



# WABASH COLLEGE

**11th Annual Celebration of Student  
Research, Scholarship, and Creative Work  
Friday, January 28, 2011 • Detchon Center**

## **Welcome and Introduction**

### **From Dean of the College Gary A. Phillips**

Welcome to the 11th Annual Celebration of Student Research, Scholarship, and Creative Work at Wabash College. For the past 10 years, the College has recognized in a proud and public way the creative thinking and work of Wabash students. We celebrate not only the particular achievements of individual students, but also a deeply embedded ethos of the College. The liberal arts are about such student intellectual engagement as this as part of a mission to change lives. The impressive breadth and quality of this year's work cause us to look ahead confidently to many annual celebrations.

This program is dedicated to the memory of Paul Caylor McKinney, '52, who passed away in 2003 after a courageous battle with cancer. Dr. McKinney proudly served the College for more than half a century as chemistry teacher, department chair, division chair, and Dean of the College. He was an exemplar of the liberally educated person whose interests ranged from quantum mechanics to Plato, from playing the piano to pondering Nietzsche. He acted in Wabash College Theater productions and was often found backstage working on difficult equations in his notebook. Among Wabash men, he would well understand and appreciate everything presented today; he would be the first to celebrate the successes of Wabash students and faculty members.

Close collaboration between Wabash students and faculty across the College is a hallmark of our institution, a labor of pedagogy that makes a difference. It is a special pleasure to introduce some of the results of that collaboration in these presentations. Our thanks go to the students who are prepared to teach the Wabash community about their good work and to faculty and staff members who have devoted considerable time helping students in their research and creative productions.

A conference of this size and scope would not be possible without the dedicated work of many people. I want personally to express my thanks to the planning committee: Chair Chad Westphal, Jim Amidon, Jeff Beck, Adam Bowen, Bill Doemel, David Kubiak, Lissa Mason, Lon Porter, and Tom Stokes. Scott Feller and Matt Roark have contributed to the poster production, as have other Media Center and IT Services staff; Ed McGaughey and Marge Fuentes and their Campus Services colleagues, and Kecia Tatman and Mary Jo Arthur and her Bon Appetit staff make the logistical support appear effortless. We also extend gratitude to Jerry Bowie and Kitty Rutledge for their help. We are grateful to all, and especially to Lilly Endowment, Inc., whose grant to College to fund the Center of Inquiry in the Liberal Arts helps support this community Celebration.

Gary A. Phillips  
Dean of the College

## About the 11th Annual Celebration of Student Research, Scholarship, and Creative Work

### **Schedule for Oral Presentations**

Oral presentations will begin at 1:10 p.m. and continue every 20 minutes through 4:00 p.m. In general, students will present information for 12-15 minutes with a few minutes for questions and passing time. Please see the following two pages for a list of oral presentations by room location and time slot. Biographies of the presenters, as well as their sponsors and abstracts, are listed in alphabetical order beginning on page 8.

### **Schedule for Posters and Exhibits**

Students will present and discuss their posters and exhibits in 90-minute increments beginning at 1:00 p.m. in Detchon International Hall. You will find a list of presenters and their locations — sorted alphabetically by lead presenter — beginning on page six. A diagram of International Hall and the location of the various posters is available on page seven. Biographies of the poster presenters and co-presenters, as well as their sponsors and abstracts, are listed in alphabetical order beginning on page 20. Students exhibiting work in the Detchon Reading Room are listed starting on page 30. Please note that biographies are listed alphabetically by the primary presenter.

## Schedule of Oral Presentations by Time Slot and Location

### Detchon 111

1:10	Kyle Grand	Cadillac's American Dream and Its Effect on Women
1:30	Josh Raspopovich	Dove's Campaign for Real Beauty: Deconstructing the Hegemonic Ideology of Beauty and Reconstructing Representative Form
1:50	John Ruddy	Gender and Wrestling
2:10	Michael Holmes	<i>A Snow Flake Gauntlet: A Short Story</i>
2:40	Steven Hinojosa	Mexican American Fatherhood
3:00	Shane Brown	Contemporary Views of Masculinity
3:20	Lucas Blakeslee	Incomprehensible Tongues of Hybrid Beasts: A Postcolonial Analysis of Exclusionary Social Practices and Language Politics at Work Against the Marginalized Individual, as Seen in <i>The Satanic Verses</i> and <i>In the Heart of the Country</i>
3:40	Chadwick Woods	Breaking the Script to Play the Part: Metafictional Identity and Failed Friendship in James Joyce's <i>Ulysses</i>
4:00	Brian Van Duyn	What Drove Housing Prices to Increase in Cities Throughout the U.S. Before the Bubble Burst in Late 2007?

### Detchon 112

1:10	Lucian Lupinski	Graphene Quantum Dots
1:30	Christopher Gorman	Halo Ion Traps
1:50	Bo Wang	Computation of the Potential of Mean Force between two Molecules Using the WHAM Method
2:10	James Gorman	Computational Chemistry of Phospholipid Membranes
2:40	Zachary Rohrbach	Quantum Unstable Particles
3:00	Kaleb Hemmelgarn	Hourly Wages of Veterans versus Non-Veterans: Implications on Public Policy
3:20	Brian David and Jeremy Coons	The Dome: The Creation of a Business Plan
3:40	Long Cao	Factors Affecting Bank Failure
4:00	Andrew Sparks	The Effects of Capital Asset Ratio on Loans

### Detchon 209

1:10	James Fitzpatrick	The Last King's World Tour: Immigration and the Fall of the Hawaiian Monarchy
1:30	Nicholas Marzotto	Peronismo: Argentine Myth and History
1:50	Jacob German	The Cold War: Averting Armageddon
2:10	Corey Buehner	A Romantic Poet Among Fascists: Friedrich Hoelderlin and His Place in the Cultural Identity of National Socialism
2:40	Reginald Steele	Black Gospel Music: Through the Decades
3:00	Billy Evans	The DNA Revolution
3:20	Cody Stipes	Urban Education: The Lessons I Learned That Will Shape the World
3:40	Kyle Bender and Brian David	The Liberal Arts in the Modern High School Classroom

## Detchon 211

1:10	Ian MacDougall	The Real Father of the Constitution's Compromise
1:30	Michael Brendle	Aaron Burr Innocent
1:50	Benjamin Cook	John Adams: Tact and Victory
2:10	Michael Del Busto	The Personal is Political
2:40	Adam Brasich	Cultural Flows and Individual Experiences: Analyzing the Origins of the Stone-Campbell Movement with Tweed and James
3:00	James-Michael Brazill	Wabash: A Society Apart
3:20	Hung Duong	Can Affiliative Photos Increase Prosocial Behavior in Children?
3:40	Jacob Stump	To Phthia: Elenchus and Divinity in Plato's <i>Crito</i>

## Detchon 212

1:10	Jarod Brock	Psychological Processes in Music: The Mozart Effect
1:30	Christopher Zabriskie and Ben Foster	Uncovering the Hidden Meanings of Mozart's <i>The Magic Flute</i> : Two Points of View
1:50	Billy Evans	The <i>Zulu</i> Film, the People and Warrior: A Comparison
2:10	Luke Robbins	Building a Character for the Stage
2:40	Adam Phipps	Adapting Ayn Rand's <i>The Fountainhead</i>
3:00	Dirk Garriott	Marc Antony, Dionysius, and the Battle for Public Image through Coinage, 42-20 BC
3:20	Adam Schenk	<i>Roma Aeterna</i> : Hadrian and His Plan for City and Empire
3:40	Matthew Scheller	Striking a Balance: Nero, Alexander, Coinage, and Provincial Identity in the Roman Empire

## Detchon 220

1:10	Filip Lempa	Where Will a Stimulus Thrive? Political Science Senior Seminar Research
1:30	Jacob Clough	Hamas: A Study in Contradictions
1:50	Jacob Surface	Hyperinflation and Political Bargaining: Assessing the Role of Economic Policy Failure in the Modes of Transition of Four Latin American States
2:10	Michael Nossett	Majority in the Middle? The Impacts of Partisan Ideological Polarization on Independent Voters
2:40	Adam Auter	<i>El Sabor de los Tacos: El Uso de Palabroatas Como un Espejo Cultural</i>
3:00	Steve Henke	Hapsburg Portraits and How to Enjoy Them
3:20	Patrick Stroud	<i>Esperanto: La Lingvo Internacia</i>
3:40	Darryl Dedelow, Jr.	How the Execution of 13 Young Spanish Women Solidified Their Fight for Feminism Under the Second Spanish Republic (1931-1939)

## Exhibits in the Detchon Reading Room

Time	Presenter	Title
1:00	Jarod Brock, Pat West, Garrett Sell, D.J. Young, Ryker Stalbuam	Music 221: Electronic Music Compositions
1:00	Adam Auter and Chris Beedie	Thinking Outside the Tire
1:00	Tian Tian	Democratized Fashion
2:30	Matthew Levendoski	My Physical and Spiritual Existence
2:30	Patrick Garrett	The Shawnee Environmental Ethic: Insights into the Religion and Ceremonial Practices of an Eastern Woodlands Native American Tribe

## Schedule of Poster Presentations (Locations on the Following Page)

### Session 1 — 1:00 p.m. to 2:30 p.m.

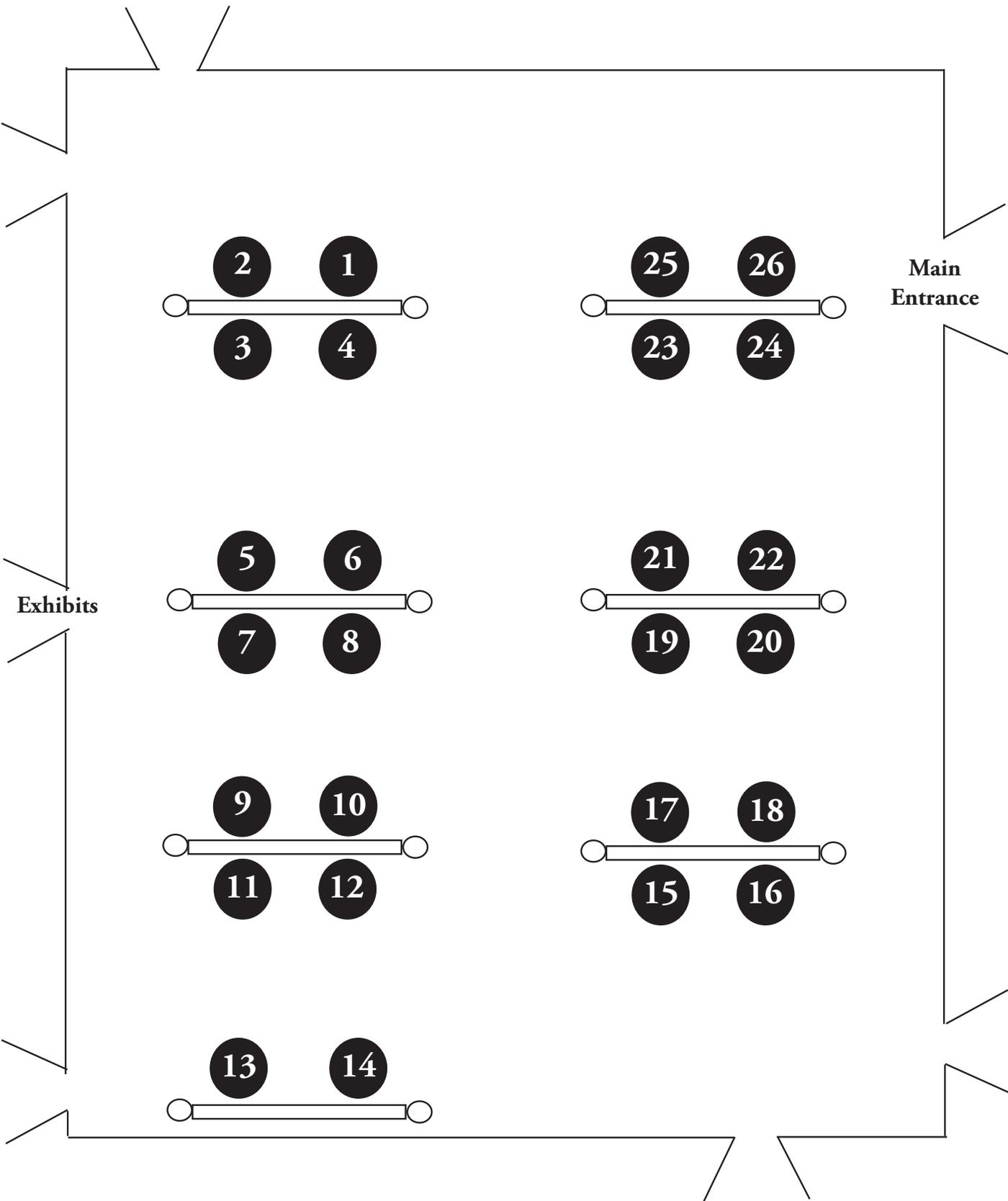
No	Presenters	Title
1	Romeo Amoa	Effect of Post-Training Cocaine on Habit Facilitation in Female Rats: Relationship to Estrous Cycle
3	Steven Apostolidis	The Infralimbic Cortex is Required for the Facilitation of Habit Learning by Cocaine
5	Patrick Garrett	Utility of Plastid trnC-rpoB in Resolving Phylogenetic Relationships in <i>Eragrostis</i>
7	Brad Vest, Ben Foster, and Logan Rice	Adventures with MoNA/LISA
9	Tuan Nguyen	yhiM is Required for Acid Resistance in <i>Escherichia coli</i>
11	Jay Huenemann	Cell Division is Not Required for Regeneration in <i>Nematostella vectensis</i>
13	Tyler Buresh, Zachary Rohrbach, and Jeff Soller	Brownian Motion in Optical Tweezers
15	Zachary Rohrbach, Tyler Buresh, and Jeff Soller	A Measurement of the Cosmic Ray Muon Flux Through Large-Area Scintillators
17	Mike Lu and Jordan Hoerr	Expression and Purification of an Iron-Dependent Regulator Protein from <i>Thermobifida fusca</i>
19	Edward Evans	Effect of yhiM Expression on Antibiotic Resistance of <i>E. coli</i>
21	Austin Drake	Structural and Kinetic Characterization of <i>Francisella tularensis</i> Acetate Kinase
23	Seth Bawel and Shane Evans	Expression of Plant Stress Genes Induced by Plant Extracts
25	Nathan Line	Microwave Functionalization of Hydride-Terminated Porous Silicon: Initial Steps Toward New Solid-Supported Catalysts

### Session 2 — 2:30 p.m. to 4:00 p.m.

No	Presenter	Title
2	Xumin Sun	Effect of Direct Infusion of Cocaine into the Infralimbic Cortex on Habit Learning
4	Rob Dalhaus III	Red/Green Color Naming Decline in the Periphery. Blue/Yellow Does Not. What Happens in Visual Search?
6	Lucian Lupinski	Ytterbium Experiments
8	Tianren Wang	Maximum Likelihood Estimation (MLE) of Students' Understanding of Vector Subtraction
10	Andrew Gillman	Role of yhiM in T4 Bacteriophage Attachment and Growth in <i>E. coli</i>
12	Brandon Tritle	Muscle Regeneration in the Sea Anemone <i>Nematostella vectensis</i>
14	Yifei Sun	Multiscale Adaptively Weighted Least-Squares Finite Element Methods for Convection-Dominated Elliptic PDEs
16	Bihui Liu	A Data Grid for Preclinical Molecular Imaging Research Communities
18	Mike Lu	Retinal Methyl Rotation Behavior Produces Novel Insights into Rhodopsin Activation
20	Lucas Evans	Nitrogen Containing Derivatives of (R)-12-Hydroxystearic Acid
22	Shengshuang Zhu	The pKa of Retinal Depends on the Conformation of the $\beta$ -Ionone Ring
24	Andrew Alexander	Synthesis of Lavendamycin Analogues
26	Yijun Tang	Investigating the Hydrogen Potential in ZrH <sub>2</sub>

# Detchon International Hall Poster Presentations

2011 Celebration of Student Research, Scholarship, and Creative Work



## Oral Presentations (Alphabetical by Presenter)

**Name:** Adam Auter  
**Sponsor:** Dan Rogers (Modern Languages)  
**Title:** *El Sabor de los Tacos: El Uso de Palabrotas Como un Espejo Cultural*  
(The Flavor of Tacos: Swear Words as a Cultural Mirror)

**Biography:** I am a Spanish major from Granger, Indiana. When I studied in Spain I observed that swear words seem to be an obsession for Spaniards of all social status; thus, I wanted to try to find an explanation for this phenomenon.

**Abstract:** This will be a presentation of the project I did for my senior thesis. I will analyze Spanish obscenities and show how they reflect the tensions within Spanish culture.

**Name:** Kyle Bender, Brian David  
**Sponsor:** Michelle Pittard (Teacher Education)  
**Title:** The Liberal Arts in the Modern High School Classroom

**Biography:** Kyle Bender is a political science major from Delphi, Indiana, while Brian David is a rhetoric major from New Milford, New Jersey.

**Abstract:** Recall from past experiences the typical high school classroom and the traditional teaching styles that were often associated with this model. Now return to the present, and consider the differences between these traditional methods and the challenging curriculum ever present at Wabash College. This presentation will explore two Wabash students' attempts to bring college teaching methods into the high school classroom. They will present assertions and evidence that support their teaching claims, while also providing context on the research that goes into a teaching unit, and what the Education Area of Concentration at Wabash entails.

As two students on the path toward obtaining teaching licenses, part of our course work in EDU 302 consisted of developing a two week teaching unit at Crawfordsville High School. Part of our area of emphasis centered upon bringing new multicultural ideas in the classroom while catering to the multiple intelligences present in individual students. We will provide examples and evidence as to whether these methods can successfully be implemented at the high school level.

**Name:** Lucas Blakeslee  
**Sponsor:** Agata Szczeszak-Brewer (English)  
**Title:** Incomprehensible Tongues of Hybrid Beasts: A Postcolonial Analysis of Exclusionary Social Practices and Language Politics at Work Against the Marginalized Individual, As Seen in *The Satanic Verses* and *In the Heart of the Country*.

**Biography:** I am an English major from Milford, Indiana. I became interested through the work of Dr. Brewer's senior seminar, "The Body of the Other in British and Postcolonial Literature." The seminar focused on the compelling process of alienation at play in a postcolonial world.

**Abstract:** In 1896 hybrid individuals were presented by H.G. Wells as Dr. Moreau's grotesque, failed experiments. During the 19th and 20th centuries, real life persons of hybrid nature were considered of 'degenerate' root and often forcibly exiled from society. Postcolonial study revisits the exclusionary mechanisms packed within degeneration theory as it exists today. Hybrids emerge as individuals who exist between species; that is, people who are simultaneously both and neither of their parent groups. Such people belong to no single group, nor any group at all—but man is an animal who likes its categories. Conscious of an outsider status, hybrid individuals can be led to purposely isolate themselves, risking dissolving to obscurity altogether. Two modern hybrids come to life as the transcultural Saladin Chamcha in Rushdie's *The Satanic Verses* and the 'subaltern' Magda in Coetzee's *In the Heart of the Country*. This paper examines social exclusionary mechanisms coupled with internalized marginalization, especially by negative self-awareness and willful self-exclusion, at work producing spiraling anomie, or total 'unhinging,' within these characters' lives. The novels portray colonial language politics forcibly articulating the dichotomy of active agent/docile body in order to signify society's dominant and alien, indeed incomprehensible, tongues.

**Name:** Adam Brasich  
**Sponsor:** Robert Royalty (Religion)  
**Title:** Cultural Flows and Individual Experiences: Analyzing the Origins of the Stone-Campbell Movement with Tweed and James

**Biography:** I am a religion major, Ancient Greek and political science double minor from Fort Wayne, Indiana. I have long been interested in the Stone-Campbell movement due to family connections to one of the churches that came out of that tradition as well as the movement's importance in the religious history of the Midwest (Indiana).

**Abstract:** In many methodological theories of religion, the theoreticians place emphasis on either the individual or collective natures of religion. However, while religion inherently involves individual experiences, such experiences do not occur within a contextual vacuum. These experiences are negotiated within a larger cultural context that involves reactions to existing customs, ideas, and realities. This is amply illustrated in the origins of the Stone-Campbell movement, out of which came the Christian Church (Disciples of Christ), the Churches of Christ, and the independent Christian churches. Through a mingling of the theories of religion devised by Thomas A. Tweed and William James, I aim to provide insight into how Alexander Campbell and Barton Stone, through individual religious experiences operating in conjunction with larger cultural flows, transformed the traditional Presbyterian communion season into a means of rebellion against the rigid Calvinist orthodoxy of Scottish and American Presbyterianism, thereby creating a new religious tradition in early nineteenth century America.

**Name:** James-Michael Brazill  
**Sponsor:** Jonathan Baer (Religion)  
**Title:** Wabash: A Society Apart

**Biography:** I am a religion major from Decatur, Indiana. I have been very interested in comparative religion, and “non-traditional” religion. Wabash shares similarities with tribal religious practices, and that gave me the idea.

**Abstract:** The presentation that I am submitting is based on my senior seminar paper, titled “Wabash: A Society Apart.” It analyzes the College, its “religious” life, and its societal structure from an anthropological perspective. To strengthen the argument, I have also outlined the Catholic monastic social structure, and drawn comparisons between the two. The essay discusses ideology, structure, sacred symbols, and other basic components of religion and society. Throughout the work, I cite anthropologists, who give accounts of what creates a religious, exclusive society. I posit that Wabash is, like a monastery, an independent society, with its own “civil religion” and social structure. Therefore, it is able to withstand “American society’s” pressures to change in the way that most universities have.

**Name:** Michael Brendle  
**Sponsor:** Jeff Beck (Library)  
**Title:** Aaron Burr Innocent

**Biography:** I am a biology major from Middlebury, Indiana. I became interested in this topic when I was first in Prof. Himsel’s “Founding Fathers” Tutorial. Throughout the course I learned more and more about the shifty character of Aaron Burr. However, that was not enough. I wanted to

learn more about the treason Aaron Burr was accused of.

**Abstract:** Aaron Burr was the most despised founder of his time. How could anyone forget the time he killed Hamilton? Or the time he compounded his multiple affairs by marrying the old prostitute, Eliza Jumel? Furthermore, Thomas Jefferson accused Aaron Burr of treason against the United States of America. The focus on Burr’s serious character flaws led to the acceptance of the charge of treason. Yes, Burr had a cloudy personal character, but in my presentation I will prove that Aaron Burr was innocent. In short, Aaron Burr was the victim of a false accusation. Joseph Hamilton Daveiss sought revenge on Burr because Aaron Burr killed Alexander Hamilton. Therefore Daveiss told Jefferson that Burr was “planning to overthrow the administration.” This accusation started a downward spiral leading to Jefferson’s abuse of power. For instance, Thomas Jefferson did not provide evidence for his accusation against Burr. The fact that Jefferson had Burr’s rights violated proves he did not have the evidence to back his claim. Those opposing Burr threw the Constitution out the window by trying to redefine the meaning of the word treason.

**Name:** Jarod Brock  
**Sponsor:** Larry Bennett (Music)  
**Title:** Psychological Processes in Music:  
 The Mozart Effect

**Biography:** I am a music major from Noblesville, Indiana. I am also a psychology minor and want to pursue a career in Music Therapy. I wanted to dig out the connections between the fields of music and psychology and see how this plays a role the way music is used as therapy.

**Abstract:** I will be presenting about the physiological and psychological processes of music and what it means for improving function of the brain and body. Music can be used for certain types of “healing” and can help many diseased and disabled people better their lives. This is known as the Mozart Effect and it is slowly bringing music to prominence as a legitimate “scientific” field.

**Name:** Shane Brown  
**Sponsor:** Warren Rosenberg (English)  
**Title:** Contemporary Views of Masculinity

**Biography:** I plan to major in biology and my hometown is Crawfordsville, Indiana. I grew interested in this project because of my association with the local school system and my own personal experiences growing up male in it.

**Abstract:** This presentation compares the contemporary views of masculinity based on surveys from elementary,

middle, and high school students in Crawfordsville, Indiana and traditional masculine ideology. Five aspects of masculinity are focused on, including emotional invulnerability, heterosexual dominance, physical strength, sports, and violence. The responses that some children gave may surprise you.

**Name:** Corey Buehner  
**Sponsor:** Brian Tucker (Modern Languages)  
**Title:** A Romantic Poet Among Fascists: Friedrich Hoelderlin and His Place in the Cultural Identity of National Socialism

**Biography:** German major from Newburgh, Indiana. This project grew out of an independent study with Dr. Tucker that focused on Martin Heidegger and his role in the National Socialist movement in Germany, as well as what his participation meant for his philosophy.

**Abstract:** In the summer of 2010, I flew to the Literature Archive in Marbach, Germany with the support of the Dill Fund to examine World War II era publications of Friedrich Hoelderlin's poetry. Hoelderlin, a German Romantic poet that died in the early 19th century, served important ideological functions for the National Socialist Regime. The widespread popularity and publication of his work during World War II, including extensive sponsorship by the Nazis, provides an exceptional platform to discuss the importance this regime placed on national cultural identity and supposed historical justification for their radical programs and beliefs. Through a reading of Hoelderlin's poem 'Germania,' I show why the Nazis looked to a poet whose own personal life and beliefs differed drastically from those the regime idealized, and how their appropriation of Hoelderlin distorted the true sense of his poetry. When I returned from Germany, I wrote a paper discussing this topic with the help of Professor Brian Tucker, which is the basis of my presentation today.

**Name:** Long Cao  
**Sponsor:** Joyce Burnette (Economics)  
**Title:** Factors Affecting Bank Failure

**Biography:** I'm a senior from Ho Chi Minh City, Vietnam. I'm interested in finance and this project for my senior seminar investigating bank failures improves my understanding of important factors affecting financial institutions and the whole economy.

**Abstract:** Bank failure is a chronic phenomenon in economics. During the Great Depression, 12.9 percent of operating banks failed. There have been 343 failed banks since 2000. Bank run was the main cause of bank failures during the Great Depression. Although several regulations,

such as deposit insurance, have been introduced to prevent bank run, a run still occurred in the recent financial crisis. The run on the repo market was an example. Financial panic induced lenders to seize and sell collateral, which in turn forced borrowers to raise repo rates and haircuts. Bank failure is contagious, spreading quickly throughout the economy and causing serious damage to the financial system. The purpose of my project is to evaluate bank failures in the current crisis based on a variety of financial and economic factors. I use single-equation regression models to estimate the connection between these factors and the failing probability. The results indicate capital adequacy, asset quality, and earnings are consistently significant factors affecting failed banks.

**Name:** Jacob Clough  
**Sponsor:** Melissa Butler (Political Science)  
**Title:** Hamas: A Study in Contradictions

**Biography:** I am a political science major from Indianapolis, Indiana. I became interested in Hamas during my class on Mideast Politics. I've always been interested in terrorism, as 9/11 has been one of the biggest memories of my formative years, and Hamas is one of the most fascinating terrorist groups out there, so I chose to do an independent seminar on Hamas, and subsequently my senior seminar research paper.

**Abstract:** In this presentation (and the paper it is based on) I compare Hamas with former and current terrorist organizations, including Sinn Fein, the African National Congress, the Muslim Brotherhood, Hezbollah, and Fatah, in an attempt to predict the possibility of Hamas laying down its arms and becoming a serious player in post-2006 Palestinian politics. I conclude that a number of obstacles stand in the way, but if concessions are made by Israel and a truce reached with Fatah, the likelihood of peace in the Middle East grows significantly.

**Name:** Benjamin Cook  
**Sponsor:** Scott Himsel (Political Science)  
**Title:** John Adams: Tact and Victory

**Biography:** I am a History major from Carmel, Indiana. The founding fathers fascinate me. I enjoyed exploring how we can apply the lessons of the founders to our own lives in my Freshman Tutorial class, Founding Brothers and Revolutionary Characters.

**Abstract:** Think of a time when a stubborn, obnoxious person argued with you. Was he successful? Probably not. Tact is needed in needed for persuasive success. Tact is doing what is best in specific situations. With tact, there is a fine balance between passion and civility. Adams makes

a great case study because at different times, his behavior reaches both ends of the balance. Adams successfully defended the British soldiers in the Boston Massacre Trial and gained votes for Independence when he struck the right balance. However, he failed to dissuade the continental congress from sending an Olive Branch Petition to King George III when he did not. Modern politicians can learn from John Adams' persuasion attempts. I show this by connecting the lessons learned from Adams life to examples of modern politicians. For example, Obama demonstrates the importance of speaking passionately in a world of sound bites. He also demonstrates, like Adams, the consequences of unpopular actions. Furthermore, I analyzed the 1984 election between Walter Mondale and Ronald Reagan to discuss tactfully addressing the public. Both the recent elections and Adams' life illustrate the importance of timing. In the end, we see that the lessons of Adams apply to our own lives.

**Name:** Brian David, Jeremy Coons  
**Sponsor:** Angie Cook-Smith (Business Leaders)  
**Title:** The Dome: The Creation of a Business Plan

**Biography:** Brian David is a rhetoric major from New Milford, New Jersey, and Jeremy Coons is a history major from Hobart, Indiana. We became interested in attending the Business Immersion Program to learn about business. One of the projects was to create a business plan, which we will discuss today.

**Abstract:** Over the course of the 2010 summer, Brian David and Jeremy Coons created a business plan for a venture looking to gain capital for investment. They came up with a strategy to offer venture capitalists the ability to invest in a business called The Dome. The Dome is an indoor sports recreational facility located in West Lafayette, Indiana. The Dome will be furnished with an AstroTurf field that will allow consumers to partake in sporting leagues such as soccer, softball, flag football, and ultimate Frisbee. Additionally, the facilities will include batting cage nets for softball and baseball and will have a driving range for golfers. Significant research into the fields of product/service, financial information, industry analysis, market analysis, target markets, organizational plans, risk assessment, and exit strategy had to be assessed correctly for The Dome to be a viable option for investors. The presentation we will be delivering provides analysis into all of these fields and offers a glance into the necessary research that goes into a business plan.

**Name:** Darryl Dedelow Jr.  
**Sponsor:** Ivette Wilson (Modern Languages)  
**Title:** How the Execution of 13 Young Spanish Women Solidified their Fight for Feminism under the Second Spanish Republic (1931-1939)

**Biography:** I am a Spanish major from Munster, Indiana. This research was conducted for my Senior Seminar Project.

**Abstract:** Thirteen young socialist women, all under the legal age, were condemned to death by a post-Spanish Civil War tribunal led by the Nationalist Party. The crime was their support for the Communist Party during the war. My research focuses on how their active participation in the Second Spanish Republic (1931-1939) and the Spanish Civil War (1936-1939) ultimately granted them the suffrage that was later revoked by the Franco regime. The primary sources that I have chosen to use in this comparative study include a literary text, a film, and an interview. My results have shown that women did have a substantial impact on the Iberian culture in two ways during the war. First, they entered the workforce to cover the jobs left by those men who went to fight. Secondly, they participated in such political parties as the Juventudes Socialistas Unificadas (JSU). Thus, the aim of my presentation seeks to clearly demonstrate that under the Second Spanish Republic (1931-1939) women in that society were given ample opportunities to progress towards a more societal acceptance of gender equality within the traditionally patriarchal Spanish culture.

**Name:** Michael Del Busto  
**Sponsor:** Scott Himsel (Political Science)  
**Title:** The Personal is Political

**Biography:** I am a biology major from Carmel, Indiana. I had to do a research paper for my freshman tutorial with Professor Himsel. The Jefferson and Hemings affair was listed as a suggested idea. I immediately became intrigued.

**Abstract:** Affairs in politics matter some, but they should matter more because the personal life cannot be separated from the political life. The values, beliefs, and character of a political leader will be the same both socially and politically. The two are one. Thomas Jefferson's affair with Sally Hemings and the buying of the Louisiana Purchase prove this true by demonstrating the overlap of personal and public betrayal through the violation of ethical and Constitutional boundaries. A modern parallel of the personal being political is Bill Clinton's affair with Monica Lewinsky and his tax cut plans. Scandals in politics influence voters' opinions, impact politicians' reputations, and their standings; both qualitative and quantitative

research confirms this. It is impossible to separate the values and beliefs of a politician from his character and actions.

**Name:** Hung Duong  
**Sponsor:** Eric Olofson (Psychology)  
**Title:** Can Affiliative Photos Increase Prosocial Behavior in Children?

**Biography:** I am a psychology major from Hanoi, Vietnam. I have always had a deep passion for working with children, especially on fostering positive behaviors and social skills. During the summer working with Prof. Olofson on his project about children's linguistic acquisition, we discussed a study that applies affiliative photos in order to increase prosocial behavior in children. Given the practical application of the study, we decided to test out this study in classroom settings at a local elementary school in Crawfordsville. That is how I became interested in this project.

**Abstract:** One question that has always captured attention from parents and teachers is how to teach children to behave nicely to one another in class. Previous research by Over and Carpenter (2009) examined possible reasons why children engage in prosocial behaviors, which are intended to promote social acceptance and friendship, in a community have found that the fear of ostracism, or the fear of being excluded from a group, can increase a child's tendency to behave in a prosocial manner. Recently, they took a different route from this line of research and assessed whether affiliation (the feeling of attachment to a group) can also influence children's tendency toward prosocial behavior. However, their study tested 18-month-olds and was carried out in a lab setting. Thus, the research I am currently conducting with Prof. Olofson is testing this hypothesis by assessing whether looking at affiliative photos can increase children's prosocial behaviors and decrease antisocial behaviors in a classroom setting. We recruited students from eight kindergarten classes at Laura Hose elementary school. Each teacher received a set of 25 photos, with four classes starting with the "together" set (pictures of children together) and the other four starting with the "alone" set (pictures with only one child). Data collection is ongoing but preliminary data appear to support the hypothesis that looking at affiliative photos can decrease antisocial behavior. These data can be used to generate practical application in classroom setting.

**Name:** Billy Evans  
**Sponsor:** Tracey Salisbury (History)  
**Title:** The DNA Revolution

**Biography:** I am a history major from Gary, Indiana. I was interested in how DNA analysis has affected our society.

**Abstract:** September 11, O.J. Simpson, President Clinton, and The Unknown Soldier all have at least one thing in common: Forensic DNA analysis. Many historians and individuals have not realized how the invention of DNA analysis by Sir Alec Jeffrey in 1984, has changed our society forever. To say that DNA analysis, being used as evidence, has only affected our current society and our history for years to come would be completely inaccurate. DNA evidence has not only placed people behind bars or exonerated past wrongfully guilty individuals, but it has also changed the way we looked at people from our past. National Icons such as Thomas Jefferson have been plagued by DNA evidence, extracted from his remains, with showing proof of having fathered many children with his slaves. To understand the impacts of DNA collected at crime scenes as criminal evidence, one must first understand the basics of what DNA analysis is, and also about how it has developed from Sir Alec Jeffreys' discoveries in 1984 to the moral, privacy, and ethical issues surrounding the DNA Database for Criminal in the contemporary society.

**Name:** Billy Evans  
**Sponsor:** James Makubuya (Music)  
**Title:** The *Zulu* Film, the People and Warrior: A Comparison

**Biography:** I am a history major from Gary, Indiana. I became interested in this project when watching the film *Zulu*.

**Abstract:** Based on a heroic true story, the film entitled *Zulu*, features 150 soldiers of the British Empire being attacked by a Zulu regiment of over 4,000 men. On January 22, 1879 the British army suffered one of its worst defeats when Zulu forces attacked the 1,500 British troops at Isandhlwana, South Africa. After the main battle, the Zulu force advanced on a British hospital supply dump, guarded by about 150 Welsh infantrymen. During the 12-hour battle, the Zulu Warriors at the outskirts of the hospital consistently created explosive musical sounds in the surrounding environment. The purpose of my research project is twofold. One is to examine whether the director of the film accurately portrayed the role of the Zulu warriors. Secondly, I have examined the accuracy of the types of instruments and the style of music featured in this film, as well as the role and effect the featured Zulu music played.

**Name:** James Fitzpatrick  
**Sponsor:** Richard Warner (History)  
**Title:** The Last King's World Tour: Immigration and the Fall of the Hawaiian Monarchy

**Biography:** I am a history major from Honolulu, Hawaii. I first became interested in the King's world tour while working as an intern at the Iolani Palace Museum in the summer of 2009. The majority of my time was spent researching King Kalakaua's world tour because very little information has been gathered about it. That research was the foundation for this paper.

**Abstract:** In 1881 King Kalākaua, the seventh and last king of the Hawaiian Islands, travelled around the world, which created an immediate influx of new immigrants for Hawaii. While the King's tour did not cause the first, nor the last influx of immigrants to Hawaii, it marked an important moment in the history of the Hawaiian Kingdom. The world tour of King Kalākaua resulted in treaties allowing the massive influx of new immigrants with no historic or cultural ties to Polynesia or the Hawaiian monarchy, which resulted in an overwhelming shift in the make-up of the islands' population, and the socioeconomic and cultural identity of Hawaii. The King's tour was a personal triumph, bringing honor to the monarchy in the short run; however, the consequences of the tour and the immigration treaties from the visits ensured the hegemony of the Euro-American economic elite. New immigrant indifference towards the monarchy, coupled with the decrease in the Native Hawaiian population, meant that the power base of the Hawaiian king decreased as the economic hegemony of the missionary families and sugar planters grew. The effect of the power shift caused by the influx of new immigrants would be one of the key factors in the fall of the Hawaiian monarchy.

**Name:** Dirk Garriott  
**Sponsor:** Jeremy Hartnett (Classics)  
**Title:** Marc Antony, Dionysius, and the Battle for Public Image through Coinage, 42-20 BC

**Biography:** I am a classics major from Pine Village, Indiana. I became interested in my project during a field trip our senior seminar took to the Indianapolis Art Museum. We were instructed to examine several coins arranged about a table in chronological order and to observe their size, shape, chosen metal, and who or what they displayed. A coin that I found to be the most fascinating was the cistophoric tetradrachm from Ephesus displaying Marc Antony with Bacchic icons. This coin led me to investigate further not only in its history, but the traditions of Roman provincial coinage as a whole.

**Abstract:** This presentation tells the story of the Roman politician Marc Antony and public image in Asia Minor. While a member of the second triumvirate (the three-man rule of Rome founded in the wake of Julius Caesar's assassination), Marc Antony traveled to Ephesus to consolidate his political base by parading as the Greek god Dionysius, who the Ephesians claimed was born near their city in Asia Minor. Soon afterwards, the Ephesians marked the occasion by minting a coin that pictured Marc Antony on one side and Dionysius on the other. The coin reflected the past, by drawing a long local iconographic tradition, but also opened Marc Antony up for criticism by his political rival, Octavian (the future emperor Augustus), who played on Roman misgivings about this god to play the image against Marc Antony. This case study suggests both the power of coinage in shaping public opinion in Rome and also the power of local religious traditions, for even after the Augustus effectively rendered Dionysiac imagery impotent throughout most of the empire, some cities in Asia Minor still sought to connect themselves to their region's most famous divinity.

**Name:** Jacob German  
**Sponsor:** Michelle Rhoades (History)  
**Title:** The Cold War: Averting Armageddon  
**Biography:** I am a history major from Crawfordsville, Indiana. I examined the historiography of the Cold War for my History 497 class. A central question developed that I wanted to answer: why did the Cold War never escalate to a "hot" war?

**Abstract:** It is ironic that one of the most perilous periods in American history occurred in the decades following World War II. The allied powers had successfully defeated Germany, and Americans were optimistic that world peace and security would be restored. The Soviet Union, England, and the United States had successfully defeated the Nazi hegemony, battling the Germans on two simultaneous fronts. Belief in the ability of nations to work together for the common good was ubiquitous. However, the spirit of cooperation that had characterized the joint war effort was turning sour as decisions about the fate of Germany, postwar reparations, and territorial concessions were discussed among the superpowers. Cooperation was replaced with suspicion, which grew into opposition and belligerence. Instead of peaceful prosperity, the world was divided into what one historian calls "bipolar politics" that separated East and West and nearly resulted in World War III. The United States and the Soviet Union did not confront each other militarily during the postwar era because the leadership of each country pursued diplomatic channels to de-escalate growing divisiveness and tension, and the Soviets and the Americans found it more profitable both ideologically and economically to pursue other goals rather than to provoke nuclear war.

**Name:** James Gorman  
**Sponsor:** Scott Feller (Chemistry)  
**Title:** Computational Chemistry of Phospholipid Membranes

**Biography:** I am a chemistry major from Decatur, Indiana. I applied for a summer research position at Wabash last summer, during which I learned how much can be done with computers, and their importance in all research fields, not just chemistry.

**Abstract:** Both alpha-tocopherol and cholesterol are anti-oxidants, but the two molecules go about the process in different ways; alpha-tocopherol is more commonly called Vitamin E, while cholesterol is considered a health risk. Whereas cholesterol can be highly concentrated in lipid bilayers, alpha-tocopherol is found in much smaller concentrations. 1-stearoyl-2-docosahexaenoyl-sn-glycero-3-phosphocholine (SDPC) is a phospholipid with one polyunsaturated fatty acid chain and one saturated fatty acid chain. 1,2-Dipalmitoyl-sn-glycero-3-phosphocholine (DPPC) is a phospholipid with two saturated fatty acid chains that was used in the simulations. The solute differences were shown by their different interactions between saturated and unsaturated lipids.

**Name:** Christopher Gorman  
**Sponsor:** Martin Madsen (Physics)  
**Title:** Halo Ion Traps

**Biography:** I am a physics and mathematics major from Decatur, Indiana. Dr. Madsen asked me if I was interested in working with him this summer and I accepted because the ability to trap ions appealed to me.

**Abstract:** We present the design of a new type of compact toroidal or “halo” ion trap. Such traps may be useful for mass spectrometry, studying small Coulomb cluster rings, quantum information applications, or other quantum simulations where a ring topology is of interest. We present results from a Monte Carlo optimization of the trap design parameters using finite-element analysis simulations that minimizes higher-order anharmonic terms in the trapping pseudopotential, while maintaining complete control over ion placement at the pseudopotential node in 3D using static bias fields. These simulations are based on a practical electrode design using readily available parts, yet can be easily scaled to any size trap with similar electrode spacings. We also derive the conditions for a crystal phase transition for two ions in the compact halo trap, the first non-trivial phase transition for Coulomb crystals in this geometry. The material that will be presented has been submitted and accepted into *Physical Review Journal A*.

**Name:** Kyle Grand  
**Sponsor:** Todd McDorman (Rhetoric)  
**Title:** Cadillac’s American Dream and Its Effect On Women

**Biography:** I am a rhetoric major from Indianapolis, Indiana. I saw a Cadillac commercial and thought it would be an interesting approach to my senior paper/presentation.

**Abstract:** This presentation is an examination of a Cadillac CTS commercial produced for the 2008 model year. The commercial is entitled “My Favorite Things” and features famous actress Kate Walsh as the lead role. In this presentation I will perform a feminist critique on the commercial using the feminist approaches of redefining and revisioning. I will use these feminist approaches to analyze a version of the American Dream, which Cadillac is trying to sell to its viewing audience, mainly women. Cadillac’s version contains three main components, which are wealth, competition, and freedom. Cadillac demonstrates that buying into its version of the American Dream, which ultimately ends in getting a Cadillac CTS, will improve a woman’s life. After I explain these messages I will move to discuss the negatives of Cadillac’s American Dream. For my conclusion I will look at how the car performed on the open market and discuss what effect the commercial had on its success. To go along with this I will offer my conclusions about the effectiveness of the commercial as a whole and tell why I think the commercial is powerful and persuasive.

**Name:** Kaleb Hemmelgarn  
**Sponsor:** Christie Byun (Economics)  
**Title:** Hourly Wages of Veterans versus Non-Veterans: Implications on Public Policy

**Biography:** I am an economics major from Portland, Indiana.

**Abstract:** This paper examines wage differences between veterans and non-veterans using CPS (Consumer Population Survey) data from August 2009. Controlling for 11 different independent variables, and using an OLS regression model, this paper concludes that on average, veterans earn 8.8% less per hour than non-veterans. This difference in hourly earnings, taking present value into account, results in lost wages of \$18,068 per veteran over the course of a working lifetime. The question this paper poses is, should the US government be responsible for compensating veterans for the loss of wages experienced in the workforce over the course of a lifetime?

**Name:** Steve Henke  
**Sponsor:** Dan Rogers (Modern Languages)  
**Title:** Habsburg Portraits and How to Enjoy Them

**Biography:** I'm a political science major with rhetoric and Spanish minors from Indianapolis, Indiana. I became interested in the Habsburg family after reading *The Habsburgs: Embodying Empire* by Andrew Wheatcroft. At one point in the book, he asks the reader to take his word for some general claims that he makes about the portraits. I didn't find that satisfying, so using his book as a starting point, I studied the Habsburgs and visited art museums across Europe to better understand their portraits and underlying ideology.

**Abstract:** When visiting an art museum, it's easy for students to become bored with portraits of dead white royalty. My presentation will provide a case study for artwork analysis, based on my independent study of Habsburg commissioned artwork in Spain and Austria. I'll start by a brief historical background on the Habsburg family, and then move into individual portraits and paintings. These individual paintings will help teach the basic conventions used in portraiture and show how these conventions can be used or manipulated to convey a moral or political message.

**Name:** Steven Hinojosa  
**Sponsor:** Warren Rosenberg (English)  
**Title:** Mexican American Fatherhood

**Biography:** I am from Harlingen, Texas and became interested in this topic in my Freshman Tutorial class. We had to choose a topic for our final project that was related to masculinity. I chose the topic "Mexican American Fatherhood." The stereotypes, traditional, and modern conceptions showed different types of Mexican American fathers. Also, being able to compare my findings with my own family was really interesting as well.

**Abstract:** There are many stereotypes associated with Mexican American fatherhood. I have researched how stereotypes are formed, and which ones are associated with Mexican American fathers. This included positive, negative, traditional, and contemporary stereotypes. Some examples of stereotypes included hard working, religious, and family oriented. A main part of Mexican American fatherhood was "machismo." This was connected to the ideas of what "machismo" is, and what it contains. This included its traditional values and negative conceptions. I have also used personal experiences to compare with my findings. Both my father and grandfather are Mexican American fathers, and I used their life experiences and characteristics as part of my research. I compared my findings with my father and grandfather to find out which

stereotypes apply to them. I also compared my personal experiences with the film *Mi Familia*, a movie based on three generations of a Mexican American family. As I examined these stereotypes in research and my family, I found stereotypical behaviors that I would like to follow when I become a Mexican American father, and there are others that I would rather not.

**Name:** Michael Holmes  
**Sponsor:** Marc Hudson (English)  
**Title:** *A Snow Flake Gauntlet: A Short Story*

**Biography:** I am a philosophy major from Buffalo, New York. I became interested in this project through my Introduction to Creative Writing course with Professor Hudson last fall, where I originally wrote this story.

**Abstract:** It was raining heavily all across western New York. The lake effect was melting in the sky and languorously spilling from great black clouds. From far away you could see the rain falling in what looked like dark apparitions slowly disintegrating towards the ground. There were thousands of stories that happened that day in western New York, thousands of individuals who drove on the I-90 that day, thousands of people who would meet at a rest stop, or a gas station, a coffee shop or a mechanic's shop. Thousands of seemingly random people, randomly meeting thousands of people, in thousands of ways... This is the story of two of them.

**Name:** Filip Lempa  
**Sponsor:** Melissa Butler (Political Science)  
**Title:** Where Will a Stimulus Thrive? Political Science Senior Seminar Research

**Biography:** I am a political science major from Bytom, Poland. I became interested in the political economy of China during my study abroad at Shanghai's Fudan University.

**Abstract:** The resurgence of depression economics in the current crisis has led to the use of expansionary fiscal policies in governments worldwide. Using case studies of the U.S. and the People's Republic of China, this paper examines the creation and implementation of stimulus packages in democratic and single-party authoritarian regimes. I find that due to a stronger executive branch, more involvement of economic expertise, and faster implementation the Chinese stimulus has been more successful than its American equivalent. I assert that single-party regimes are more effective in stimulating the economy through fiscal means. My analysis provides grounds for criticism of liberal democracies and suggests that the road to democratization through free market

capitalism in China and other non-democratic regimes is not as certain as many political scientists have supposed.

**Name:** Lucian Lupinski  
**Sponsor:** Martin Madsen (Physics)  
**Title:** Graphene Quantum Dots

**Biography:** I am a physics major from Zionsville, Indiana. I became interested in this project last summer at a Research Experience for Undergraduates (REU) at Michigan State University.

**Abstract:** Graphene quantum dots are an emerging area of research in condensed matter physics. Possible applications include constructing better solar panel technology and creating more flexible LEDs. An important parameter controlling the effectiveness of the quantum dots in these applications is its Auger recombination time. In this talk I will discuss the theory and method to find the Auger recombination time.

**Name:** Ian MacDougall  
**Sponsor:** Jeff Beck (Library)  
**Title:** The Real Father of the Constitution's Compromise

**Biography:** I am from Westfield, Indiana, and plan to major in French and political science or rhetoric. Professor Himsel assigned a final paper and presentation about a topic surrounding our Founding Fathers course.

**Abstract:** We consider James Madison the "Father of the Constitution," but he is not worthy of this title. Instead, Roger Sherman is the real hero of the Constitutional Convention. He saved the country with his Connecticut Compromise. In my talk, I will explore how Sherman used compromise as an effective tool to unite large and small states and move the country forward. Sherman was present at every movement that shaped our country. Indeed, he was the only Founding Father to sign the Declaration of Resolves of 1774, the Declaration of Independence, the Articles of Confederation, and the Constitution. Madison fought with a narrow mind for his Virginia Plan that favored the large states, but Sherman killed the New Jersey Plan that favored smaller states. Sherman killed the New Jersey Plan in favor of the Connecticut Compromise, because he realized that large and small states had to give ground to keep our nation united. We need another Roger Sherman today to help us resolve the equally contentious issues that challenge us today.

**Name:** Nicholas Marzotto  
**Sponsor:** Richard Warner (History)  
**Title:** Peronismo: Argentine Myth and History

**Biography:** I am a history major from Elkhart, Indiana. While studying abroad in Rosario, Argentina in the fall of 2009, I became fascinated with the history and memory of Juan and Eva Perón. The opportunity to observe the aftermath and how Peronism is still affecting the nation into the present proved to be an exceptional experience for me and my studies on Peron.

**Abstract:** In the past two centuries, Argentina has struggled to find stability and closure in all sectors of its society. The rise of Juan Domingo Perón in the 1930s and 1940s gave Argentina its first real glimpse of stability and world recognition. The remarkable persistence of a mythological aura based in the memory of the regime of Juan Domingo Perón reveals a continual search for national identity with deep roots in Argentine independence some 200 years ago. Beneath the myth of Peronist populism lies the more sobering reality of Argentine life, witnessed by a culture of popular distrust of the government, brought on by the inept management of the nation state. I will present and analyze the mythological influence that Perón, who died over 35 years ago, and his ideologies still have today.

**Name:** Michael Nossett  
**Sponsor:** Melissa Butler (Political Science)  
**Title:** Majority In the Middle? The Impacts of Partisan Ideological Polarization on Independent Voters

**Biography:** I am a political science major from Brownsburg, Indiana. My interest in the polarization of the American polity grew out of some recent coursework. Coupled with several personal interviews with leading political figures, my studies in Political Science 311 and the immersion trip to Washington, D.C. that accompanied it, furthered my interest in the causes and effects of partisan ideological polarization such that I chose to focus my senior political science research on some facet of the topic. Given the lack of current research in the political science literature on the effects of polarization on independent voters, I thus chose to concentrate on this specific topic in order to make a new contribution to the field.

**Abstract:** This research examines the two recent trends of the ideological polarization of the political parties and the growth in the number of Independent voters in the electorate, and argues that not only are the trends related, but also that polarization has 1) been a cause of the growth of the number of Independent voters, and has 2) caused Independent voters to play a more important role in the electorate. Using ANES data from the 1952-2004 elections,

this research finds that while the results are strongly in support of the first point, they are inconclusive at best in terms of supporting the second point. Thus, this research posits that, while there exists a causal relationship between the two trends, the effects of polarization on the role of Independent voters are as yet unknown.

**Name:** Adam Phipps  
**Sponsor:** Michael Abbott (Theater)  
**Title:** Adapting Ayn Rand's *The Fountainhead*

**Biography:** I am a theater major from Hurst, Texas. Over the summer I read *The Fountainhead* and found it to maintain a distinctly dramatic quality amongst its characters. My strong desire to see a live performance of the work led to my interest in its adaptation.

**Abstract:** The focus of my senior seminar project revolves around the process of adapting Ayn Rand's *The Fountainhead* for the stage. A large portion of the project involves my developing method for breaking down the entire story and appropriating material from the novel for each scene, resulting in both a macro and micro process. I have researched theories and other forms of adaptation, and intend to compare the three major aspects most common in adaptations. A segment of one scene that I have written will be performed as a staged reading, while the scene itself will be compared alongside the actual pages from which they originated, along with personal notes describing and showcasing my approach.

**Name:** Josh Raspopovich  
**Sponsor:** Todd McDorman (Rhetoric)  
**Title:** Dove's Campaign for Real Beauty: Deconstructing the Hegemonic Ideology of Beauty and Reconstructing Representative Form

**Biography:** I am a rhetoric major from Merrillville, Indiana. I wanted to conduct a study on a successful marketing campaign and analyze the rhetorical implications that led to its success.

**Abstract:** There has been much hype and discussion involving Dove's Campaign for Real Beauty since 2004. This scholarship rhetorically analyzes Dove's marketing campaign, seeking to expose the underlying relationship between Dove and its competitors in the beauty industry. By utilizing the units of analysis of representative form and an ideological critique, we will see how Dove ultimately seeks to deconstruct the representative form of beauty offered by the mass media and Dove's competitors, and subsequently reconstructing a more positive, healthy ideology of what beauty is through offering their own

representative form to consumers and society at large.

**Name:** Luke Robbins  
**Sponsor:** James Cherry (Theater)  
**Title:** Building a Character for the Stage

**Biography:** I am a theater major with a music minor, from Indianapolis, Indiana. This project was part of the capstone course for my theater major, and was done in conjunction with my performance as Leduc in the Wabash production of Arthur Miller's *Incident at Vichy*.

**Abstract:** This project reflects the work and research done in preparation for my performance as Leduc in the Wabash production of Arthur Miller's *Incident at Vichy* in October. It discusses the kinds of preparatory and exploratory exercises and tools taught to acting students by the theater department here at Wabash, as well as exploring how aspects of the play and simply having been in the play have shaped me as a person since the performance. Following in the beliefs of American theatre icon Stella Adler, I focused on creating a detailed backstory and biography for Leduc, so that I could draw from the character's past experiences to generate emotional responses, rather than being forced in to the Stanislavsky method of affective memory, which asks an actor to draw from the actor's own experience to produce a character (thus limiting the range of the character to the experiences of the actor).

**Name:** Zachary Rohrbach  
**Sponsor:** Dennis Krause (Physics)  
**Title:** Quantum Unstable Particles

**Biography:** I am a physics major from Indianapolis, Indiana. I have always been fascinated by waves because they are very tangible things, but they are just out of the reach of immediate intuitive understanding. Dr. Krause offered an internship this past summer on investigating wave phenomena, and this seemed like a perfect fit for my interest.

**Abstract:** Have you ever sat by a lake and watched how the ripples and the waves in the lake interact with each other? Quantum mechanics is based off of the idea that particles have some of the same characteristics as waves in a pond. This talk will provide an introduction to some of the fundamentals of quantum mechanics with a special focus on how these ideas relate to particle instability. Additionally, the talk will propose a method on how to integrate Einstein's theories of special and general relativity into this quantum mechanical treatment of particle instability.

**Name:** John Ruddy  
**Sponsor:** Jennifer Abbott (Rhetoric)  
**Title:** Gender and Wrestling

**Biography:** I am a rhetoric major from Chicago, Illinois. This project started as an assignment for a presentation on gender studies. The other members in my group shared an interest in wrestling and decided to look deeper.

**Abstract:** This group project offers a gender analysis of professional and amateur wrestling, presented in a video documentary format. Through it, we argue that although different, both professional and amateur wrestling promote hyper-masculinity and heterosexuality, despite hints of homoeroticism, by encouraging homophobia. To support that claim, we conduct our analysis in four parts: amateur wrestling performance, professional wrestling performance, amateur wrestling attire, and professional wrestling attire. The section on amateur wrestling performance considers the ways society often perceives the physical aspects of amateur wrestling as homoerotic—and how both homophobia and physical domination have surfaced to counter such perceptions. The section on professional wrestling performance is similar to that of amateur wrestling with the addition of physical violence and verbal domination as prominent ways to thwart the perception of homoeroticism. The amateur wrestling attire section looks at the ways in which the practical purposes behind the singlet uniform traditionally worn by wrestlers has often led to the perception of homoeroticism. This section also notes the change to less revealing uniforms in recent years. The professional wrestling attire section also notes the practical reasons for the revealing attire but focuses on the physique of the wrestlers as suggesting both hyper-masculinity and homoeroticism.

**Name:** Matthew Scheller  
**Sponsor:** Jeremy Hartnett (Classics)  
**Title:** Striking a Balance: Nero, Alexandria, Coinage, and Provincial Identity in the Roman Empire

**Biography:** I am a classics major from Wadesville, Indiana. This presentation stems from my senior seminar project.

**Abstract:** During the reign of the infamous Roman emperor Nero, moneyers in the North African city of Alexandria increased the output of their mints multiple-times over. The coins they issued would find their way into the hands of soldiers, citizens, and traders as they made their way to and from Egypt, and thus offered Alexandrians a conspicuous and portable means of spreading their city's fame, history, and identity. At the same time, the moneyers had no doubt that the imperial house, and perhaps even Nero himself, would also be made aware of the coins, their

images and legends. This situation offered opportunities for appeasing the emperor while simultaneously appealing to local sensibilities. My presentation examines Alexandrian coinage under Nero and analyzes three distinct strategies adopted by Alexandrians as they sought to articulate their city's rich heritage and to gain Nero's goodwill (or avoid his fickle temperament). I will argue that the moneyers displayed abstract personifications of Alexander the Great's values before then celebrating Nero's travels to Greece's principal shrines

**Name:** Adam Schenk  
**Sponsor:** Jeremy Hartnett (Classics)  
**Title:** *Roma Aeterna*: Hadrian and His Plan for City and Empire

**Biography:** I am a mathematics and classics double major from Evansville, Indiana. My project will be a presentation of my senior thesis paper for my Classics 400 seminar dealing with Numismatics.

**Abstract:** This paper takes as its beginning point a gold coin (called an *aureus*) minted in Rome under the emperor Hadrian. It depicts a bust of the leader on one side and a representation of the goddess Roma (the personification of the city) on the other. Appearing around the seated figure of Rome is the legend "*Roma Aeterna*," (Eternal Rome) two words that, of course, were hardly foreign to Romans, but had never been combined. In addition to the new coin, Hadrian also undertook to construct the largest temple in the city (and, indeed, in the empire) and dedicated it jointly to *Roma Aeterna* and *Venus Felix* (the lucky). My presentation will consider Hadrian's motivations for propagating this new epithet for the goddess/city, and my investigation spans such evidence as Hadrian's empire-wide travels, his provincial building campaigns, and Roman notions of time and immortality. My central argument is that while Hadrian's predecessors had captured much territory through military means, this emperor sought simultaneously to consolidate those holdings and to elevate Rome the city as the empire's undisputed focal point.

**Name:** Andrew Sparks  
**Sponsor:** Joyce Burnette (Economics)  
**Title:** The Effects of Capital Asset Ratio on Loans

**Biography:** I am an economics major from Crawfordsville, Indiana. My interest in this project began after reading "The Credit Crunch" paper by Ben Bernanke, Cara S. Lown, and Benjamin M. Friedman. I replicated their model with observations from the current economic crisis.

**Abstract:** The purpose of this paper is to investigate the effect of capital-asset ratios on the lending of large and

small banks in the Northeast and Midwest region during the economic crisis. The model utilized in this analysis is replicated from a paper “The Credit Crunch” by Ben Bernanke, Cara S. Lown, and Benjamin M. Friedman. The results provide evidence that total lending was not affected as severely in the current economic crisis as in 1990-1991. The data analysis also indicates that capital-asset ratio was correlated to the lending of small banks in the Northeast and Midwest, but there was no correlation for large banks.

**Name:** Reginald “Reggie” Steele  
**Sponsor:** Tracey Salisbury (History)  
**Title:** Black Gospel Music: Through the Decades

**Biography:** I am a music major from Moss Point, Mississippi. Growing up in the black church has been an experience and major influence to how I view the world today. I am more interested in this project today than I was three years ago because I have the resources to find the few scholars that research Black Gospel Music, and compare their research to different regions of the United States. Thanks to Diane Norton, Dr. Vanessa Rogers, and Dr. Tracey Salisbury, I am learning more about the black community and how it is viewed by scholars. I now compare Black Gospel Music to Baroque, Classical, and Romantic music. This research is not just a project, but a reflection and foundation of my life. I hope to someday become a Black Gospel Music scholar.

**Abstract:** This presentation would go through the history of Black Gospel Music starting with its roots in West Africa to the controversial issues that black churches still face today. I will discuss shared styles and genres of music, derived from Negro Spirituals to blues to jazz to hip-hop. Legends such as Thomas Dorsey, Mahalia Jackson, and my personal favorite, the Divas of Black Gospel Music: The Clark Sisters. Controversial issues within the black church — such as praise dancing, hip-hop infusing, and homosexuality — will be reviewed. Please be aware that this section is an active demonstration, and all audience members must participate in the interesting activities and discussions during the presentation to continue research and extraordinary culture to the campus of Wabash College.

**Name:** Cody Stipes  
**Sponsor:** Michele Pittard (Teacher Education)  
**Title:** Urban Education: The Lessons I Learned That Will Shape the World

**Biography:** I am a mathematics major with an area of concentration in teacher education from Bunker Hill, Indiana. I have a deep passion for education, but until my junior year of college, I had no idea how I wanted to

contribute to the educational system. After a one-week immersion trip in Chicago, it became clear that I wanted to make a difference in urban education. This project is an extension of that experience and the subsequent knowledge that I have acquired about urban education that will help me to make a difference in this world.

**Abstract:** Urban Education: The Lessons I Learned That Will Shape the World is based on my research during an immersion experience in Chicago, Illinois in May of 2010. Through this one-week experience, I was able to experience urban education and gather information about the great challenges that face students and teachers in inner city Chicago. As a part of the experience, I was also able to teach and interact with many students at the prestigious Whitney Young High School. WYHS is one example of a Chicago public school that has successfully been able to educate young men and women despite the great challenges facing each student in their community. My passion lies in helping students in these low-income, urban areas achieve greatness, and I will demonstrate how one great school can truly make a difference in the lives of students. With this knowledge, I plan to make a difference this fall as I begin my two-year commitment as a Corps Member with Teach For America in Indianapolis, Indiana and my subsequent career in educational administration.

**Name:** Patrick Stroud  
**Sponsor:** Jane Hardy (Modern Languages)  
**Title:** *Esperanto: La Lingvo Internacia*

**Biography:** I am a potential history major from Noblesville, Indiana. I first developed an interest in the constructed language of *Esperanto* while working on a research paper for my Freshman Tutorial “We Are What We Speak: The Life & Death of Languages.”

**Abstract:** Saluton! In this presentation, I will give a brief overview of *Esperanto*, a constructed “international language” created in the late 1800s. Despite its constructed nature, *Esperanto* was revolutionary in its popularity: there were over two million speakers of the language during *Esperanto*’s height in the 1950s. After other introductory statistics about *Esperanto*, information will be given on the history of *Esperanto*’s creation as well as the ideology of the language’s creator, Ludwig Lazarus Zamenhof. Unfortunately, *Esperanto* rapidly declined in use following the 1950s. Likely explanations of *Esperanto*’s failure will be presented, as well as how small groups of intellectuals strive to maintain the language and even strive to pass it on to future generations. Though the language is constructed, a small idea of an overarching “*Esperanto* culture” will be shown through some literary and film examples, including a 1965 horror movie starring Canadian actor William Shatner! Towards the end of the presentation, the

audience will be taught some basic phrases and grammar in *Esperanto*.

**Name:** Jacob Stump  
**Sponsor:** Mark Brouwer (Philosophy)  
**Title:** To Phthia: Elenchus and Divinity in Plato's *Crito*

**Biography:** Originally from Owasso, Oklahoma, I am majoring in philosophy and minoring in Greek and German. I first became interested in the task of this paper — making sense of Plato's allusion in the *Crito* to Achilles' dilemma in the *Iliad* — when Professor Claudia Zatta (wisely) insisted on returning conversation to it at the end of most of my GRK-302 classes. This paper is both the result of those conversations and much research besides.

**Abstract:** At the beginning of the *Crito* Socrates dreams that a woman appears to him and says, "Socrates, on the third day you would arrive at fertile Phthia" (Cr. 44b). The great majority of commentators either dismiss this dream as just a fanciful poetic allusion or briefly note it in passing. Of those who do discuss it, some, connecting Phthia to the verb φθίω ("to die"), suggest that it foreshadows Socrates' coming death. The others attempt to place it in its Homeric context by casting Socrates' dilemma in terms of Achilles.' I argue that both interpretations fail precisely insofar as each omits what the other includes: The Phthia dream should be taken both with respect to the *Iliad* and as a spiritual homecoming. When done so, however, it raises the embarrassing point that, just as Achilles would have betrayed his responsibility to fight had he fled to Phthia, so would Socrates have betrayed some responsibility in his choice to drink hemlock and go to Phthia (i.e. Hades) instead of escape from jail. I argue that the responsibility that Socrates seemingly betrays was his divine obligation to practice philosophy, which he interpreted as the practice of elenchus. He abandons this when he does not engage the Laws in elenchus, thus, as it seems, making the analogy complete. I conclude however by calling attention to passages in the *Euthyphro*, *Protagoras*, and *Apology* that suggest Socrates' ability to engage in elenchus depends upon divine influence; his elenctic silence becomes then merely the result of his not being enthused, an event finally explained with recourse to Thetis' last visit to Achilles before his death.

**Name:** Jacob Surface  
**Sponsor:** Melissa Butler (Political Science)  
**Title:** Hyperinflation and Political Bargaining: Assessing the Role of Economic Policy Failure in the Modes of Transition of Four Latin American States

**Biography:** I am a political science major from Crawfordsville, Indiana. An interest in Latin American politics and history as well as a study abroad semester in Chile led me to this topic. I wanted to understand the recent political history of the region and gain in depth knowledge of the experience of authoritarianism in the region and the "third wave of democratization" that has redefined the global political spectrum.

**Abstract:** I undertake a narrative case analysis of Chile, Uruguay, Brazil and Argentina to examine how military governments' performance as guardians of state and economy influenced their ability to institute military prerogatives to protect the armed forces under civilian rule. Following Ziegler and Smith's (2008) analysis, I use hyperinflation as an indicator of political instability. I use the modes of transition approach to classify the bargaining power available to military officers. I then analyze the current status of democracy using data from Polity IV. I find that the ability of military governments to manage the economy and insulate their citizens from the effects of hyperinflation influenced the level of bargaining power they had in negotiating transitions to civilian rule. Finally, I argue that due to the work of parties and electoral competition, military influence has faded even in the most adverse transitions. Although the bargaining power of authoritarians is important in the early stages of the transition process, it does not preclude a state from reaching liberal democracy. Nevertheless, an analysis of the transition of a regime is integral to understanding the experience of bureaucratic-authoritarianism in the region and could be helpful in understanding military regimes and democratization elsewhere.

**Name:** Brian Van Duyn  
**Sponsor:** Joyce Burnette (Economics)  
**Title:** What Drove Housing Prices to Increase in Cities Throughout the U.S., Before the Bubble Burst in Late 2007?

**Biography:** I am an economics major from Granger, Indiana. I became interested in this project because I was curious to see what variables affected housing prices to go up before the bubble burst in late 2007. Since we have been discussing the financial crisis almost the entire semester, I thought it would be a necessary topic.

**Abstract:** During the time period from 2002 to 2005, it was determined by many economists that housing prices increased due to banks giving out ridiculous mortgage opportunities to borrowers who had subprime credit. In late 2007, the housing bubble burst, which put our economy into one of the biggest financial crises we've had since the Great Depression. This was due to the inability of borrowers to make reoccurring payments on a monthly basis, which caused many foreclosures on houses. The goal of my research is to investigate what helped housing prices increase up to the late bubble burst in 2007. I use data provided by the FHFA from quarter 4 in the year 2000 to quarter 4 in 2006. I use four independent variables in my regression analysis and came to the conclusion that both supply and demand had an effect on why housing prices increased more on east coast and west coast cities rather than cities in the Midwest. Undevelopable % area of land was my supply variable, and % change in population from 2000 to 2009 was my demand variable, which both tested for statistical significance, meaning chance was not involved in the regression results.

**Name:** Bo Wang  
**Sponsor:** Scott Feller (Chemistry)  
**Title:** Computation of the Potential of Mean Force between Two Molecules Using the WHAM Method

**Biography:** I am a mathematics and chemistry double major from Beijing, China. I became interested in this project because it allows me to use my math computations to simulate the Gibbs free energy in a chemical reaction, which is of great interest to me. By conducting this experiment, I can apply what I have learned from class to the real practical project.

**Abstract:** The impact that the interaction between peptides has upon the conformation of the protein is the focus of this research. We select the Docosahexaenoic acid (DHA) as our object to study. The whole research is based on the simulation from CHARMM. The interaction here means the Potential Mean Force (PMF), and there are two ways to get the PMF as a function of distance, through RDF or WHAM. In order to check whether these two methods both work, we set up a waterbox model. We built the waterbox of 20\*20\*20 on the CHARMM-GUI website, and used the rdf.inp to get the plot of it. After that, by  $A(x) = -RT \ln g(x)$ , we got the PMF. And this is the accurate way, for we got the PMF from RDF, by definition. On the other side, we had to figure out whether WHAM, which did this simulation just between 2 molecules, could also work. So we simulated the water molecule under specific distances and different conditions to check the best parameter to conduct WHAM. After 12 simulations, we found that with spring constant value of 2, step interval of 0.5 Å, under

298K, and with a total step of one million, we could generate the relative best PMF plot. The two sets of results showed good agreement of each other, which indicates that the WHAM method can be used into the more complicated DHA molecule simulations.

**Name:** Chadwick Woods  
**Sponsor:** Agata Szczeszak-Brewer (English)  
**Title:** Breaking the Script to Play the Part: Metafictional Identity and Failed Friendship in James Joyce's *Ulysses*

**Biography:** I am an English and psychology double major from Greenfield, Indiana. I originally wrote this paper for Dr. Agata Szczeszak-Brewer's English course on James Joyce's *Ulysses*. With Dr. Brewer's guidance, I submitted it to the annual James Joyce Conference in Prague where I presented it this summer. I would like to thank Dr. Brewer and Wabash College for letting me have this wonderful opportunity to share my research.

**Abstract:** In *Ulysses*, James Joyce explores the relationship between the characters and their scriptwriter, which, in effect, posits the "characters" of the novel more like actors on a stage: self-aware and playing roles. Joyce first introduces the reader to the grandiose Buck Mulligan as he performs a blasphemous Catholic mass for nobody in particular. One wonders: who is his audience? Joyce hints at theatricality and the "scripting" that the characters alternately follow or resist, and it is the author's hand that guides their actions throughout. Mulligan and Stephen resent Joyce's expectations for them as they attempt to take control back from the author. An examination of Stephen's resistance and Mulligan's adherence to the roles that Joyce has written for them illuminates the dissolution of their relationship, since, ultimately, the characters' attitudes towards their respective "scriptings" are incompatible. Mulligan delves deeper into his own one-dimensional role, while Stephen resists Joyce's control. With Joyce's authority always present, will we ever see the fulfillment of Stephen Dedalus' self-affirmation, or will the oppressive text hold him down from the liberating flight his surname promises?

**Name:** Christopher Zabriskie, Ben Foster  
**Sponsor:** Larry Bennett (Music)  
**Title:** Uncovering the Hidden Meanings of Mozart's *The Magic Flute*: Two Points of View

**Biography:** Ben Foster is a physics major from Valparaiso, Indiana, while Chris Zabriskie is a religion major from Indianapolis, Indiana. This presentation stems from a research paper for Music 218.

**Abstract:** This presentation will focus on two opposing views of *The Magic Flute*:

**Chris's Point of View:** Mozart's *The Magic Flute*, written by librettist Emmanuel Schikaneder, is arguably one of his most well-known operas. I find that the real beauty within *The Magic Flute* lies within its Masonic Symbolism. Mozart was a well-known and active Freemason in his time and composed great music for it. *The Magic Flute's* Masonic influence is important, because within Freemasonry are Enlightenment ideals, where Freemasonry was one of the chief vehicles that propelled Enlightenment thought. I argue that *The Magic Flute* is an important opera because it hints at Enlightenment ideas towards the moral perfection (good) of man. Without these influences and tendencies, the opera is no more than a fairytale.

**Ben's Point of View:** The libretto for *The Magic Flute* has often been criticized for its numerous logical inconsistencies, such as Papageno's union with Papagena despite his inability to complete the trials set before him by Sarastro's brotherhood. I argue that this is not necessarily a weak point of *The Magic Flute*, but rather an intentional feature of the opera. These supposed "holes" actually lend support to the idea that there is no absolute good, only good relative to each individual's needs.

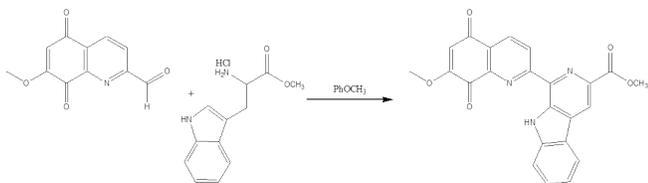
## Posters Presentations (Alphabetical by Primary Presenter)

### Poster #24

**Name:** Andrew Alexander  
**Sponsor:** Ann Taylor (Chemistry)  
**Title:** Synthesis of Lavendamycin Analogues

**Biography:** I am a chemistry major from Yorktown, Indiana. I have been interested in organic chemistry, especially with facets that can be related to medicine. The project of working on an anti-tumor agent with my chemistry knowledge really appealed to me.

**Abstract:** Lavendamycin was isolated in 1981 from the broth of *Streptomyces lavendulae*. These compounds were found to have a specificity and toxicity as an antitumor agent. Using the Pictet-Spengler condensation of a quinolinedione with tryptophan, the Lavendamycin analogue is formed. This research focuses on the synthesis of 7-methoxy or 7-ethoxy Lavendamycin analogues.



### Poster #1

**Name:** Romeo Amoa  
**Sponsor:** Neil Schmitzer-Torbert (Psychology)  
**Title:** Effect of Post-Training Cocaine on Habit Facilitation in Female Rats: Relationship to Estrous Cycle

**Biography:** I am a chemistry major from Indianapolis, Indiana. I have plans on becoming a surgeon for my career and I found that Dr. Schmitzer-Torbert offered an internship

working with — and doing surgery — on rats.

**Abstract:** Previous work has proven that whether the rats used a 'place' or 'response' navigation depends heavily on the estrous cycle. Studies have shown that rats which are treated with estrogen used a 'place' strategy more than those that were deprived from it and used a 'goal directed' much less than those without the hormones. The goal directed and habitual lever pressing showed a different pattern for the rats that pre-fed on pellets and those who pre-fed on sucrose. For the experiment a group of 12 rats was used to examine the role of the estrogen on cocaine facilitated habitual and goal directed behavior. All of the 12 rats were given vaginal smears on consecutive days over a period of four weeks. The classic stages of the rat oestrous cycle can be identified as oestrus (E), metoestrus (M), di-oestrus (D) and pro-oestrus (P). Rats were trained to press two levers, each rewarded with a different outcome, and trained in separate sessions. Rats received injections of either saline or cocaine (10 mg/kg) immediately after training. During lever press training rats received one of two rewards: sucrose solution or food pellets. After ample training the rats were given several sessions where they would receive a post training injection of either saline or cocaine. Overall, female rats showed habitual behavior for levers paired with post-training cocaine injection (similar to our previous work with male rats). The poster will also examine how this effect varied with the estrous cycle.

### Poster #3

**Name:** Steven Apostolidis  
**Sponsor:** Neil Schmitzer-Torbert (Psychology)  
**Title:** The Infralimbic Cortex is Required for the Facilitation of Habit Learning by Cocaine

**Biography:** I am a Spanish and psychology double major from Indianapolis, Indiana. I've been working on this research since the summer of my freshman year and have grown increasingly interested in neuroscience. Dr. Schmitzer-Torbert extended an internship offer to me and the spark for research took hold ever since.

**Abstract:** For the experiment a group of eight rats was used to examine the role of the infralimbic cortex on cocaine facilitated habit forming. Out of the eight rats, four of the rats were given lesions in the infralimbic cortex. The other four rats were used as sham rats for comparison. All of the rats were put on food restriction in order to achieve roughly 80% of their original body weight. After the desired weight was achieved the rats were given two magazine training sessions and three lever press training sessions. During lever press training rats received one of two rewards; sucrose solution or food pellets. After ample training the rats were given several sessions where they would receive a post training injection of either saline or cocaine. An extinction session was then performed to examine the effect of disabling the infralimbic cortex. The results showed that cocaine paired actions within the sham rats were performed habitually where as rats with lesions in the infralimbic cortex displayed goal oriented behavior. This suggests that the infralimbic cortex plays a role in determining whether an action is performed habitually or as a goal oriented behavior.

#### Poster #23

**Names:** Seth Bawel, Shane Evans  
**Sponsor:** Ann Taylor (Chemistry)  
**Title:** Expression of Plant Stress Genes Induced by Plant Extracts

**Biography:** Seth Bawel is a chemistry major from, Indianapolis, Indiana. "Last spring, I decided that I wanted to take part in undergraduate chemistry research. Wabash was kind enough to fulfill that desire for me. This particular research problem involving plants interested me because I would like to try for an internship position at Dow Agrosciences.

**Abstract:** By exposing plants directly to various herbal extracts, it is possible to see whether or not the extracts turn on known defense genes. We specifically tested for the presence of the PR-5 defense gene. Leaf segments were soaked in a solution of the herbal extract for a given amount of time. After exposure, mRNA was removed from the leaf sample. The mRNA was then converted into cDNA. PCR was used to amplify the DNA content of a known defense gene from the cDNA samples. Agarose gel electrophoresis was used to detect the presence of DNA corresponding to the defense gene. It was found that exposure to lemon balm, licorice root, panax ginseng, peppermint, spearmint, feverfew, stinging nettle, ginkgo,

and woodruff all induced the expression of the PR-5 defense gene in plant samples. Further research would include testing specific chemicals to see if they induce the PR-5 gene and also testing the samples themselves to see if salicylic acid is already present. This work was sponsored by the Haines Fund for the Study of Biochemistry at Wabash College.

#### Poster #13

**Names:** Tyler Buresh, Zachary Rohrbach, Jeff Soller  
**Sponsor:** Martin Madsen (Physics)  
**Title:** Brownian Motion in Optical Tweezers

**Biography:** Tyler Buresh is a junior physics major from Hamilton, Michigan. Zachary Rohrbach and Jeff Soller are junior physics majors from Indianapolis, Indiana. We became interested in this project because the idea of moving small objects with light seemed fascinating. Also, the fact that we can quantitatively model random motion seemed counter-intuitive and intriguing.

**Abstract:** Brownian motion is the apparently random evolution of an object's position due to collisions with the molecules of the media it is immersed in. All currently accepted mathematical models of Brownian motion determine that an object's average distance from its original starting point will change linearly over time. By using video tracking software to quantify Brownian motion of micron-sized polystyrene spheres, we observed motion in quantitative disagreement with this model. One possible source of this disagreement is that our video tracking has a significantly faster frame rate than previous experiments. We were also able to qualitatively limit the Brownian motion of the spheres by using a Helium-Neon laser to trap them, known as optical tweezers, which we hope to use in further experiments such as exploring the manipulation of proteins and DNA.

#### Poster #4

**Name:** Rob Dalhaus III  
**Sponsor:** Karen Gunther (Psychology)  
**Title:** Red/Green Color Naming Decline in the Periphery. Blue/Yellow Does Not. What Happens in Visual Search?

**Biography:** I am a psychology major from Saint Joseph, Illinois. This research is what I've been working on for my Senior Capstone Project. Since I am partially color blind, color vision research interests me quite. I am able to learn how people are able to see colors and how I differ from those with normal color vision.

**Abstract:** The ability to name red and green declines earlier in the periphery than the ability to name blue and

yellow (Hansen, Pracejus, & Gegenfurtner, 2009; Newton & Eskew, 2003). This is thought to be due to differences in retinal wiring. In the fovea, midget retinal ganglion cells receive a single L or M cone input to their central receptive fields and multiple, random, cone input to the surround, yielding chromatic opponency. In the periphery, however, midgets receive multiple cone central input, reducing chromatic opponency (Gunther & Dobkins, 2002; Mullen & Kingdom, 1996, 2002), and apparently also reducing subjects' ability to name red and green stimuli. The ability to name blue and yellow (unique blue and yellow or retinal/physiological violet and chartreuse), however, remains farther into the periphery. These colors are processed by the small bistratified cells, which receive S vs. L+M cone input throughout their entire receptive fields, without center/surround organization, across the entire retina. Thus, "blue"/"yellow" performance would not be predicted to vary with eccentricity. Here we test the effect of this red/green peripheral drop-off in a visual search task. We first mapped out color naming performance, and found that red/green performance declines sharply beginning around 40° eccentricity, whereas violet/chartreuse performance declines less sharply around 45-50°. In a feature visual search task (e.g., red target dot amongst green distractor dots; twelve, 2.5° diameter dots; 0, 20, and 45° eccentricity; 12 subjects), these differences in retinal wiring significantly impaired red/green visual search more than violet/chartreuse visual search at 45°.

#### Poster #21

**Name:** Austin Drake  
**Sponsor:** Walter Novak (Chemistry)  
**Title:** Structural and Kinetic Characterization of *Francisella tularensis* Acetate Kinase

**Biography:** I am a chemistry major from Fairbanks, Indiana. I gained interest in the project through applying to work last summer with Dr. Novak. It certainly has medicinal ties, which particularly peak my interest. Ultimately, I plan to look back upon this project with a great appreciation for the investigative process, especially that which leads to the development of medicines for my patients.

**Abstract:** *Francisella tularensis* is the bacteria responsible for tularemia, or rabbit fever. Weaponized strains of *F. tularensis* were developed in the 1940's, and although all stockpiles of these strains were presumably destroyed, the bacterium still has the potential to be converted into a bioweapon. In order to treat weaponized strains, new targets and new treatments must be developed. To this end, we have characterized the acetate kinase from *F. tularensis* both structurally and kinetically. The acetate kinase gene was subcloned into a pProEX-HTb expression vector, and was purified using a nickel-affinity column. The

structure of *F. tularensis* acetate kinase was determined to a resolution of 2.2 Å, and is similar to other known acetate and propionate kinases. The kinetic constants,  $k_{cat}$  and  $K_M$ , with acetate as the substrate were determined to be 363 s<sup>-1</sup> and 14 mM, respectively. While the kinetic constants,  $k_{cat}$  and  $K_M$ , with propionate as the substrate were determined to be 66 s<sup>-1</sup> and 75 mM, respectively. In addition, we utilized high-throughput virtual screening to identify potential inhibitors of the acetate kinase, and we have demonstrated that the acetate kinase is amenable to inhibitor screening using a thermal stability assay.

#### Poster #20

**Name:** Lucas Evans  
**Sponsor:** Scott Feller (Chemistry)  
**Title:** Nitrogen Containing Derivatives of (R)-12-Hydroxystearic Acid

**Biography:** I am a chemistry major from Urbandale, Iowa. This project was the result of my participation in a NSF Research Experience for Undergraduates at Georgetown University this past summer.

**Abstract:** (R)-12-hydroxystearic acid (HSA) is a naturally occurring low molecular-mass organic gelator. Low concentrations of LMOGs form self-assembled fibrillar networks in a variety of liquids. The purpose of this project was to investigate the gelation properties of two nitrogen containing derivatives of HSA—the hexylammonium salt (1) and octylammonium salt (2)—and to compare them with other derivatives prepared previously. The two salts were prepared via neutralization reactions of HSA with an ammine. The ionic salts (1) and (2) only gel CCl<sub>4</sub> and are relatively poor gelators when compared with HSA, HSA amide derivatives, and HSA amine derivatives. All three of these derivatives gel multiple liquids and have a much higher temporal stability and thermal stability than either (1) or (2). There is also a pronounced difference in the structure and extent to which the fibrillar network forms between the gels that were allowed to cool to R.T. slowly (very long branched fibers) and those that were rapidly brought to R.T. (Spherulitic with small pockets of fiber formation).

#### Poster #19

**Name:** Edward Evans  
**Sponsor:** Ann Taylor (Chemistry)  
**Title:** Effect of yhiM Expression on Antibiotic Resistance of *E. coli*

**Biography:** I am a chemistry and mathematics double major from Gulfport, Mississippi. I am considering medical field as a potential career path. This summer research project allowed me to learn how proteins can influence the

effectiveness of certain antibiotics in bacteria, which is very important in the manufacture of medicines.

**Abstract:** yhiM is an inner membrane protein from *E. coli* associated with reduced susceptibility to bacteriophage infection. It has also been suggested that it is involved in antibiotic resistance. This hypothesis was tested by examining the zones of clearing obtained by various antibiotics with *E. coli* that either contained transposon mutants of yhiM or overexpressed yhiM. No significant difference in antibiotic resistance was observed. This work was supported by the Haines Fund for the Study of Biochemistry at Wabash College.

#### Poster #5

**Name:** Patrick Garrett

**Sponsor:** Amanda Ingram (Biology)

**Title:** Utility of Plastid trnC-rpoB in resolving Phylogenetic Relationships in *Eragrostis*

**Biography:** I am a biology major from Crawfordsville, Indiana. I've shown an interest in biology for most of my life, catching snakes and turtles along the banks of Sugar Creek as a child. Recently my biological interests have shifted from an interest in animals to an interest in plants, due in part to the mentoring of Dr. Ingram.

**Abstract:** *Eragrostis* is a genus of 400+ species distributed worldwide, mainly in arid tropical and subtropical environments. Relationships among species of *Eragrostis* and between *Eragrostis* and other genera in its subfamily (Chlorodoideae) are not yet well understood, but previous phylogenetic analyses of DNA sequence data from nuclear and plastid genomes have provided some insights. The nuclear loci yield a well-resolved phylogeny, but the plastid loci do not resolve all relationships within *Eragrostis*. As a result more characters are needed to resolve these relationships within *Eragrostis*. Therefore this experiment tested the utility of the trnC-rpoB plastid locus in resolving the phylogenetic relationships among species within the genus *Eragrostis*. It was found that the trnC-rpoB data in conjunction with other plastid loci improved phylogenetic resolution. However, a large polytomy is still present in the plastid phylogeny, which shows that additional data is still needed in order to further resolve the plastid phylogeny. One likely hypothesis is that the large unresolved region in the phylogeny is the result of rapid evolution of the genus over a short period of time.

#### Poster #10

**Name:** Andrew Gilman

**Sponsor:** Rebecca Sparks-Thissen (Biology)

**Title:** Role of yhiM in T4 Bacteriophage Attachment and Growth in *E. coli*

**Biography:** I am a biology major from Farmersburg, Indiana. My interest in this project came from microbiology class and trying to understand how virus and bacteria work, how they interact, and to just gain a overall greater understanding to what is happening in this part of microbiology.

**Abstract:** Viruses are obligate intercellular parasites. An obligate intercellular parasite is an organism that cannot reproduce outside a host cell. We study bacteriophages which are viruses that infect bacteria, specifically the bacterium, *E. coli*. Our work and others has demonstrated that the bacteriophage's reproduction is entirely dependent on the structures of the bacteria. We undertook a genetic approach to identifying which bacterial structures were necessary for bacteriophage replication. We found one gene, yhiM, which is required for multiple different bacteriophages to replicate including T4 and T7. We showed that T7 could not efficiently attach or lyse yhiM deficient cells. We next wanted to know if yhiM had a similar function in T4 replication. To demonstrate that yhiM was necessary for T4 replication, we infected yhiM deficient cells and found no replication of T4 in the absence of yhiM. We next investigated whether T4 could attach normally to yhiM deficient cells. Attachment of T4 to yhiM deficient cells was significantly delayed in comparison to wild-type cells. To investigate whether T4 could replicate in yhiM deficient cells after attachment, we allowed the virus to attach to yhiM deficient cells for 30 minutes on ice and then shifted the infected cells to 37°C to allow the attached virus to enter and replicate. In contrast to our results with T7, we found that T4 could not replicate in yhiM deficient cells, even after prolonged attachment. This suggests that yhiM is responsible for efficient attachment of T4 to the cell surface and that yhiM controls a second step in replication post attachment.

#### Poster #11

**Name:** Jay Huenemann

**Sponsor:** Patrick Burton (Biology)

**Title:** Cell division is Not Required for Regeneration in *Nematostella vectensis*

**Biography:** I am biology major from Lafayette, Indiana. I became interested in this project while searching for internships for the summer following my junior year. I discussed with Dr. Burton the work that he was doing in his lab and felt that it was very interesting and would be a great system to work with.

**Abstract:** Organisms vary widely in their capacity for regeneration and development of new structures. Some animals are limited to wound healing while others can regenerate whole limb structures or body plans. The sea anemone *Nematostella vectensis* is capable of both wound

healing as well as more significant levels of regeneration, which includes replacing their entire oral and aboral structures. I investigated the cellular aspects of regeneration by testing whether cell division is required for regeneration. Using the chemicals AraC and Hydroxy Urea (HU), I have been able to reduce the number of dividing cells to nearly undetectable levels. The results from my long term treatments show that even with the inhibition of mitosis, *Nematostella* still retain some ability to regenerate their oral structures, albeit at a reduced speed. This indicates that there is likely some form of cell re-specification that is allowing these organisms to develop the new oral structures observed during regeneration. From this it is apparent that cell division is not required for the regeneration of oral structures in *Nematostella vectensis*.

#### Poster #25

**Name:** Nathan Line  
**Sponsor:** Lon Porter (Chemistry)  
**Title:** Microwave Functionalization of Hydride-Terminated Porous Silicon: Initial Steps Toward New Solid-Supported Catalysts

**Biography:** I am a chemistry major from Crawfordsville, Indiana. I am interested in attending graduate school in organic chemistry and this work provided more research experience.

**Abstract:** Previous work from Dr. Porter's research group yielded an efficient and highly-scalable reaction that produces alkyl-functionalized porous silicon (por-Si) by way of a multimode microwave reactor. This microwave-assisted hydrosilylation reaction provides stable monolayers in a fraction of the time required by traditional reflux methods and in greater yield than catalyst-mediated room temperature reactions. Our current work seeks to apply microwave functionalization methodologies to the anchoring of catalytic transition metal complexes onto hydride-terminated por-Si chips. This was carried out through the functionalization of 11-bromo-1-undecene followed by subsequent transformations to yield various surface-bound phosphine linkers capable of binding transition metal species to the porous silicon support. Each surface modification step was characterized by transmission-mode FT-IR. Currently, we are investigating the activity and recyclability of the supported catalyst. A palladium catalyzed [2+2+2]-cyclootrimerization microwave reaction of 2-butyne is our model system and characterization is accomplished using H-1 and C-13 NMR spectroscopy.

#### Poster #16

**Name:** Bihui Liu  
**Sponsor:** Brent Liu  
**Title:** A Data Grid for Preclinical Molecular Imaging Research Communities

**Biography:** I'm a math major from Harbin, China. I became interested in biomedical engineering, especially radiology because my aunt's illness. Last year, my aunt was diagnosed with brain cancer. However, she was not properly treated because of the lack of advanced imaging technology. Thus, I have determined to do research in the subject myself.

**Abstract:** The current data storage and sharing infrastructure in preclinical molecular imaging facilities are limited to comparatively primitive technologies due to the complexity of experimental objectives, multiple non-standardized file formats, multiple modalities, and multiple investigative users. The lack of study-centric database catalogues, and methods to upload files within its study context, has prevented existing archiving system in preclinical molecular imaging facilities to provide searchable context to its data resources. Furthermore, the lack of distributive data infrastructure and user-based interfaces for accessing data means preclinical imaging data is often lost or discarded upon completion of initial experimental findings. Today, sharing of preclinical imaging data among preclinical research communities is feasible using available web- and grid-technologies. The Molecular Imaging Data Grid consists of three main design components: a study-centric database schema for cataloging preclinical imaging files, a grid-based infrastructure for archiving and distributing preclinical molecular imaging datasets among multiple institutions, and a user-centric interface for staff and investigators to register, monitor, retrieve, and manage imaging datasets in the Molecular Imaging Data Grid. My main task during the summer was to develop a middleware to bridge the web user interface and the Data Grid backend.

#### Poster #17

**Names:** Mike Lu, Jordan Hoerr  
**Sponsor:** Walter Novak (Chemistry)  
**Title:** Expression and Purification of an Iron-Dependent Regulator Protein from *Thermobifida fusca*

**Biography:** Mike Lu is a chemistry and economics double major from Shanghai, China. Jordan Hoerr is a chemistry major from Peoria, Illinois. We both thought it would be fun and interesting to do research over the summer.

**Abstract:** Iron-dependent regulators are proteins found in a variety of pathogenic bacteria that cause diseases such

as tuberculosis and diphtheria, but few such regulators have been studied. The purpose of this research is to clone, express and purify an iron dependent regulator that is vital to the survival of *Thermobifida fusca*, the causative agent of farmer's lung. The target gene that expresses this regulator was inserted into a pET-28b expression plasmid both with and without 6x-His tags, which can help the protein purification process. These plasmids were then transformed into *E. coli* BL21 (DE3) cells to overexpress the protein. While the non-His-tagged protein failed to bind to a nickel column under several different conditions, the 6x-His-tagged protein could be purified using a nickel column, yielding approximately 35 mg per liter of culture. Subsequent purification using a size-exclusion column suggested the protein has a tendency to aggregate. Initial binding studies indicate the protein successfully binds the diphtheria and tuberculosis DNA consensus sequence.

#### Poster #18

**Name:** Mike Lu  
**Sponsor:** Scott Feller (Chemistry)  
**Title:** Retinal Methyl Rotation Behavior Produces Novel Insights into Rhodopsin Activation

**Biography:** I am a chemistry and economics double major from Shanghai, China. I started working on this project in my freshman summer and I have been doing it ever since. This project interests me because its ultimate goal is to accurately model the behavior of proteins on computers. Without having to spend months or even years trying to study a new protein, people can just calculate every property of the protein using a computer.

**Abstract:** We have accurately modeled methyl rotations in a series of model compounds that represent retinal, the bound ligand in rhodopsin responsible for the primary events in the vision process. Our focus is motivated by the essential role methyl groups play in rhodopsin activation, which in turn can provide invaluable insight into the function of G-protein coupled receptors. Using quantum mechanical calculations at the MP2 level of theory on a series of retinal fragment model compounds, dihedral scans were carried out on the retinal C5-, C9-, and C13-methyl groups to correctly identify their rotational behavior with respect to experimental 2H NMR data. Results show that intra-retinal steric interactions as well as electronic effects contribute to the unique behavior of retinal methyl rotations. Consequently, previous assumptions about methyl rotational behavior in molecular mechanics force fields do not uniformly apply to retinal methyls, a result with significant implications for the implementation of molecular dynamics simulations of rhodopsin.

#### Poster #6

**Name:** Lucian Lupinski  
**Sponsor:** Martin Madsen (Physics)  
**Title:** Ytterbium Experiments

**Biography:** I am a physics major from Zionsville, Indiana. I first became interested in the project during my summer internship after my sophomore year.

**Abstract:** We report on progress towards producing cold Ytterbium atoms in an undergraduate laboratory. We constructed a low-cost Zeeman slower designed to slow Yb atoms from 325 m/s to roughly 1 cm/s on the S0 to P1 atomic transition, accessible by a direct-diode laser at 398.8 nm. We propose using the spectrally-resolved spontaneous emission from a long-lived decay channel ( $\tau$  is roughly 1 $\mu$ s) to measure the Yb beam velocity.

#### Poster #9

**Name:** Tuan Nguyen  
**Sponsor:** Rebecca Sparks-Thissen (Biology)  
**Title:** yhiM is Required for Acid Resistance in *Escherichia coli*

**Biography:** I am a biology and chemistry double major from Hanoi, Vietnam. I am interested in this project because my favorite fields of study are biochemistry and microbiology.

**Abstract:** yhiM is a putative inner membrane protein that is required for bacteriophage infection. To determine the function of the yhiM protein in uninfected *Escherichia coli* (*E. coli*), we tested two independent yhiM mutants for tolerance to low pH (pH=5 and pH= 2.5). Both yhiM mutants grow normally at pH=7 but do not grow normally at pH5 or pH =2. We next tested how yhiM might be important in acid resistance. There are three documented acid resistance systems in *E.coli*. The first uses a glutamine-dependent antiporter to pump excess H<sup>+</sup> out of the cytoplasm. The second is dependent on an arginine-dependent proton pump. The third system is dependent on the expression of the glucose repressed sigma factor RpoS. The  $\Delta$ yhiM mutants were exposed to a low pH environment in minimal media in the presence or absence of glucose, arginine or glutamine to determine which acid resistance systems were absent in  $\Delta$ yhiM. The results show that yhiM plays a role in the RpoS and glutamine dependent acid resistance systems but no role in the arginine dependent acid resistance system.

#### Poster #15

**Name:** Zachary Rohrbach, Tyler Buresh, Jeff Soller  
**Sponsor:** Martin Madsen (Physics)  
**Title:** A Measurement of the Cosmic Ray Muon Flux Through Large-Area Scintillators

**Biography:** Zachary Rohrbach is a junior physics major from Indianapolis, Indiana, Tyler Buresh is a junior physics major from Hamilton, Michigan, and Jeff Soller is a junior physics major from Indianapolis, Indiana. Interest in this project stemmed from research completed in Advanced Lab. The detection of muons has increasing real world applications in national security, a topic that greatly excites all of the members on the project team. Completing research with possible applications is extremely rewarding.

**Abstract:** Understanding the characteristics of the cosmic ray muon flux is vital for its use in security and archaeological applications. Anomalies in the muon flux as detected by a large-area scintillator detection array are key to these applications. As a step toward developing a detector array, we utilized the neutron detector bars from the MoNA LISA project to measure the angular dependence of the cosmic ray muon flux. Our data are consistent with the accepted cosine-squared angular dependence.

#### Poster #2

**Name:** Xumin Sun  
**Sponsor:** Neil Schmitzer-Torbert (Psychology)  
**Title:** Effect of Direct Infusion of Cocaine into the Infralimbic Cortex on Habit Learning

**Biography:** I am a mathematics and psychology double major from Guiyang, China. Because my goal after Wabash is to enter a Ph.D. program in neuroscience, I was surprised when I heard there was a related summer internship with Prof. Schmitzer-Torbert, who is the sponsor of this project. I like research on how the brain works and how it can improve our daily life. So this opportunity offered me a great starting point on my track.

**Abstract:** Our recent studies showed that lesion to infralimbic cortex can disrupt habitual behaviors produced by post-training cocaine injection. Based on these results, our present study tested the effect of direct injection of cocaine into infralimbic cortex after training on an instrumental task. In the study, all of the four rats were given injection through a dual cannula direct into infralimbic cortex. All of the rats were put on food restriction in order to achieve roughly 80% of their original body weight. After the desired weight was achieved the rats were given both magazine and three lever press training sessions. During lever press training rats received either sucrose solution or food pellets as rewards. After ample training the rats were given several sessions where they would receive a post training cannula infusion of either saline (sham) or cocaine direct to infralimbic cortex. An extinction session was then performed to examine the effect of infusions. The results showed a trend for behaviors that were paired with cocaine infusions to be performed habitually, while behaviors paired with sham infusions

remained goal-directed. This suggests that the direct infusions of cocaine into the infralimbic cortex can produce habitual behavior.

#### Poster #14

**Name:** Yifei Sun  
**Sponsor:** Chad Westphal (Mathematics)  
**Title:** Multiscale Adaptively Weighted Least-Squares Finite Element Methods for Convection-Dominated Elliptic PDEs

**Biography:** I am a mathematics and physics double major from China. I am interested in Applied Math, which is the topic of my poster.

**Abstract:** We consider a weighted least-squares finite element approach to approximating convection-dominated elliptic partial differential equations, which are difficult to approximate numerically due to the formation of boundary layers. The new approach uses adaptive mesh refinement in conjunction with an iterative process that adaptively adjusts the least-squares functional norm. Numerical results show improved convergence of our strategy over the standard approach and a prior method. We also apply our strategy to approximating the Navier-Stokes equations.

#### Poster #26

**Name:** Yijun Tang  
**Sponsor:** G. E. Granroth (Oak Ridge Nat'l Laboratory)  
**Title:** Investigating the Hydrogen Potential in  $ZrH_2$

**Biography:** I am a physics major from Changshu, Jiangsu Province, China. This project was assigned to me during my off-campus study at the Oak Ridge National Laboratory.

**Abstract:** At low incident neutron energy ( $E_i$ ), the inelastic neutron scattering (INS) spectrum of H atoms in zirconium dihydride ( $ZrH_2$ ) can be modeled as a set of quantum harmonic oscillators. However, when neutrons with sufficient energy strike the sample, an H atom can overcome the trapping potential and recoils as a free particle. This study investigates the transition between the bound and unbound states of hydrogen in  $ZrH_2$ . We performed INS measurements on a 1.5-g powder  $ZrH_2$  sample at  $T=6$  K on SEQUOIA, a fine-resolution Fermi chopper spectrometer [1] located at the Spallation Neutron Source (SNS). Monte Carlo ray-tracing simulations of our experiment were conducted to distinguish sample effects from instrumental resolution effects. We found that the potential in  $ZrH_2$  does not have a single barrier height. The height of the lowest potential barrier occurred along the  $\langle 111 \rangle$  crystal direction, between 775 and 961 meV; the highest potential was found to be between 1523 and 1810 meV.

**Poster #12**

**Name:** Brandon Tritle  
**Sponsor:** Patrick Burton (Biology)  
**Title:** Muscle Regeneration in the Sea Anemone  
*Nematostella vectensis*

**Biography:** I am a biology major from Valparaiso, Indiana. I became interested in this line of research after learning about the excellent regenerative capabilities of Cnidarians.

**Abstract:** Few investigations have been made into the regeneration of specific cell types of *Nematostella vectensis*. By imaging the musculature of *Nematostella*, we can investigate the timing and mechanism of muscle cells and fiber regeneration. Given *Nematostella*'s contractile abilities, we predicted the muscles to exist in a grid of longitudinal and circumferential fibers in a grid-like fashion. Our results are consistent with this hypothesis. Furthermore, we identified a long time point at which the musculature of the animal is fully regenerated. Our results also identified an unexpectedly strong area of staining at the oral pole. We hypothesized that this musculature is involved in tentacle movement for prey capture. Surprisingly, regeneration of the musculature in this area occurs several days after living samples are capable of effective tentacle use.

**Poster #7**

**Names:** Brad Vest, Ben Foster, Logan Rice  
**Sponsor:** James Brown (Physics)  
**Title:** Adventures with MoNA/LISA

**Biography:** Brad Vest is a physics major from Nineveh, Indiana, Logan Rice is a physics major from Lafayette, Indiana, and Ben Foster is a physics major from Valparaiso, Indiana. This poster presents summer research with Dr. Brown on the Modular Neutron Array (MoNA).

**Abstract:** Brad Vest, Ben Foster, and Logan Rice worked together over the summer of 2010 to assemble particle detectors for future nuclear physics research examining very neutron-rich nuclei. The detectors are part of a multi-institutional project including many other undergraduate institutions. Each of the two-meter long scintillator bars received one photomultiplier tube (PMT) on each end. The students were assigned the task of assembling and testing the detectors, which included careful construction of the electronic bases for the PMTs, and attaching them to the scintillator bars. PMT detectors are light sensitive and designed to detect the very weak scintillation light from neutrons striking the plastic, therefore each assembled detector was checked to be light tight. Other tests were performed on each of the 16 detectors including gain matching and measuring the attenuation length of the light signals in each bar. The 16 detector bars will be taken to

the National Superconducting Cyclotron Laboratory at Michigan State in the winter of 2011 to make the Large multi-Institutional Scintillator Array (LISA) to supplement the current Modular Neutron Array. The project was funded by the National Science Foundation under grant DUE-0922446. The MoNA collaboration includes students and faculty from from Augustana College, Central Michigan University, Concordia College, Florida State University, Gettysburg College, Hope College, Indiana University at South Bend, Michigan State University, Ohio Wesleyan University, Rhodes College, Wabash College, Western Michigan University, and Westmont College.

**Poster #8**

**Name:** Tianren Wang  
**Sponsor:** Eleanor Sayre (Physics)  
**Title:** Maximum Likelihood Estimation (MLE) of Students' Understanding of Vector Subtraction

**Biography:** I am a mathematics and economics major from Shandong Province, China. I am interested in this project because first it involves some basic ideas about math and statistics, and I can apply my knowledge in real cases. I can use different types of methods to analyze the data, resulting the perfect outcomes. The second reason is that I am still a student, so researching in students' performance in academic study will help me to improve my daily study.

**Abstract:** In this project, we focus on the impact that slight changes in question format have on student response to one-dimensional vector subtraction tasks. Approximately 1,500 students from Ohio State University participated in our project. Students in this study are enrolled in a traditional, calculus-based, large, introductory physics sequence for engineers covering Mechanics and E&M. We use Maximum Likelihood Estimation (MLE) analysis to analyze students' responses on six very similar questions, which vary in context, vector alignment, and operation. Responses on all questions are generally correct and do not vary by instructional week or even by course. From the positions and heights of the peaks in the graph of binomial likelihood, it indicates the values of the probabilities, and differences among them. The overlapping areas of the curves represent the scale of differences among the probabilities. Context and specific operation do not show significant differences. Vector alignment is significantly different, indicating that perception is a bigger cause of failure than conceptual deficit.

**Poster #22**

**Name:** Shengshuang Zhu  
**Sponsor:** Scott Feller (Chemistry)  
**Title:** The pKa of Retinal Depends on the Conformation of the  $\beta$ -Ionone Ring

**Biography:** I am a math and chemistry double major from Sichuan, China. I got interested in this project because it takes advantage of a high-performance computer to simulate chemistry reactions, which are hard to conduct in the laboratory. In this way, we can conduct research more efficiently and effectively. In addition, I feel pretty excited to see the knowledge I gain from the lectures can be applied to research.

**Abstract:** While much attention has been placed on how methyl substituent groups, charge distribution, and protein environment influence the loss of the proton from the Schiff base in retinal during the phototransduction process, the influence of the conformation of  $\beta$ -ionone ring has not been explored. We examine the effect of  $\beta$ -ionone ring conformation, defined by the value of the C6-C7 torsion, on the retinal phototransduction process, specifically how

the ring conformation influences the pKa value. We have carried out quantum chemical calculations, including a detailed examination of the effect of different basis sets and the inclusion of correlation, to predict the pKa as a function of the C6-C7 torsion angle. The results of the calculations suggest that the pKa value shifts around 2 units as the C6-C7 dihedral changes with the minimum pKa value arising from nonplanar conformations. Our high level MP2 quantum mechanical results also reveal very different torsional potential energy surfaces for the protonated and deprotonated forms of retinal, an observation with important implications for empirical force fields employed in molecular simulations of rhodopsin. We compare the torsional barrier from quantum mechanics calculations with CHARMM surface calculations, and we reparameterized the force field to agree with our highly accurate quantum mechanics results.

### Exhibitions (Alphabetical by Primary Presenter)

#### Exhibit #3

**Names:** Adam Auter, Chris Beedie  
**Sponsor:** Jane Hardy (Modern Languages)  
**Title:** Thinking Outside the Tire

**Biography:** Adam Auter is a Spanish major from Granger, Indiana and Chris Beedie is a Spanish and religion double major from Western Springs, Illinois. We were both made aware of this project via email while we were studying abroad in Spain. Because we had already developed a fascination with immersing ourselves in other cultures, we made sure to take advantage of this opportunity.

**Abstract:** During the summer of 2010 we worked with a non-profit organization, *El Ingenio*, which is based in Chiapas, Mexico. The mission of *El Ingenio* is to provide local individuals with meaningful educational experiences outside the classroom that incorporate a liberal arts curriculum. The topic of our particular workshop was sustainability, namely, sustainable building techniques. Our exhibit will highlight the specific techniques that we not only researched and presented but also physically implemented in conjunction with workshop participants. We will also discuss our experiences from a “large picture” perspective during which we will explain what we learned about the value of a liberal arts education as well as the reality of our capability to implement these same techniques in a variety of contexts. This project was made possible by a grant we received from the Dill Fund.

#### Exhibit #1

**Names:** Jarod Brock, Pat West, Garrett Sell, DJ Young, and Ryker Stalbaum  
**Sponsor:** Jacob Rundall (Music)  
**Title:** Music 221: Electronic Music Compositions

**Biography:** Jarod Brock is a music major from Noblesville, Indiana, Pat West is a history major from Brownsburg, Indiana, Garrett Sell is a music major from Woodburn, Indiana, D.J. Young is a music major from Chino Hills, California, and Ryker Stalbaum is a music major from Hebron, Indiana.

**Abstract:** This is for the Electronic Music class that was offered this semester, Music 221, to showcase their original compositions that were assigned as part of class work. There were five students who were assigned to complete three compositions each over the course of the semester. This totals 15 different songs that were created.

#### Exhibit #4

**Name:** Patrick Garrett  
**Sponsor:** Paul Myhre (The Wabash Center)  
**Title:** The Shawnee Environmental Ethic: Insights into the Religion and Ceremonial Practices of an Eastern Woodlands Native American Tribe

**Biography:** I am a biology major from Crawfordsville, Indiana. As a biology major with a religion minor I often question how the two disciplines interact with each other. In this case the environment is closely linked to my interests in biology and the ethics and religion of the Shawnee are extremely interesting. There is virtually no

scholarly work done on the environmental ethics of eastern woodland tribes. As a result I really wanted to explore the topic and see where it took me.

**Abstract:** Shawnee environmental ethics are rooted in tribal ceremonial practices that value balance, harmony, and respect in all arenas of life. Their ethics are directly associated with their historic tribal lands in Pennsylvania, West Virginia, Kentucky, Ohio, Indiana, and Illinois along the Ohio river and its tributaries. This paper provides an exploration of Shawnee environmental ethics through ritual practice, environmental observation, Shawnee stories, and an analysis of their history and cultural practices through examination of primary and secondary resources. I will explain how the Shawnee environmental ethic has survived to present day even through intense geographic dislocation from their historic homelands due to the pressure of warring tribes and the influence of white settlers. I will also explain how the environmental ethic has allowed them to preserve the most important aspects of their culture and how it has also allowed them to maintain their identity as a tribe in face of extraordinary circumstances.

#### **Exhibit #2**

**Name:** Matthew Levendoski  
**Sponsor:** Douglas Calisch (Art)  
**Title:** My Physical and Spiritual Existence

**Biography:** I am a studio art major from Michigan City, Indiana. This past summer I was a part of a missions trip that worked with inner city youth in Los Angeles. While there the staff challenged us to grow in our sense of spirituality. They described this sense as an intimate relationship that took a real intense effort and dedication. Consequently I have tried to struggle my sense of spirituality and Christianity. In doing so I have found that at times I am distracted from and obstinate about having a real desire to pursue greater sense of faith and spirituality. These feelings and constant struggles have become the basis of my work in this series.

**Abstract:** An ongoing theme in my creative work is the exploration of how to symbolically represent the relationship between the spiritual and carnal worlds. My desire to understand this connection is inspired by my faith and practice of Christianity. The pieces in this series are reflections of my own personal experiences of living out my faith while struggling within a human existence. Each one is a depiction of the various stages I have undergone. At times the two sides form a beautiful and intimate coexistence and at others they are locked in intense conflict to overpower each other. I chose to use steel and plaster because of the associations and concepts that we link with them. Steel is generally considered extremely dense and strong where as plaster is soft and fragile. These opposing

natures solidify the ongoing strain that has been a part of my spiritual journey and the many ups and downs I have experienced along the way. For the “Celebration” I will have a series of four pieces dealing with this sentiment, which I will be prepared to discuss with the viewers.

#### **Exhibit #4**

**Name:** Tian Tian  
**Sponsor:** Alexandra Hoerl (Political Science)  
**Title:** Democratized Fashion

**Biography:** I am an art major from Shenyang, China. Throughout my college education at Wabash, I have been realizing and embracing the core value of liberal arts. Throughout my academic life, multiple internships, and study abroad experiences, I have been dedicated to the goal of combining artistic skills, international culture with business perspective. Thanks to the great advice from alumnus Fred Wilson, I started to learn about multiple aspects of the fashion industry. The more I learn about this industry, the more I believe this is the greatest field for me to optimize my versatility.

**Abstract:** Coco Chanel, Ralph Lauren, Donna Karan, Tom Ford... these legendary names make us think of the world of fashion. These designers not only produced iconic work, but also democratized fashion. While fashion could be easily categorized as a commodity, it also played multi-faceted roles in defining and distinguishing social classes, as well as explaining the coexistence of individualism and standardization. In my research I examine two aspects of democratized fashion. First, I analyzed its status as a commodity, deriving from the apparel industry and mirroring the majority of social movements. Second, I examine fashion as a democratic cultural phenomenon that defined social identity. Furthermore, I focused on three case studies of democratized fashion: the couture work of Coco Chanel; the “seven easy pieces” of Donna Karan reflecting New York street culture; and the preppy style that dominated college campuses in the United States in the 1980s.

