members of the Meadville community performed in Jackie Dunkelman's senior dance concert, "Make Me a Grilled Cheese." The concert, part of her senior comprehensive project, explored the human relationship with food through movement. This project argues that dance is more than a mode of entertainment or an exercise in storytelling, but can be used as a means by which to actively understand and change the world.

**Major: Community & Culture (student-designed) / Minors: Dance & Movement Studies; Psychology**  
**Senior Project Advisor(s): Bill Bywater, Eleanor Weisman**  
**11:30 a.m., CC 302**

**Ryan Farmer**

## **Binding Affinity of bacteriophage Felix O1 to Salmonella**

Detecting food-borne pathogens is paramount to halting their spread, and a quick, inexpensive, and easy method currently does not exist for the detection of Salmonella. Therefore, progress has been made towards the ability to detect Salmonella by the reporter bacteriophage Felix O1::mCherry. Felix O1 binds to Salmonella using the N-acetyl glucosamine sugar that is situated on the end of the core of the lipopolysaccharide, and to increase Felix's binding affinity (and therefore its ability to detect Salmonella) the O antigen must be shortened to relieve steric hindrance. After cold temperature incubations, down to 17°C, an increase in the binding affinity was demonstrated after just 1 hour.

**Major: Biochemistry / Minor: Economics**  
**Senior Project Advisor(s): Brandi Baros, Shaun Murphree**  
**10:50 a.m., Doane A103**

**Peter Fill**

## **Bounds for Norms of Composition Operators on the Hardy Space**

This paper will analyze bounds on the norms of composition operators on the Hardy space. In order to do so, the properties of inner products and Hilbert spaces will be discussed, and

then applied to the Hardy space. Littlewood's Theorems will provide an initial result regarding bounds on the norm of a Hardy space composition operator. Combining Littlewood's results and some other theorems will yield a formula for estimating the norm. The remainder of this paper will attempt to refine this estimate by integrating kernel functions into the calculation.

**Major: Mathematics / Minor: Political Science**  
**Senior Project Advisor(s): Rachel Weir, Michael Barry**  
**11:50 a.m., CC 303**

**Melissa Geer**

## **The Construction of a Multicultural State: An Examination of Multicultural Reforms in Bolivia**

The indigenous of Bolivia constitute 63% of the country's population. Although they make up the majority, over the past five centuries they have been treated as the minority. Throughout the 1970s and the 1980s, the indigenous of Bolivia began organizing against these long-standing injustices, and by the 1990s their struggles for self-determination, territorial autonomy, and political inclusion became salient features of Bolivian politics. The growing pressure of these movements led to the implementation of multicultural reforms under the Sánchez de Lozada administration (1993-1997). But the government was not handing over indigenous rights on a silver platter. Rather, Sánchez de Lozada and his administration realized the underlying benefits of multiculturalism. Therefore, my senior thesis will answer the question: What did the state seek to gain in the construction of a multicultural nation?

**Majors: International Studies, Spanish**  
**Senior Project Advisor(s): Shannan Mattiace, Barbara Riess, Elisabeth Haywood**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Sarah Goetz**

## **The Accessibility of the Meadville Market House to Local Low-Income Individuals and Families: Problems and Solutions**

The Meadville Market House is a great asset to the local community. However, statistics indicate that Market House consumers tend to fall within the middle to upper income range. This project seeks to understand why local low-income individuals and families typically do not shop at the Meadville Market House. Additionally, some possible solutions to the situation are proposed.

**Major: Values, Ethics & Social Action / Minor: Psychology**  
**Senior Project Advisor(s): Elizabeth Ozorak**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Danielle Gray**

## **Crisis and Rebirth: A New Ethic for Public Health**

This project seeks to establish an ethic for one of society's most pressing concerns, public health. The development of the concept of health is examined. The fields of public health and medicine are also examined in relation to the developing concept of health. Traditional biomedical ethics is demonstrated



# A B S T R A C T S

to be an inappropriate place to begin an ethic for public health. Different ethical theories are explored as a basis for public health ethics. These theories include Jonathan Mann's theory of health and human rights, Dan Beauchamp's new ethic for public health, and Daniel Callahan's approach to the individual and their relationship to the health of the public. Each of these theories provides an essential component for a capabilities approach to health inspired by Amartya Sen.

**Majors: Political Science, Philosophy / Minors: Values, Ethics & Social Action; Psychology & Science; Health & Society**

**Senior Project Advisor(s): Robert Seddig, Eric Palmer  
11:50 a.m., CC 301**

**Brandon Heckman**

## **Teacher Incentive Pay and the Effects on Student Achievement**

This study examines the effects of teacher incentive pay on student achievement gains. To test the effects of the incentive system, data was gathered from two similar Colorado school districts. One district implemented an incentive program that rewarded teachers for increasing reading scores on the Colorado Student Assessment Program (CSAP) and another neighboring district kept a consistent pay structure all throughout the study. A difference-in-difference estimator was run comparing both districts' CSAP scores before and after the implementation of the incentive system. The estimator found that the incentive system in the treatment school increased CSAP reading scores by 0.048 points or a gain of 3.0% but was not statistically significant. Due to the inability to find two perfectly comparable school districts which could be used in the difference-in-difference estimator, an immeasurable source of error may have occurred.

**Major: Economics / Minor: Communications**

**Senior Project Advisor(s): Stephanie Martin, Janine Sickafuse**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Haley Hoenke**

## **Midwives to Malpractice: An Introduction to Childbirth Politics in Pennsylvania**

Women in Pennsylvania are being denied the right to choose midwives as their primary caregiver in childbirth. How has the history of American childbirth brought us to the point where a woman is not allowed natural childbirth? What is the current state of modern maternity care in this country? What action is being taken to ensure that women have the reproductive right of birth?

**Major: Women's Studies / Minor: Dance & Movement Studies**

**Senior Project Advisor(s): Laura Quinn, Paula Treckel  
11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Amanda Jones**

## **Boeing vs, Airbus A Theoretical and Empirical Analysis of Government Involvement in the Aircraft Manufacturing Industry**

Competition within the commercial aircraft manufacturing industry has evolved drastically over the past few decades. The consolidation of the industry into a duopoly leaves the American Boeing and European Airbus to compete viciously for market share in order to become the dominant firm. As a result of this rigorous competition, the impact, if any, of government involvement on the success of both firms has been publicly criticized in a subsidy dispute. The industry, as a strategic industry, is subject to government trade policy and industrial protection. Although the effect of government involvement is subject to much debate, this paper seeks to determine the role government plays in shaping the competitive nature of the aircraft manufacturing industry. By examining theoretical propositions in context of Bertrand, Cournot, and Strategic Trade Policy models, I explain the success of aircraft manufacturing firms in terms of economic and developmental factors, and demonstrate how government participation serves as subsidization in the promotion of these factors, and thus affects the success and competition within the industry. I find that Airbus and Boeing have been the recipient of large amounts of government aid that serve as subsidies in reducing fixed and variable costs, as well as production and financial risks. The multi-period models, such as strategic game theory, seem the most appropriate given the long run nature of the industry and product lines. Given that both firms are subsidized, the competition is most likely reduced to a prisoners' dilemma, leaving both the U.S. and Europe with decreased welfare because of taxes, but increased welfare for consumers and a higher producer surplus.

**Major: Economics / Minor: Music**

**Senior Project Advisor(s): Tomas Nonnemacher, Asuman Baskan**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Laura Jones**

## **A Thermodynamic Study of Multiple Single-Adenosine Bulge Loops in RNA Duplexes**

Thermodynamic parameters of RNA oligomers containing two single-adenosine bulge loops were determined through optical melting in 1 M NaCl. The inner duplex between the bulge loops was varied in length and sequence. Five inner duplexes consisting of two to four A-U base pairs and four inner duplexes consisting of two to four G-C base pairs were analyzed. This thermodynamic data was compared to the current prediction model (Blose et al. 2007). The Blose model is not accurate in determining the destabilizing effect of two single base bulges because the second bulge affects the duplex differently from the first bulge. However, the Blose model does accurately predict the trend of the bulge, becoming less destabilizing as the weaker adjacent stem becomes less stable. Despite a visible pattern, the trends were found insignificant because of the small data set studied. A larger more conclusive data set should be examined.

**Major: Chemistry / Minor: Economics**

**Senior Project Advisor(s): Martin Serra**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

# A B S T R A C T S

**Andrea Kessler**

## **The Subprime American Dream: An Analysis of the Subprime Mortgage Market and Regulatory Approaches to Curb Predatory Lending**

The increase in subprime mortgage lending has caused homeownership levels to rise and has enabled many borrowers to acquire the so-called American Dream. This social welfare gain has been overshadowed as the existence of predatory lending is revealed. As the market unravels under increasing foreclosure and delinquency rates, economists and policymakers attempt to devise effective policy prescriptions. How do predatory lending laws affect the supply of credit? Is regulation achieving its goal of curbing predatory lending? By understanding the market and using empirical research, this study suggests predation thrives through an asymmetry of information. The construction of policy proposals can cause countervailing effects: an increase in demand for subprime loans due to improved consumer confidence or a reduction in credit supply due to tightened lending standards. Political initiatives must strike a balance between coverage and restrictions to tackle negative short term effects, correct long term inefficiencies and prevent future crises.

**Major: Economics / Minors: Spanish, Women's Studies**  
**Senior Project Advisor(s): Tomas Nonnenmacher, Stephanie Martin**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Amanda Klemmer**

## **Changes in Ecosystem Processes as a Result of Fluctuating Densities of Detritivores**

In sub-alpine ponds in central Colorado, long-term cycles in the abundance of top predators (tiger salamanders) result in coupled oscillations in the abundance of prey, including caddisflies. In this study, we manipulated the density of caddisfly larvae (*Limnephilus externus*) in in-pond cages to study how changes in their density affect leaf-litter processing, algae, and nutrient dynamics. Increasing caddisfly densities resulted in increased leaf-litter processing, increased decay rate ( $k$ ), decreased per-capita consumption, and increased C:N ratios in un-processed detritus. Caddisfly foraging reduced algal biomass on grazed tiles, especially at the highest densities. High detritus processing was not accompanied by increased concentrations of total phosphorus or ammonium, nor increased algal biomass on ungrazed tiles. Our results provide evidence that long-term cycles in the top-predator in these ponds should have cascading effects on caddisfly leaf-litter processing and algal standing stock biomass.

**Major: Biology / Minor: Psychology**  
**Senior Project Advisor(s): Scott Wissinger, Milt Ostrofsky**  
**10:50 a.m., Arnold M106**

**Hillary Kosnac**

## **El sueño incompleto de “El país bajo mi piel”: La retórica contra la práctica de los derechos humanos en la Revolución sandinista (The Incomplete Dream of “El país bajo mi piel”: The Rhetoric versus the Practice of Human Rights in the Sandinista Revolution)**

This essay examines the differences between the rhetoric and the practice of human rights in the Sandinista Revolution. In order to study the rhetoric, this work assesses the role that human rights played in the revolutionary imaginary through an exploration of a cultural representation, Gioconda Belli's “El país bajo mi piel”. This rhetoric is then compared to the actual protection of three rights that are emblematic of the different categories to which they belong—freedom of speech, the right to vote in free and fair elections, and the right to education. The study concludes that the conditions in Nicaragua during the 1980s—a counterrevolutionary war financed by a foreign superpower, United States intervention and a crumbling economy—coupled with a flawed construction of a utopian society and the subsequent mismanagement by the Sandinista leadership account for the difference between the rhetoric and the practice of human rights in Sandinista Nicaragua.

**Majors: Spanish, Political Science**  
**Senior Project Advisor(s): Barbara Riess, Shannan Mattiace**

**10:50 a.m., CC 302**

**Glenna Kramer**

## **Studies towards the synthesis of chiral amino alcohols through boron mediated transfer approaches to enamines**

Methods for the efficient synthesis of chiral amino alcohols are beneficial in the realm of medicine, biology and pharmacology. The attempt to develop new methodology to synthesize molecules with this particular functionality is examined through reactions between the borane compounds 9-BBN and tributylborane and the enamine 1-styrylpyrrolidine. Spectroscopic evidence suggests that a boron ate-complex forms during the reaction of the enamine with borane implying that the reaction does progress in a manner favorable to the development of the new synthetic method. Further work on this project would entail synthesizing a variety of enamines to be reacted with a variety of borane reagents, to determine if an intramolecular transfer of a ligand does occur. The intramolecular transfer could result in a new chiral center, which upon oxidation of borane, would produce a chiral amino alcohol product.

**Major: Chemistry / Minor: Music**  
**Senior Project Advisor(s): P.J. Persichini**  
**10:50 a.m., Arnold M111**

# A B S T R A C T S

**Matthew Lackey**

## **A Dichotomy of Words and Actions: A Comprehensive Analysis of Anti-Americanism in Contemporary Chile and Venezuela**

In recent years, several leftist presidents have come to power through democratic elections. The United States has traditionally opposed the left, especially those regimes in the western hemisphere; the current left has developed an outspoken anti-American stance in response to the United States' criticism. Within the region, the left represents a range of countries, some of which comply with a liberal social policy while maintaining more conservative policies, while a more radical camp follows a more traditional leftist ideology. The Republic of Chile is a good example of the moderate left: it has retained its commitment to the neoliberal economic model, but it has also enacted social programs to alleviate poverty. The Bolivarian Republic of Venezuela, on the other hand, has nationalized sectors of the economy and has heavily subsidized food and education programs for its people. Ironically, Venezuela, a country that is very dependent on the United States, has demonstrated a great degree of anti-Americanism. Chile, meanwhile, has quietly but effectively lowered the importance of the U.S. in its economy. This paper uses a multi-faceted investigation of each country's political and economic histories as well as selections of presidential discourse to analyze the importance of anti-Americanism in each country's international relations.

**Majors: International Studies, Spanish**

**Senior Project Advisor(s): Shannan Mattiace, Wilfredo Hernández, E.K. Haywood**

**11:10 a.m., CC 302**

**Kristen Lane**

## **Organized Crime in Cleveland, 1920–1940**

The purpose of this senior project was to examine the evolution of organized crime in Cleveland during the Prohibition era. What began as a violent struggle for control over Cleveland's illicit alcohol market, quickly transformed into a powerful criminal enterprise, which moved beyond both alcohol and the city of Cleveland. Also included in this project is Eliot Ness' attempts to eliminate corruption and restructure the Cleveland Police Department as a way to combat organized crime.

**Majors: History, Psychology / Minor: German**

**Senior Project Advisor(s): Paula Treckel**

**11:50 a.m., CC 206**

**Justine Law**

## **Fishing Kills Me Exactly as It Keeps Me Alive: A Humanistic Look at Common Pool Resource Tensions in the Lake Erie Fishery**

Lake Erie is home to a vibrant, rebounding fishery. Commercial and sport fishing industries currently coexist on the lake, but for nearly one hundred and fifty years, the commercial industry was the sole stakeholder in the fishery. Today, that industry is facing potential extinction. Political pressure from Ohio, which has allied itself with the sport industry, has been driving up regula-

tion of the commercial industry in both the United States and Canada for nearly forty years. As a result, the presence of the commercial industry on Lake Erie has progressively diminished. This essay attempts to tell the story of these Lake Erie fishery tensions using the testimonies and opinions of those who know it best: its fishermen. It is a first-hand account of the conflict that hopefully will not only fill gaps in understanding left by scientists, politicians, and the media, but also will encourage readers to consider natural resource issues more fully.

**Major: Environmental Science / Minor: Studio Art**

**Senior Project Advisor(s): Eric Pallant, Ben Srote**

**10:30 a.m., Arnold M111**

**Dara Levendosky**

## **Just Like That**

My Senior Project is a play that tells the story of Emily and Ethan who are in their 30s and have been dating for ten years. The two love each other but can't compromise on marriage and religion. Their relationship is put to the test when Emily's younger sister gets engaged before her. Emily begins to put everything in perspective. She has to decide which she wants more: the man she loves or the life she always wanted.

**Major: Theatre / Minors: History, Writing**

**Senior Project Advisor(s): Mark Cosdon**

**11:10 a.m., CC 301**

**Olivia Lobaugh**

## **The Use of Benzyne in a Boron-Mediated Transfer**

The most important reactions to synthetic organic chemists are the reactions that result in new carbon-carbon bond formation. The Lewis acidity of boron has been shown to form new carbon-carbon bonds when reacted with a Lewis base and forms a Lewis acid/base complex. A substituent on boron acts as a latent nucleophile and migrates to an electrophilic carbon to form a new carbon-carbon bond. Benzyne is a highly reactive intermediate that exhibits both electrophilic and nucleophilic properties which are necessary for new carbon-carbon bond formation. The nucleophilic character of benzyne can serve as the Lewis base when reacted with a borane compound and the latent nucleophilic substituent on boron can transfer to the electrophilic site on benzyne. The focus of this investigation is to form new carbon-carbon bonds via a 1,3 boron-mediated transfer using the reactivity of benzyne with a borane compound.

**Major: Chemistry / Minor: Psychology**

**Senior Project Advisor(s): P.J. Persichini**

**10:50 a.m., CC 206**

**Kim Luperi**

## **Money versus Morals: Sensation and Censorship in Pre-Code Hollywood and the Case of Baby Face**

Pre-Code Hollywood is described as the era in film history from 1929/1930-1934. These years are characterized by risqué films that pushed the boundaries of traditional morality with sensational subjects such as sex and violence. This time period

# A B S T R A C T S

in American history coincides with the start of the Great Depression. The economic crisis put the film industry in dire straits. On one hand, the industry tried to sell sensation at the box office to keep profits up. On the other hand, reformers rallied strongly for censorship as films seemed to go against traditional morality as never before. Thus, a struggle between money and morals ensued. The 1933 film *Baby Face* stands as an excellent example of a film that was subjected to censorship on the basis of immorality, and the two versions of the film that exist today reveal the battle between the industry and censors at this time. In the end, the studio that produced *Baby Face* were forced to give in to censors' demands largely to preserve their profits.

**Majors:** History, English

**Senior Project Advisor(s):** Ian Binnington, Lloyd Michaels  
**10:50 a.m., CC 303**

**Ashley Macari**

## **An Examination of the Student Movement's Impact on the Greens in West Germany**

The purpose of this project is to examine the student movement's impact on the Greens in West Germany. This is done by looking at three aspects in both the student movement and the Greens, and examining the ways in which the aspects of the student movement influenced the Greens beliefs, party structure, and tactics. The students protested against capitalism. They called for an end to authoritarian institutions and eventually began to use violence as a political tool. The Greens, who emerged in parliament 12 years later, adopted political principles dedicated to opposing capitalism, decentralizing the democratic system, and to supporting nonviolent means. After learning from the shortcomings of the student movement concerning these three aspects, the Greens were able to modify their beliefs, party structure, and tactics accordingly in order to create an effective protest movement that transitioned into a successful political party.

**Majors:** International Studies, German

**Senior Project Advisor(s):** Shannan Mattiace, Karen Richter, Kenneth Pinnow  
**11:10 a.m., Arnold M106**

**Hope Marijan**

## **Balancing Ethnicity with Identity: First and Second Generation Filipino Americans**

I filmed and produced a 30 minute documentary that explores the lives of Filipino Americans, along with the struggles they face. I interviewed several first and second generation Filipino Americans and asked them to explain how they balance their Filipino ethnicity with their American identity. Topics discussed include the title of Asian-American, assimilation, americanization, family relationships, ethnicity, and of course, identity.

**Major:** Communication Arts / **Minor:** Psychology

**Senior Project Advisor(s):** Michael Keeley  
**10:30 a.m., Doane A103**

**Jennifer Parry**

## **The Revitalization of Freudian Theory: The Psychoanalytic Analysis of John Henry Fuseli and The Nightmare**

Psychoanalysis is a relevant interpretative tool when it is properly applied to specific individuals whom manifest their subconscious complexes and desires into their artwork. John Fuseli was an artist of the subconscious, which can be proven by taking an in-depth look at his most famous painting, *The Nightmare*. *The Nightmare* was never attributed to any direct literary source during contemporary debate; however, the modern addition of psychoanalytic interpretations of artwork provides a deeper understanding of the painting and its creator. The psychoanalysis of Fuseli redeems Freudian theory by enlightening aspects of *The Nightmare*, which have remained inexplicable through literary, medicinal, political, social, and folkloric explanations alone. A more developed understanding of dream theory and psychoanalysis reveals Fuseli's painting as a collaboration of disparate information and experiences from Fuseli's own subconscious, thus explaining his ability to produce an image that encapsulated so many different fields of study and personal emotion.

**Major:** Art History / **Minors:** Psychology, Economics

**Senior Project Advisor(s):** Richard Schindler, Amelia Carr  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Meghan Perry**

## **Recommendations for an Allegheny College Partnership with the City of Meadville for Community Revitalization**

The existence of an urban center and its college is intertwined, connected by and to each other's successes and failures. As an institutional citizen of a city, a college can utilize its physical presence, economic influence, and progressive nature to become the catalyst for change in the community. This study determines what mutually beneficial role Allegheny College should take to maximize Meadville's revitalization efforts. Nine schools were chosen for inclusion as the case studies. Additionally, four of Allegheny College's peer institutions were included for comparison. A set of metrics was developed to evaluate programs for Allegheny College in five areas, finance, education, faculty and staff experience, student experience and community engagement. Examination of the basic elements required for successful revitalization indicated that Allegheny College is prepared to participate in collaborative programs. Three initiatives were recommended as the best collaborative programs that improve the community and advance Allegheny College's mission.

**Major:** Environmental Studies / **Minor:** Religious Studies

**Senior Project Advisor(s):** Caryl Waggett  
**10:15 a.m., Shafer Auditorium**



# A B S T R A C T S

## **Crystal Ptacek**

### **In the Solitude of a Hermit: Thomas Jefferson's Poplar Forest**

Poplar Forest was a vital part of Thomas Jefferson's life – a private retreat, situated far from the public scrutiny and demands on his time. It was his most personal architectural creation and landscape, a place where he came to find rest, to rekindle his creativity, and to enjoy private time with his family. Poplar Forest was also a working plantation, critical to his efforts as a farmer. Jefferson planned extensive gardens for his home at Monticello, but he also dedicated a great deal of energy to creating an ornamental landscape around his house at Poplar Forest. By looking at Jefferson's influences, family, formal education, and tours throughout America and Europe, my comp shows how Poplar Forest became a culmination of his previous architectural and horticultural works, his scholarly wisdom, and his appreciation of a sophisticated international taste. This private statement expressed Jefferson's ideals of beauty, particularly in the gardens he designed and the way he incorporated his unique octagonal house with the landscape.

**Major: History / Minor: Music History**

**Senior Project Advisor(s): Paula Treckel**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

## **Eric Rich**

### **A Theoretical and Empirical Examination of the Determinants of Growth in the Residential Construction Industry**

The purpose of this study is to display how elementary economic theories can be applied to indicate the significant economic factors that influence the residential construction industry by using multiple regression analysis. The regression model determined that the real interest rate and the growth rates of real GDP, the price of labor, the price of rent of a primary residence, and the adult population are economic factors that have a significant influence on the growth rate of residential investment. The determination of the economic factors that yield significant influence over the economy's level of residential investment allowed for the proposal of monetary and fiscal policies based on altering these economic factors to increase residential investment.

**Major: Managerial Economics / Minor: Communication Arts**

**Senior Project Advisor(s): Stephen Casler**

**11:10 a.m., Arnold M111**

## **Robert Rodgers**

### **The Determinants of Real Investment Growth**

The purpose of this paper is to examine the determinants of investment in the United States. Using data from the years 1959-2005, a regression has been executed to determine what variables have the largest impact on investment fluctuations in the economy. The variables used in this regression study are the real interest rate, real GDP growth net of investment, investor confidence growth, real technological growth, real wage growth, and the growth of the price of capital. Various investment theories are discussed, with a primary focus on the

accelerator model. A regression incorporating all of the variables was then run to measure the effects of the determinants on investment. After analyzing the results, it is clear that real GDP growth net of investment is the strongest factor in determining investment growth. The study concludes by discussing the implications of the findings and recommendations to increase investment growth, including increasing output and lowering interest rates.

**Major: Economics / Minor: Communication Arts**

**Senior Project Advisor(s): Stephen Casler, A. Behrooz Afrasiabi**

**10:30 a.m., CC 303**

## **Jeffrey Rutter**

### **Impacts of Agriculture on Levels and Heterogeneity of Soil Carbon and Nitrogen Content in Crawford County, PA**

Land use in the northeast has shifted multiple times from forested to agriculture and again back to forest. The cultivation that occurs during normal agricultural practices has a large impact on total levels of carbon and nitrogen as well as the spatial distribution of these nutrients. Eight sites located in Crawford County, PA that contained both forested land with no previous agricultural use, as well as land currently used for agricultural production were selected. Soil samples were taken with an oakfield corer at depths of 0-15 cm., and 15-30 cm. The results of the soil analysis displayed that there is significantly more soil carbon and nitrogen at the forested sites. On average, the forested sites contained 27% more carbon and 38% more nitrogen. These differences can be explained by increased erosion, removal of biomass, increased soil temperature, and the break up of soil aggregates on formerly agricultural sites. The majority of the loss of these nutrients was confined to the 0-15 cm. layer with the deeper 15-30 cm. layer remaining very similar among both land uses. Furthermore, the nutrients were more homogeneously spaced in the agricultural plots due to various physical and chemical exposures that these soils experienced. These results display the great loss of nutrients that soil, especially in the upper layers undergoes after being in agricultural production. This small and relatively limited variability nutrient distribution can lead to less forest biodiversity and, therefore a less healthy forest.

**Major: Environmental Science / Minor: Psychology**

**Senior Project Advisor(s): Richard Bowden, Eric Pallant**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

## **Matt Salera**

### **The Stakeholder Model of Corporate Governance as the Solution to Pressure from the Principal-Agent Dilemma in the Form of Stock Options**

The shareholder and stakeholder models of management became two different styles that evolved in business, and tried to achieve the same goals of firm success. Stock options presented a very quick way to align the interests of the owners with the managers, regardless of management styles. As the economy hit boom periods at the latter end of the 20th century, many

# A B S T R A C T S

corporate scandals began to emerge. The scandals gave way to information dealing with executive compensation and the excessive amounts of stock options that were being received. For this study, ethical and fraudulent companies were examined to determine if excessive stock option use was more prevalent in the fraudulent companies, and ultimately to understand if stakeholder management is better suited to handle pressures from the principal-agent dilemma in the form of stock options. Two variables, salary as a percentage of options, and remaining dollar value of firm ownership, were used in a logit model to determine the significance towards corporate fraud. The results lead to further questions about the different styles of compensation and how they affect corporate performance.

**Major: Managerial Economics / Minor: Communication Arts**  
**Senior Project Advisor(s): Don Goldstein, Janine Sickafuse**  
**10:50 a.m., CC 301**

**Lacey Scott**  
**Manipulating Reality**

This body of work is meant to challenge the viewer's perception of reality. In an era of technology we are bombarded with altered imagery. These works depict images of natural objects altered digitally by a means that can be compared to natural evolution. While evolution takes place gradually and slowly, this fast paced digital age allows for the rapid revolution of this flora. The images show the progression from what we perceive as the natural state of the objects to a new, modified reality. While each image is changed, it is still a depiction of the original object.

**Major: Art & Technology / Minor: German Studies**  
**Senior Project Advisor(s): George Roland, Robert Raczka**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Corey Shemelya**  
**An Extended Hydrophobic Surface Submerged in Water: The Formation of a Depletion Layer**

Hydrophobic literally means water hating. When small amounts of water come in contact with a hydrophobic surface, the water will minimize its contact area by forming a drop. What will happen when bulk water comes in contact with an extended hydrophobic surface? We have employed the surface sensitive technique of surface plasmon resonance to probe for the existence of a depletion region (an ultra-thin low-density region) at this boundary.

**Major: Physics / Minors: Chemistry, Economics**  
**Senior Project Advisor(s): Adele Nicole Poyner Torigoe**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Evan Sheppard**  
**Creating a GIS-Based Suitability Index of Wetland Creation in the French Creek Watershed**

Progressive environmental managers are expanding their use of watershed-scale planning in wetland restoration. Geographic Information System (GIS)-based models are powerful tools for such decision making. I applied a GIS-based model to siting

wetland creation projects in the French Creek watershed. The model output is a Suitability Index, which displays varied site suitability for constructing a wetland across the watershed. I built the model by linking processes and setting weighting and classification of the input layers. Inputs included elevation, current land cover, soil drainage, and existing wetland locations. I used these datasets in the model to create index variables, such as the slope and contributing watershed area. Inaccuracies in input data and model processes create uncertainty regarding the appropriate confidence in the output. I tested two techniques used to quantify confidence and show the effect of input data inaccuracies.

**Major: Environmental Science / Minor: Psychology**  
**Senior Project Advisor(s): Jennifer DeHart, Jim Palmer**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Jude Shingle**  
**Eudaimonia**

When dreams of whales haunt a young man's sleep, he is led to question the promises of the dominant culture: 'Is this the life that was promised? Are we really on the path to a great and glorious new tomorrow?' As the dreams persist, more questions arise and soon the young man is confronted by the reality of a planet on the verge of ecological collapse. Through rotoscoped animation, this lyrical and heartbreaking film explores what it means to acknowledge the atrocities of the dominant culture and the pains and triumphs of following your heart. Eudaimonia is a Greek term literally translated as "having a good guardian spirit." The term asks us to question: "What are the best activities of which man and woman are capable?" Perhaps our greatest good in this time of crisis demands that we rediscover our own unique talents and gifts and devote them to where our hearts tell us to go.

**Major: Studio Art / Minor: American Studies**  
**Senior Project Advisor(s): George Roland, River Branch**  
**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**Yusufu Sulai**  
**Wavelength Dependence of Photo-Induced Gliding of Liquid Crystals**

The relationship between the wavelength of incident light and the photo-induced gliding of nematic liquid crystals is measured. The results indicate an inverse relationship between the surface gliding and the wavelength of the incident light. This relationship was measured on surfaces coated with polyimide and polyethyl-methacrylate. Surface gliding on the surface coated with polyimide demonstrated more of a response to change in wavelength than the surface coated with polyethyl-methacrylate.

**Major: Physics / Minor: English**  
**Senior Project Advisor(s): David Statman**  
**11:30 a.m., CC 303**



# A B S T R A C T S

**Benjamin Swanekamp**

## **Have Gun, Will Travel: Private Military Firms in the Developing World**

Private military firms are reshaping the security of the developing world. These new actors provide military style services to the highest bidder. This presentation will examine why these firms have risen to prominence, and the effect they will have on the developing world.

**Major: Political Science / Minor: Philosophy**

**Senior Project Advisor(s): Howard Tamashiro**

**11:30 a.m., Doane A103**

**11:30 a.m. – 12:30 p.m., Poster Presentation, CC Lobby**

**John Mark Swafford**

## **Using Grammatical Evolution to Evolve Robot Controls**

Grammatical evolution is one of several evolutionary approaches to solving optimization problems that, instead of generating a solution for a problem, creates a program, or a portion of a program, to solve a problem. The results of this research show that, using grammatical evolution, a program can be generated and interpreted by a robot to solve a standard navigation problem. The collected data also show how grammatical evolution performs at generating high-level strategies that, in combination with more detailed, lower level techniques, such as neural networks, are used to solve increasingly difficult mazes.

**Major: Computer Science / Minor: Spanish**

**Senior Project Advisor(s): Robert Roos, Robert Cupper**

**11:30 a.m., CC 206**

**Mateo Villa**

## **A Case Study in the Application of Industrial Ecology: Woodcraft Industries Inc. CHP Feasibility Study**

Manufacturers in the United States are being forced to look for solutions to problems stemming from increasing international competition, rising energy and raw material costs, and growing environmental concerns. This study examines a specific application of industrial ecology as a partial solution to these problems and a source of competitive advantage. The study will thoroughly outline the concept of material and energy exchange that is the foundation of industrial ecology. The tools necessary for making a determination of the economic feasibility of an industrial ecology project will be discussed. Using a calculation of project net present value, the study will determine the economic feasibility of a specific case of combined heat and power generation using a biomass waste stream as a fuel source. The case study will outline and discuss the project feasibility of three power generation installations of varying size at a local manufacturing firm. Conclusions about the application of industrial ecology in the manufacturing and other sectors will be drawn and discussed.

**Major: Economics / Minor: Mathematics**

**Senior Project Advisor(s): Don Goldstein, Janine Sickafuse**

**11:30 a.m., CC 301**

**David Wagner**

## **A Parallel Genetic Knapsack Problem Solver Implemented With The CUDA Graphics Architecture**

The graphics processing units (GPU) found in common personal computers are powerful, parallel processors designed to operate on textures for visual display. General-purpose programming on graphics processing units (GPGPU) is a relatively recent development that allows non-graphical programs to take advantage of these parallel processors by executing code on the GPU. Genetic algorithms (GA) are based upon natural evolution and are used to evolve a population of potential solutions to a problem until an approximate solution is found. These algorithms are inherently parallel and are a good candidate for GPGPU. In addition, a new GPU architecture called the Compute Unified Device Architecture (CUDA), aims to easily facilitate GPGPU development and increase the parallel abilities of the GPU. Through experimentation with a CUDA based parallel GA that solves the knapsack problem, it is evident that a performance increase is not experienced unless the population size is increased. Furthermore, an increased population size does not yield a higher solution quality.

**Major: Computer Science / Minor: Economics**

**Senior Project Advisor(s): Bob Roos, Gregory Kapfhammer**

**11:10 a.m., CC 303**

**Richard Wozniak**

## **From Turf Wars to Terrorism: The U.S. Intelligence Community After 9/11**

The terrorist attacks of September 11, 2001 spotlighted the United States Intelligence Community unlike any crisis since Pearl Harbor. As a result, Congress passed wide sweeping intelligence reforms in 2004 in an attempt to centralize leadership, end bickering between agencies and ultimately create a system capable of dealing with the new threat of terrorism. Although well-intentioned, these reforms have left the Intelligence Community even less prepared for an attack and have created a false sense of security for Congress and the American people.

**Major: Political Science / Minors: Chemistry, English**

**Senior Project Advisor(s): Howard Tamashiro**

**10:30 a.m., CC 301**

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