

Student Research Symposium

May 4, 2012



LUTHER COLLEGE

To the Luther Community:

Welcome to the annual Student Research Symposium at Luther College. Here you will find revealed—in oral presentations, posters, and artistic performance—the life of discovery, reflection, and creation that Luther students pursue under the inspired and skillful guidance of our faculty.

The day begins with a plenary session for all to share, and this year we have chosen two outstanding student projects to be presented to the community as the “keynote” addresses: a joint project by students in a Luther course on God and Gender, inspired by a campus visit by Pulitzer Prize-winning journalist Nicholas Kristof, highlighting the need for greater attention globally to the education of women and girls; and a presentation on the stuff at the “bottom” of the universe—the strange and mysterious world of quarks—and international collaborative efforts to unravel the mysteries, by Luther senior Dallas Wulf.

The keynote session is followed by a chapel talk by Dr. Timothy Peter of our music department, and then multiple sessions of talks, posters, and performances by many of the top students at Luther in majors across the college. Session topics and descriptions of each presentation are included in this program. In addition to these sessions, please see also the separate brochure that lists sessions featuring the top research papers from Paideia I, our common first-year course.

Interspersed through the day will be performances of jazz, choral singing, and musical interludes during conversational and poster sessions. In the evening will be a performance from year's opera workshop, Mozart's *Così fan tutte*, and an original production from the theatre/dance department, *The Secret in the Wings*. Lastly, an innovative “sound garden” on the campus commons will follow the opera performance, for a reflective end to a fulfilling day.

We are delighted that you have joined us today to see and celebrate the fruits of our students' labors this academic year.

Sincerely,

A handwritten signature in black ink that reads "Kevin Kraus". The signature is written in a cursive style with a large, sweeping initial "K".

Kevin Kraus
Dean of the College

STUDENT RESEARCH SYMPOSIUM

SESSION I: 9:00–10:00 A.M.

OPENING EVENT: CELEBRATION AND KEYNOTE ADDRESSES

Center for Faith and Life Main Hall

“One Girl: Creating Educational Opportunities in Sub-Saharan Africa,” Delaney McMullen ’14, Sarah Nolte ’14,
Tanya Maas ’14, Seth Rumage ’13, Anna Looft ’12

“Life at the Bottom,” Dallas Wulf ’12

COMMUNITY GATHERING 10:00–10:30 A.M.

INTERLUDE AND REFRESHMENTS

Center for Faith and Life Lobby

Chamber music

CHAPEL: 10:30–10:50 A.M.

Center for Faith and Life Main Hall

Speaker: Timothy Peter, professor of music

Cathedral Choir: Sandra Peter, conductor

SESSION II: 11:00A.M.–NOON

<i>Center for Faith and Life recital hall</i>	<i>Dahl Centennial Union, Mott-Borlaug</i>	<i>Dahl Centennial Union, Peace Dining Room</i>	<i>Valders 206</i>	<i>Valders 245</i>	<i>Valders 262</i>	
Fairy Tales, the Supernatural, and the Infinite	The Number Games	Tackling Environmental Challenges	I-Impact Now	Nursing: When Things Go Wrong (I)	Classics, Theories, and Classic Theories	

COMMUNITY LUNCH: NOON–1:00 P.M.

Bentdahl Commons, Central Campus

SESSION III: 1:15–2:15 P.M.

<i>Center for Faith and Life recital hall</i>	<i>Dahl Centennial Union, Mott-Borlaug</i>	<i>Dahl Centennial Union, Gallery</i>	<i>Dahl Centennial Union, Peace Dining Room</i>	<i>Valders 206</i>	<i>Valders 262</i>	
Gender and Literature	Understanding Environments Past and Present	Mosaics of Light	Drugs, Fraud, and Genomes	One Girl: The Power of Education	Global Leadership: Women and Media	

SESSION IV: 2:30–3:45 P.M.

Poster Session in Sampson Hoffland Laboratories Carlson Atrium/Valders Hall of Science concourse (with refreshments and musical interlude)

SESSION V: 4:00–5:00 P.M.

<i>Center for Faith and Life recital hall</i>	<i>Dahl Centennial Union, Mott-Borlaug</i>	<i>Dahl Centennial Union, Peace Dining Room</i>	<i>Valders 206</i>	<i>Valders 245</i>	<i>Valders 262</i>	
French Connections	From Quarks to Stars	Media and Ethics	Buying and Selling the Body	Nursing: When Things Go Wrong (II)	Encouraging Youth	

EVENING EVENTS: 7:30 P.M.

Opera Workshop Performance: *Così fan tutte* (Center for Faith and Life Main Hall)

Theatre Performance: *The Secret in the Wings* (Center for the Arts, Jewel Theatre)

Evening Sound Garden: Bentdahl Commons, after the opera performance

DAY-AT-A-GLANCE

	Valders 362	<i>Preus Library, Hovde Lounge</i>	<i>Jenson-Noble, Noble Recital Hall</i>	<i>Center for the Arts, Studio II Hall</i>	Olin 102	Olin classrooms
	Sex and Chainsaws	Interfaith Identities		Dance Dance Revolutions	Art and Expression	Paideia I Research (see separate brochure)
	Valders 362	<i>Preus Library, Hovde Lounge</i>	<i>Jenson-Noble, Noble Recital Hall</i>	<i>Center for the Arts, Studio II Hall</i>	Olin 102	Olin classrooms
	Contemporary Africa: Social Challenges	Sex Trafficking and Civil Rights	The Sounds of Music		Language and (A)literacy	Paideia I Research (see separate brochure)
	Valders 362	<i>Preus Library, Hovde Lounge</i>	<i>Jenson-Noble, Noble Recital Hall</i>	<i>Center for the Arts, Studio II Hall</i>	Olin 102	Olin classrooms
	European Minorities: Integration and Resistance	Death and Dignity		Telling Stories: Dance and Multimedia	Art Across the Ages	Paideia I Research (see separate brochure)

SYMPOSIUM SCHEDULE

9:00–10:00 A.M.
SESSION I

Center for Faith and Life Main Hall
Opening Event: Celebration and Keynote Addresses

One Girl: Creating Educational Opportunities in Sub-Saharan Africa:
Delaney McMullen, Sarah Nolte, Tanya Maas, Seth Rumage, Anna Looft

Life at the Bottom: Dallas Wulf
Jazz Band (Tom Bourcier, director)

10:00–10:30 A.M.

Center for Faith and Life Lobby
Community Gathering
Chamber music and refreshments

10:30–10:50 A.M.

Center for Faith and Life Main Hall
Chapel
Timothy Peter, professor of music
Cathedral Choir (Sandra Peter, conductor)

11:00 A.M.–NOON
SESSION II

Center for Faith and Life Recital Hall
Fairy Tales, the Supernatural, and the Infinite
Faculty Moderator: Amy Weldon

Allison Croat
Fairy Tales: A New Understanding of Reality

Hannah Lund
“The Journey”: A Supernatural Historical Tale

Jill Hughes
Infinite Connections

Dahl Centennial Union, Mott-Borlaug
The Number Games
Faculty Moderator: Erin Flater

Shane Wilson
Two-Sex Deer Population Dynamics with Effects from Seasonal Harvesting

Nick Devine
The Nursing Major Game: The Changing Game Theory of Luther College Nursing Majors

Andrew Gonzalez
Why Grandpa Loves Me Best: An Evolutionary Investigation of the Role Perceived Resemblance Plays in Grandparent Investment to Grandchildren

Dahl Centennial Union, Peace
Tackling Environmental Challenges
Faculty Moderator: Gwen Strand

Inga Rohde
Adapting the California School Garden Model to Iowa Schools and Standards

Hailey Punke
Using Local Food as a Lens into Ethical Eating

Kristi Holmberg
Seeking Common Ground for the Common Good: Eco-Justice as a Bridge for Interfaith Engagement

Valders 206
I-Impact Now
Faculty Moderator: Ann Highum

Abhra Biswas, Kristin Westby, Luke Hanson
Pipe Dreams to Pipe Reality: How Luther Students Brought Irrigation and Sustenance Farming to Awassa, Ethiopia

Valders 245
Nursing: When Things Go Wrong (I)
Faculty Moderator: Angela Kueny

Emily Tinjum, Hannah Han, Michanda Hoffman, James Swanson, Britta Pederson, Jess Mallams, Allan Sweet
Nursing and Leadership Response to Sentinel Events

Valders 262

Classics, Theories, and Classic Theories

Faculty Moderator: *Matthew Simpson*

Joseph Thor

Sovereignty and the Supernatural:
An Exploration of Divination and Political
Power in 1st Century B.C. Rome

Anna Looft

Augustine and Gender: Theoretical
Constructs versus Personal Relationships

Ben Gardner

Kierkegaard's Theory of Consciousness

Valders 362

Sex and Chainsaws

Faculty Moderator: *Maryna Bazylevych*

Sonja Thompson

Where Does One Draw the Line When
Doing Participant Observation? Participant
Observation as Anthropological Method

Aaron Rosell

Chainsaw Ethnography

Peter Graffy

The Effect of Masculinity on Sexual Health
Practices among College-Age Students
in the United States

Preus Library, Hovde Lounge

Interfaith Identities

Faculty Moderator: *Robert Shedinger*

Caitlyn Anderson

Status Confessionis: Examining Effectiveness
in Christian Resistance Movements Against
Systematic State Abuse

Jenna Yeakle

Faith Convictions and Environmental
Commitment: An Interfaith Dialogue

Jennifer Winder

Women in Transition: The Effect
of Immigration on Religion

Center for the Arts, Studio II

Dance Dance Revolutions

Faculty Moderator: *Jane Hawley*

Amanda Moran

Body of Stories: Expressing Lived Experience
through Storytelling and Movement

Michael Moran

Movement Fundamentals in Film

Matthew Imhoff

Historical Understandings for Contemporary
Audiences: Scenic Design in *Spring*
Awakening: A New Musical

Olin 102

Art and Expression

Faculty Moderator: *Holly Moore*

Cassandra Bormann

Entartete Kunst: Degenerating Authenticity

Kelsey Simpkins

The End of the World: A Personal
Exploration of Conceptual
and Environmental Art

Di Yin

Conceptual Art in Photography: Expression
of Time and Change, Evidence in Chinese
Contemporary Art with Global Influences

Olin Classrooms

Paideia I Research (see separate brochure)

NOON–1:00 P.M.

Bentdahl Commons, central campus

Community Lunch

1:15–2:15 P.M.

SESSION III

Center for Faith and Life Recital Hall

Gender and Literature

Faculty Moderator: *Kate Narveson*

Abby Nance

Kingly Boys, Subservient Girls: Gendered
Hierarchies in Harry Potter and Narnia

Jaci Wilkinson

The Voice of Fanny Butcher: A New view
of Chicago's Literary History through the lens
of the Newberry Library's Butcher Papers

Danielle Koch

Second Eden: A Novel

Dahl Centennial Union, Mott-Borlaug

Understanding Environments Past and Present

Faculty Moderator: *Beth Lynch*

James Marty

Late-Holocene Lake-level Changes in
the Northwestern Wisconsin Sand Plain:
Examining Local Climate Variability Using
Plant Macrofossil Analysis

Jacob Wittman, Andrew Weckwerth

Exploring the Dry Run Creek Watershed:
Molecules, Microbes, and Macroinvertebrates

Dahl Centennial Union, Gallery

Mosaics of Light

Faculty Moderator: Ben Moore

Molly Tulkki

Mosaics of Light

Dahl Centennial Union, Peace

Drugs, Fraud, and Genomes

Faculty Moderator: James Howatt

Ryan Fett

Money and Greed: The American Ethical Dilemma

Margaret Darling

Legislative Impact on Pharmaceutical Advertising Practices and Consumer Attitudes in the United States and Peru

Mallory Heinzeroth

The Business Ethics of Scientific Research: A Comparative Analysis of Funding for In Vitro Fertilization and the Human Genome Project

Valders 206

One Girl: The Power of Education

Faculty Moderator: Kristin Swanson

Delaney McMullan, Sarah Nolte, Tanya

Maas, Seth Rumage, Anna Looft

One Girl: Creating Educational Opportunities in Sub-Saharan Africa

Valders 262

Global Leadership: Women and Media

Faculty Moderator: Laurie Iudin-Nelson

Anne Proescholdt, Mikaela Belland,

Ashley Matthys

How Prominent Women Use Media to Effect Socially Sustainable Change

Valders 362

Contemporary Africa: Social Challenges

Faculty Moderator: Don Jones

Thato Masire

A Plan to Contribute and Advance the Provision of Tertiary Education in Botswana

Hans Dosland

Aid Dependence in Sub-Saharan Africa—The Dangers It Poses and Its Limitations on Continued Development

Kathryn Goodroad

Complexity of War: Child Soldiers Created by the Lord's Resistance Army and World Reaction

Preus Library, Hovde Lounge

Sex Trafficking and Civil Rights

Faculty Moderator: Ginger Meyette

Jonathan Grieder

A Civil Rights Presidency: Harry S Truman in the White House

Antonia Lliteras Espinosa

Understanding Sex Trafficking: Prevention from the Treetops to the Grassroots

Siri Lokensgard

Policy Changes Targeted at Combating the Sex Trafficking Industry: A Historical Analysis

Jenson-Noble Recital Hall

The Sounds of Music

Faculty Moderator: Michael O'Brien

Benjamin Kost

The Singer's Formant: A Pedagogical Investigation

Kristina Nienhaus

St. John Nepomucene: Music in the Making

Phuc Phan

Transcribing and Arranging Music: Process and Product

Olin 102

Language and (A)literacy

Faculty Moderator: Laurie Zaring

Lauren Bentrott

The Crisis of Aliteracy in the Schools

Erin McWilliams

Effects of Bibliotherapy on Adjustment of First-Year College Students

Jessica Sawdy

Eliminating Transfer Errors: The Role of Metalinguistic Awareness in Third Language Acquisition

Olin Classrooms

Paideia I Research (see separate brochure)

2:30–3:45 P.M.

SESSION IV

Sampson Hoffland Laboratories Carlson

Atrium/Valders Hall of Science Concourse

Poster Session

(with refreshments and chamber music)

Faculty moderator: Kirk Larsen

Michelle Boursier
Synthesis of Matrix Metalloprotease
Chemical Probes to Profile Enzyme Activity

Hannah Bygd
Oxygen Barrier Properties of Thiol-Ene
Networks Containing Halloysite Nanotubes

Jensen Connor
Natural Areas Burn History of Luther
College: GIS Application

**James Flanary, Katrina Okerstrom,
Kendra Smallwood, Carolyn Wheeler**
Caching Task Assessing Future Planning
in Clark's Nutcrackers

Valarie Fyfe, Andrew Knight
Detecting Trace Amounts of Environmental
Pollutants via Fluorescence Spectroscopy

Peter Kraus
Follow-up Study of Daily and Monthly
Patterns of Summer Aquatic and Terrestrial
Insect Drift in a Northeast Iowa Trout Stream
after Stream Bank Reconstruction and
Tallgrass Prairie Establishment

Emily Lynn
The Single Category Implicit Association
Test as a Measure of Gendering Mental
Illness

Emily Lynn, Quinn Meyer
Tool Use in Blue Jays

Nikki McDermond-Spies
A Comparison of the Impact of Fire
and Mowing in Simple and Diverse
Prairie Plantings in Anderson Prairie

Michael Noltner
Event Importance of the Elite Ironman
Triathlon

Eleanor Schuman
Music Psychology: Why Music Makes Us
Feel Good

**Jacob Seibert, Nicholas Andresen,
Margaret Michenfelder, Mitchel Obey,
Katherine Perschbacher**
Investigation of Internal mRNA Methylation
as a Potential Regulatory Mechanism
in Gene Expression

Hannah Shatzer
An "Island of Brilliance": Absolute Pitch
in Musical Savants

Stefan Snyder, Patrick Hussey
Pulmonary Shunting in a Rat Model

Emma Spoon
Effect of the Highway 52 Roadside Prairie
Planting on Plant and Insect Communities

Shane Steele
Plant Communities in Northeast Iowa
Hanging Bogs

Scott Sundstrom
Using Charity/Government Aid to Help
Finance Youth Tennis Programs in Both
France and the United States

**Laura Swanson, Melene Thompson, Erin
Voelschow**
Calcium-regulated Gene Expression in *Vibrio
parahaemolyticus*

Georgianna Whiteley, Rachel Hodapp
The Preservation and Application
of Medicinal Plant Knowledge Among
the Maasai in Tanzania

**Additional poster displays presented by
students from the following classes:**

**Biology 112: Insects, Humans, and the
Environment**

Biology 354: Evolutionary Biology

Chemistry 490: Senior Research

Nursing 473: Community-Centered Care

Physics 282: Modern Physics II

Physics 312: Advanced Laboratory II

**4:00–5:00 P.M.
SESSION V**

Center for Faith and Life, Recital Hall

French Connections

Faculty Moderator: Anne-Marine Feat

Emma Lofthus
Socio-political Implications in Victor Hugo's
Le roi s'amuse and Giuseppe Verdi's *Rigoletto*

Lauren Meintsma
Theatricality, Sexuality, and the
Representation of Women's Identity

Jens Erickson
The Politics of Recycling:
Policy and Education in France

Dahl Centennial Union, Mott-Borlaug
From Quarks to Stars

Faculty Moderator: Jeff Wilkerson

Donald Lee-Brown

The Amplitude Distribution of Pulsating Stars in the Field of Open Cluster M23

Dallas Wulf

Searching for Radiative Transitions in $h_b(nP)$ Bottomonium States

Alexander Greiner

Recycling Solid-Phase Peptide Synthesis Resin in the Context of PAR2 Antagonists

Dahl Centennial Union, Peace

Media and Ethics

Faculty Moderator: David Thompson

Ross Frei

Facebook Organizational Crisis Communications: The Use of Facebook by British Petroleum Following the Deepwater Horizon Oil Disaster

Mikaela Belland

Cyber Bullying: The Use of Media to Bully Students in High School

Daniel Bruins

Using Graphic Narratives to Challenge Commercial Dog Breeding Operations

Valders 206

Buying and Selling the Body

Faculty Moderator: Michael Engelhardt

Antonia Lliteras Espinosa, Danielle Koch, Allison Croat, Hannah Lund, Tonya Tienter

Buying and Selling the Body Through Words

Valders 245

Nursing: When Things Go Wrong (II)

Faculty Moderator: Janna Edrington

Leah Ehret, Christina Eminger, Carly Erickson, Emily Roth, Lindsay Ryan, Kali Sharot, Alaina Stegehuis, Heather Viste
Nursing and Leadership Response to Sentinel Events

Valders 262

Encouraging Youth

Faculty Moderator: Stephanie Travers

Ethan Schultz

Encouraging the Next Generation: A High School Leadership Curriculum

Lindsey Weaver

Examination of Leadership and Athletics' Role in Authentic Leadership Development among Female Youth

Ashley Matthys

The "Forgotten Mourners": Sense-making in Sibling Survivors of Suicide

Valders 362

European Minorities: Integration and Resistance

Faculty Moderator: Todd Green

Alicia Vermeer

Irish Resistance to Secularization

Aaron Hoffland

The Saami Influence in Fennoscandia

Kayla Norman

Europe's Failure to Integrate: The Revolt of Second-Generation Muslim Immigrants

Preus Library, Hovde Lounge

Death and Dignity

Faculty Moderator: Sean Burke

Laurie Medford

Unfit and Incapacitated: Aging and Medical Illness among Union Civil War Veterans of Company "C," Eighth Wisconsin Volunteers

Melanie Kirk

Analysis of Oregon's Death with Dignity Act: A Moral Conundrum

Sarah Czechowicz

Death, Duty and Dignity: A Christian Perspective on Physician-Assisted Death

Center for the Arts, Studio II

Telling Stories: Dance and Multimedia

Faculty Moderator: Lisa Lantz

Joshua Dale

Setting the Movement: A Choreographer's Choice with Rhythm

Calli Micale

What the Soul Ate

Andrea Oldfield

"The Linguist": Storytelling, Science Fiction, and the Theatre

Olin 102

Art Across the Ages

Faculty Moderator: Kate Elliott

Katrina Houmes

The Essence of Beauty through Imogen
Cunningham's Eyes

Chelsea Lynch

Laocoon: A Comparison of the Quintessence
of Hellenistic Sculpture and El Greco's
Apotheosis of Toledan History

Jason Schmidt

Portraits and Perceptions: The Art
of Vincent van Gogh

Olin Classrooms

Paideia I Research (see separate brochure)

7:30 P.M.

OPERA PERFORMANCE

Center for Faith and Life, Main Hall

Così fan tutte

7:30 P.M.

THEATRE PERFORMANCE

Center for the Arts, Jewell Theatre

The Secret in the Wings

EVENING SOUND GARDEN

*Bentdahl Commons, after the opera
performance*

(abstract submitted by Jacob DeBacher)

PARTICIPANTS AND ABSTRACTS

Arranged alphabetically by student last name, and for presentations involving more than one student, arranged by lead student's last name (alphabetically within presentation)

CAITLYN ANDERSON '14

Status Confessionis: Examining Effectiveness in Christian Resistance Movements Against Systematic State Abuse

In historical situations of extreme racial adversity and systematic abuse at the hands of the state in which they live, there are nearly always resistant groups who achieve varying levels of success. Groups who benefit or are untouched by the persecution are less likely to mount significant resistance. However, such a role has been filled at times by people within church bodies. Resistance comes in various forms, ranging from individuals to ecumenical organizations. One major form resistance takes is *Status Confessionis*, the confession of a stance in the face of an issue threatening the integrity of the gospel with the intent of leaving the church body or excluding others who refuse to confess. But, what does it take for these acts of resistance to make an impact on the state? Through a comparison of the church struggles in Nazi Germany and Apartheid South Africa, I will outline the conditions and actions that ended in the dissipation of the German Confessing Church and the relative success of the World Association of Reformed Churches in South Africa. Based on thorough examination of primary sources and ecumenical documents, I will argue that South African success was possible because those declaring Apartheid a heresy did not have to fear for their lives like Germans in the Confessing Church and the South African *status confessionis* was fully supported by an international, ecumenical organization.

Faculty sponsor: James Martin-Schramm

MIKAELA BELLAND '12

Cyber Bullying: The Use of Media to Bully Students in High School

This honors senior project in the communication studies department examines the use of Facebook as a medium for bullying online by high school students. Fifteen high school students were interviewed about their online habits. Research was also conducted about current studies done in the communication field (and other fields) about cyber bullying. The results of both the interviews and the research have answered questions such as

how is disclosure affected by cyber bullying, what is the relationship between bullying and cyber bullying, and how are different modes of online communication used for cyber bullying. Finally, this project examines the importance of studying cyber bullying, especially in the communication field, and suggests steps to take for further research.

Faculty sponsor: Kimberly Powell

LAUREN BENTROTT '12

The Crisis of Aliteracy in the Schools

In schools across the nation, children think of reading as homework. They don't like to read; they think it is boring; they only read because it is assigned. With this attitude toward reading, America has reached a state of reading crisis: aliteracy. Students are capable of reading but are simply uninterested and choose not to read. How do we get children to read for pleasure? This presentation discusses results of research I conducted while student teaching in a fourth grade, urban classroom. The qualitative study was conducted with a group of 25 fourth-grade students ranging in reading abilities and interests. Interview data was collected on reading habits and then analyzed by students' interests and reading abilities. An action plan was formed and surveys were collected after the intervention. Recommendations based on this research point out methods that work toward increasing reading as a choice activity for children.

Faculty sponsor: Barbara Bohach

ABHRA BISWAS '13, LUKE HANSON '13, KRISTIN WESTBY '12

Pipe Dreams to Pipe Reality: How Luther Students Brought Irrigation and Sustenance Farming to Awassa, Ethiopia

In September of 2010, I-ImpactNow hatched as a simple student organization dreaming a simple dream to fight famine in Africa. Today, the Luther student organization is a legal incorporation and has completed two irrigation-based farming cooperatives in Ethiopia allowing farmers to grow spinach, tomato, and onion crops for the welfare of their family and

strengthening of their community. Through campus fund-raising, awareness campaigns, and networking—all following the bedrock principles of collaboration, self-empowerment, innovation, and sustainability—I-ImpactNow has brought sustenance to more than 150 farmers across the world from Decorah, Iowa. Our presentation will focus on how we started as an organization, our growth into a legally recognized incorporation, and the many challenges and steps of building a cooperative in a developing country.

Faculty sponsor: Jon Lund

CASSANDRA BORMANN '12

Entartete Kunst: Degenerating Authenticity

Cultural identity, authenticity, and the employment of tradition often trouble the world of art. This paper will discuss my recent exhibition, *Entartete Kunst: Degenerating Authenticity*, which was a response to research I conducted on the concepts of authenticity and tradition in contemporary Native American art. As the project progressed, I began to think about how the concepts I was examining applied to my own identity as a German American artist. If the society at large expects cultural imagery from one culture's art, why not expect it from every other culture? I began my own search for the cultural identity with which I was not yet familiar. The resulting work exhibits a longing for an understanding of a past that I do not belong to, but given my ancestry, maybe should. This project began with research into other artists' conflicted dialogue of cultural identity and has resulted in a personal quest to confront my own cultural identity as a German American artist.

Faculty sponsor: Kate Elliott

MICHELLE BOURSIER '12

Synthesis of Matrix Metalloprotease Chemical Probes to Profile Enzyme Activity

Activity-based protein profiling (ABPP) is a way to learn about the function of different proteins in a living system. Small molecules with an unnatural "tag" group are made that attach to these proteins, and the tag allows for protein detection, isolation, and identification. The goal of this study was to create four "probe" molecules for ABPP to help understand matrix metalloproteases, a large class of proteins that are involved in a number of cell functions. Although the final probes have yet to be produced, the precursors were successfully synthesized and the synthetic route has thus far been successful.

Overall yields for many of the synthetic steps were fairly low, but the projected amount of each probe produced will be enough to perform future biological analyses. This research is important because matrix metalloprotease proteins appear in greater quantity in cancer cells than regular cells. These new small molecules thus may be beneficial to cancer research and could potentially be used for cancer screenings and imaging.

Faculty sponsor: John Hedstrom

DANIEL BRUINS '14

Using Graphic Narratives to Challenge Commercial Dog Breeding Operations

Two questions have guided my research on graphic narratives this semester: How can these narratives effectively address social issues? How do they convey information about human and animal exploitation differently (and perhaps more effectively) than traditional print and visual media? I look at the work of graphic artist and scholar Scott McCloud, graphic narrative specialist Roger Sabin, and comic book icon Will Eisner to examine the theoretical issues relevant to using graphic narratives as venues for social change. Moreover, in conjunction with the Humane Society of Northeast Iowa, I am creating a narrative about commercial dog breeding operations that depicts the negative effects on the health and well-being of animals originating in these facilities and on the lives of people who buy them. It will function as a case study for my reflections on how graphic narratives can be used as a form of social advocacy. In my presentation, I will discuss these reflections, describe the techniques of graphic narrative design, and delineate the production of a comic page from conceptualization to finished product.

Faculty sponsor: Scott Hurley

HANNAH BYGD '12

Oxygen Barrier Properties of Thiol-Ene Networks Containing Halloysite Nanotubes

The objective of this work was to make thin, plastic-like materials that only allow a minimum amount of gas (oxygen) through. This was done using thiol and ene monomers in combination with Halloysite nanotubes. A thiol is an organic compound that consists of a carbon-bonded sulfhydryl group, and an ene is that which contains a carbon-carbon double bond. Form each polymer matrix, a thiol monomer, trimethylolpropane tris(3-mercaptopropionate) (3T) or ethylene bis(3-mercaptopropionate)

(GDMP), was used with the ene monomer, 1,3,5-triallyl-1,3,5-triazinane-2,4,6-trione (TTT). Halloysite nanotubes, which are naturally occurring clay particles, were then dispersed within these matrices at 1, 2, 3, 4, and 5 wt%. Even dispersion and desired composition were achieved in all materials. Gas barrier properties were measured using a Mocon OX-TRAN 2/21. Water vapor barrier properties, glass transition temperatures, material composition, and nanotube dispersion were also examined for each film. It was found that both gas and water vapor permeability were lower in the materials containing nanotubes than those without. These results show potential for the use of the resulting materials in food packaging for things such as pop bottles or chip bags.

Faculty sponsor: Carolyn Mottley

JENSEN CONNOR '12

Using GIS to Map the Natural Areas Burn History of Luther College

Geographic Information Systems (GIS) are powerful tools and can be implemented in many ways to answer questions or represent data. Using the GIS program ARCMAP, burn reports of Luther College natural areas over the past ten years were entered with the goal of creating a user-friendly comprehensive campus map that visually displays the burn history of various campus natural areas, primarily tallgrass prairies. This visual representation will aid land use managers in planning of natural areas management. In addition to implementing the map into a GIS environment, it is useful to convert these to Web-based mapping services for making these records accessible to the public through websites. Google Maps API will be used to present these data online.

Faculty sponsor: Kirk Larsen

ALLISON CROAT '12

Fairy Tales: A New Understanding of Reality

This is a selection of stories from my senior honors project. I've spent the past year writing original fairy tales, all of which are based in reality. Writing fairy tales allows me to render a deeper understanding of truth than reality alone can sometimes permit. Through fantastical elements, I am able to more fully express difficulties and struggles that humanity faces, and I can wrestle more deeply with complexities of life. Situations become heightened and psychological and relational realities appear that I could never have

envisioned if the stories had been set fully in our known reality. It took a lot of mental effort to allow these fantastic elements to enter into my writing, yet they have become my most valuable tool, offering me a deeper understanding of my own reality. I will read an excerpt from my project and discuss some of the challenges and rewards of writing this collection.

Faculty sponsor: Amy Weldon

SARAH CZECHOWICZ '12

Death, Duty and Dignity: A Christian Perspective on Physician-Assisted Death

Suicide has been a controversial issue for centuries, and consequently the history of suicide within the church and larger society has been dynamic. Recently, physician-assisted suicide has been hotly debated in states and within religious communities. While physicians have quietly helped some of their patients die for decades, Jack Kevoorkian brought physician-assisted death into the open in dramatic ways in the 1990s. By 1997 the state of Oregon had legalized certain forms of physician-assisted suicide, and ten years later the state of Washington did likewise. My research uses a case study approach to delve deeper into physician-assisted suicide. The case I focus on is titled "Death, Duty, and Dignity" and was published recently in *Christian Ethics: A Case Method Approach*, 4th ed. (Orbis Books, 2012). To work through the case and arrive at a normative conclusion, I draw upon various philosophers and theologians who address the topics of suicide, the meaning of suffering, appeals to rights, and various slippery slope arguments. In the end, I take an ethical position on whether other states should offer physician-assisted death as a legal (and moral) option for suffering individuals.

Faculty sponsor: James Martin-Schramm

JOSHUA DALE '13

Setting the Movement: A Choreographer's Choice with Rhythm

My research is based on the questions: How do choreographers use rhythm in the choreographic process, and how can rhythm affect the aesthetic of the dance being made? I am currently developing a technique of mapping time in space. The use of imagery, along with a constant beat marking time, allows the choreographer to play within a three-dimensional grid. Individuals apply the technique in various ways to discover how rhythm and timing can affect the aesthetic of their choreography, and to make rhythm more of

a choreographic choice. The grid, and its use as an approach to choreography, will be communicated through a dance presentation. I will speak about the technique and process, and physically articulate the concepts through moving bodies in space.

Faculty sponsor: Amanda Hamp

MARGARET DARLING '12
Legislative Impact on Pharmaceutical Advertising Practices and Consumer Attitudes in the United States and Peru

This project assesses the impact of advertising regulations in Peru and the United States, tracing the effects of legislation to advertising practices and ultimately to the perspectives of the public. Through juxtaposing the regulations and practices in the United States and Peru, this project highlights the varying degrees to which each government has placed limitations on pharmaceutical advertising and how each level of governmental restriction has directly affected the advertising market. Through legal analysis of health advertising regulations in each country, as well as international standards and recommendations, this paper argues that Peru maintains regulations that are closer to the World Health Organization's recommendations, while the United States has adopted a more open approach, permitting advertisements of strong prescription medicines that are prohibited in all but two countries in the world. Regarding the presence of advertising, observational surveys of Peruvian and American pharmaceutical advertisements demonstrated that the United States has a more saturated pharmaceutical advertising market than Peru, due to, among other things, smaller potential company profit, stronger historical ties to medicinal remedies, and stronger regulation of advertising. Finally, through interviews with Peruvians and Americans, this paper contends that the forms of regulations in each country have impacted public perception of pharmaceutical drugs.

Faculty sponsor: Rebecca Bowman

JACOB DEBACHER '13
Evening Sound Garden

We experience music in a variety of social situations. Sometimes we sit in a concert hall or auditorium, and live musicians perform for us from a stage. At other times, we listen, solitarily, to recorded music through a portable audio device. The notion of a sound installation, or

sound sculpture, brings together these and other strands of musical experience, as we are invited to move around a space in which sound-making sources have been intentionally placed. Following their experience with the theater/dance piece *Invited to Tea*, which premiered in March, students enrolled in Brooke Joyce and Steve Smith's electro-acoustic music course will create a "sound garden" following the performance of *Così fan tutte* on Friday evening. As opera-goers leave the Center for the Faith and Life and walk through the Bentdahl Commons, they will hear a variety of sounds, coming from multiple sound sources, that encourage lingering, exploring, and listening. Unlike *Invited to Tea*, in which audience members followed a pre-determined path through the performance space, the sound garden is completely open-ended, with no particular beginning or ending.

Faculty sponsor: Brooke Joyce

NICK DEVINE '12
The Nursing Major Game: The Changing Game Theory of Luther College Nursing Majors

Game theory suggests that individuals competing in a zero-sum game will act one way but individuals in a maximum game will act a different way. The nursing program at Luther provides a unique opportunity to test this theory because nursing majors spend a semester competing with the people around them for a finite number of positions (a zero-sum game). The "game" becomes more cooperative, however, after students are accepted into the program. I have conducted interviews with students and study partners in the nursing program to see how they approached their first-semester classes (specifically the common course anatomy) and how those relationships changed and evolved. Thus far I have found that student behavior is roughly consistent with the theory. Students competing to get into the program acted in ways they thought would maximize their chances for eventual success. After being admitted to the program, they all commented that they felt as though they had become a family, and "realized that it was detrimental to compete with the family."

Faculty sponsor: Steve Holland

HANS DOSLAND '14

**Aid Dependence in Sub-Saharan Africa—
The Dangers It Poses and Its Limitations on
Continued Development**

Over the past 60 years, at least \$1 trillion of development-related aid has been transferred to Africa. Yet, Sub-Saharan Africa is still a region blighted by famine, sickness, and lack of safe drinking water. Sub-Saharan Africa has reached the point in which the continued provision of aid appears to be making no significant contribution to the achievement of self-sustaining development. By relying on foreign educational aid, Sub-Saharan African countries limit their overall potential to grow. Aid is also a valuable commodity that can cause an increase in political unrest by making control of the government a more valuable prize. Furthermore, with high levels of aid, recipient governments are most accountable primarily to foreign donors rather than to taxpayers. If Africa wishes to continue to develop, foreign aid will have to be dramatically reduced over time, forcing countries to adopt more transparent strategies to finance development. This presentation will discuss the negative effects that foreign aid has upon those who receive it. It also will seek to provide an explanation as to how today's world credit crisis may offer Sub-Saharan Africa a unique opportunity to overhaul its development strategy away from the aid-based model and move more aggressively towards market-driven interventions.

Faculty sponsor: Paul Gardner

LEAH EHRET '12, CHRISTINA EMINGER '12,
CARLY ERICKSON '12, LINDSAY RYAN '12,
EMILY ROTH '12, KALI SHAROT '12, ALAINA
STEGEHUIS '12, HEATHER VISTE '12

**Nursing and Leadership Response
to Sentinel Events**

The Joint Commission, a non-profit organization responsible for the accreditation of hospitals and other medical care facilities, defines a sentinel event as “an unexpected event involving death or serious physical or psychological injury, or the risk thereof.” The event is called a sentinel event because it is so significant that it warrants immediate investigation and response. In the health care setting, nurses are often considered the last line of defense against medication errors and patient safety concerns. In many facilities, nurses are involved in root cause analysis and in the creation of policy or product that helps prevent a recurrence of the sentinel event. This presentation dramatizes a real-life error, safety

concern, or other sentinel event affecting the health and well-being of a patient or patients. Students will show how this incident is discovered and the process nursing and facility leadership go through to determine the root cause and to implement system-wide changes to ensure patient safety in the future. The challenge in this case: In many patient care settings, physicians and other providers give medical orders verbally, in person or over the phone. Like the old game “telephone,” this can lead to communication errors that may have serious or disastrous consequences for the patient.

Faculty sponsor: Janna Edrington

JENS ERICKSON '12

**The Politics of Recycling: Policy
and Education in France**

This past January Term, I performed research on the waste and recycling program of a rural community in Brittany, France. The county council provides yellow recycling bags (*sacs jaunes*) to local households to facilitate sorting, as well as comprehensive education to community members. However, there seems to be a lack of cooperation from the general population, which makes the processing of recycled goods more expensive for taxpayers and led elected officials of the county council to question the effectiveness of the *Sacs Jaunes* program. Current research on recycling shows that participation in recycling programs varies based on geographical area. As children in the United States, many of us are taught that recycling is simply the right thing to do. We eventually learn about such things as our shrinking supply of non-renewable resources, the Western world's habit of overconsumption, and the state of our ever-filling landfills. The educational component of the *Sacs Jaunes* program seems based on a similar assumption. However, research shows that French recycling behaviors are motivated by different reasons, such as financial incentive. In this paper, I will present my findings on whether or not the current program and policies are effectively matching local behaviors.

Faculty sponsor: Anne-Marine Feat

RYAN FETT '12

**Money and Greed: The American Ethical
Dilemma**

At the turn of the 21st century, Americans witnessed one of the largest outbreaks of corporate fraud ever recorded. Enron, WorldCom, and

Tyco are but a few of the large companies that were found guilty of misleading investors and employees and in the process tarnishing the reputation of corporate America. The financial crisis of 2008 is one of the many lasting effects of these scandals. To combat corporate fraud, ethics have become a prominent fixture in the business classroom. This paper explores the relationship of corporate fraud and the people who perpetrate such scandals. Is it possible for educational institutions and the government to prevent such things from occurring in the future? Through the analysis of several cases of corporate fraud in America as well as institutional and government-required ethics training, it can be seen that such scandals are an unpreventable consequence of the culture in which we live.

Faculty sponsor: Ramona Nelson

JAMES FLANARY '13, KATRINA OKERSTROM '13, KENDRA SMALLWOOD '12, CAROLYN WHEELER '12

Caching Task Assessing Future Planning in Clark's Nutcrackers

Past experimental research has suggested that the ability to plan for the future without regard to one's current motivational state is shared among humans and few other primates. The behaviors most animals engage in that help them in the future are attributed to instinctual behaviors or learning mechanisms instead of foresight. Raby et al. (2007) recently demonstrated that this ability to plan for the future using foresight is found in Western scrub jays. We replicated this experiment with Clark's nutcrackers, another species in the corvid family, but they didn't show the same planning ability that the scrub jays did. This suggests that the Nutcrackers aren't able to cognitively plan ahead in situations outside of their typical seasonal caching in the wild. They have a rather exceptional memory capacity that allows them to recall the locations of many seed caches, but seem to lack the capacity to use this information to plan accordingly for the future. Therefore, planning and memory appear to be unrelated abilities in these birds and may be in other animals as well.

Faculty sponsor: Kristy Gould

ROSS FREI '12

Facebook Organizational Crisis Communications: The Use of Facebook by British Petroleum Following the Deepwater Horizon Oil Disaster

Organizations must create crisis communications plans to respond properly to unforeseen events. With the advent of social networking, specifically Facebook, crisis communications is a rapidly evolving field. The author's work in the Office of Web Communications at the Environmental Protection Agency in Spring 2011 provided the foundation for understanding how organizations are leveraging social networking platforms for crisis communications. The Japan nuclear disaster provided the author with insight regarding the use of Facebook as a communication tool during a crisis. Based on a review of the literature, this paper demonstrates how British Petroleum unsuccessfully implemented Facebook as a means to communicate following the *Deepwater Horizon* oil disaster, and outlines the implications for future use of Facebook as a crisis communications tool.

Faculty sponsor: Tim Schweizer

VALARIE FYFE '12, ANDREW KNIGHT '12

Detecting Trace Amounts of Environmental Pollutants via Fluorescence Spectroscopy

With increasing awareness of the effects of environmental water pollutants, chemicals such as polychlorinated biphenyls (PCBs) and furans and methods for their detection are a growing concern for environmentalists. These molecules are very stable, fat-soluble carcinogens, allowing them to persist in and damage both the environment and human bodies. To detect these pollutants in the environment, methods for the detection of trace amounts of these molecules are required. This study aims to establish several fluorescence techniques that allow for this and to determine the detection limits for the pollutants in water. A variety of furans, PCBs, and photophysical molecules as probes, as well as β - and γ -cyclodextrin as hosts were used. Homogeneous fluorescence, Stern-Volmer quenching, and fluorescence binding studies were performed on the pollutants, and the characteristics of the guest-host relationship between the hosts and probes were studied. Other experiments, such as Beer's Law studies, were used to establish the detection limits of the probes by absorbance. Xylene and naphthalene are known photophysical compounds and were used to confirm that the pollutants were fluorescing while

bound in the cyclodextrin cavity. Dibenzofuran-4-carboxaldehyde, dibenzofuran-4-carboxylic acid, and PCB 77 bound most successfully to the β -cyclodextrin cavity, most likely due to their compatible sizes.

Faculty sponsor: Olga Rinco

BEN GARDNER '12

Kierkegaard's Theory of Consciousness

As it now stands in Kierkegaard studies, very little scholarly ink has been spilt over his theory of consciousness. This lack of attention is odd considering that Kierkegaard's most important psychological work, *The Sickness unto Death*, posits consciousness as a necessary condition of the self. As Anti-Climacus, the pseudonymous author of *The Sickness unto Death*, notes, "Generally speaking, consciousness—that is, self-consciousness—is decisive with regard to the self. The more consciousness, the more self; the more consciousness, the more will; the more will, the more self." Kierkegaard's theory of selfhood is perhaps his greatest legacy, both for its profound influence on twentieth-century philosophy and theology, and for its succinct encapsulation of his religious and philosophical thought. This paper argues that a thorough understanding of Kierkegaard's ontology of the self can only be understood in light of his theory of consciousness. Specifically, this essay argues that, according to Kierkegaard, consciousness is a necessary condition of conceptually structuring and ordering the self within time and before God.

Faculty sponsor: Matt Simpson

ANDREW GONZALEZ '12

Why Grandpa Loves Me Best: An Evolutionary Investigation of the Role Perceived Resemblance Plays in Grandparent Investment to Grandchildren

According to evolutionary psychology, we have been shaped by evolution to possess behaviors that have been selected for over the course of human existence. One interesting question involves how and why we behave altruistically, helping someone else even when it harms oneself, and in particular, concerning altruistic investment to our fellow kin. Kin Selection theory suggests that when a father invests in his children, it is important that the child biologically belong to him in order to not waste his resources on a child who does not share his genes. This is a problem known as cuckoldry, when a father unknowingly raises a child that is not his own.

This study extends the problem of cuckoldry to the grandparents, investigating whether psychological mechanisms exist to prevent grandparent investments in grandchildren (shown to be important for grandchild fitness) from going to non-kin. We propose the perception of resemblance made by the grandparent to the grandchild as a mediating factor for their investment to grandchildren. Our results found that grandparents do differentially invest in their grandchildren corresponding to degree of paternity certainty, and suggest that the investment of the paternal grandfather is correlated with perceived resemblance, an exciting discovery adding to our understanding of investment behavior in general.

Faculty sponsor: David Bishop

KATHRYN GOODROAD '12

Complexity of War: Child Soldiers Created by the Lord's Resistance Army and World Reaction

The Lord's Resistance Army (LRA) is responsible for the longest running armed conflict in Africa. Having started in Uganda and then moved toward central Africa, the LRA is known for terrorizing civilians and abducting children to replenish its unpopular army. Under the leadership of Joseph Kony, the LRA is responsible for the abduction of 14,000 children in Sudan and Uganda along with the displacement of about 1.5 million people. Joseph Kony is the face of the LRA, and is one of the most dangerous war criminals in the world because of his unethical military tactics. But demonizing one man cannot explain the 20-year running conflict between the LRA and the Ugandan Government. Throughout the war, the true victims have been the civilians, and especially the abducted children. The LRA has been abducting children and brainwashing them into attacking their own people. The Ugandan government has been unable to protect its civilians. Every attempt to stop Joseph Kony has led to a more violent LRA counterattack. This paper focuses on those who have been abducted, the LRA methodology in transforming children into soldiers, and how Ugandan and international intervention has affected the Ugandan and Sudanese civilians.

Faculty sponsor: Victoria Christman

PETER GRAFFY '12

The Effect of Masculinity on Sexual Health Practices among College-Age Students in the United States

My study investigates the realm of masculinity and its effect on our health system, specifically contraception. The purpose of this investigation is to examine the range of effects which masculinity produces in our society by way of shaping American sexual health practices. I conducted my fieldwork research in the environment veritably deemed the most sexual and “genderized”—a college campus. The college is located in a small Midwest town of 8,000, where most of my research occurred outside a downtown bar, Roscoe’s. I distributed contraception in the form of condoms to gauge the responses of my peers when it came to sexual health. Based on my analysis, I argue that masculinity has a significant impact through the social power it wields over the American system of sexual health.

Faculty sponsor: Jane Hawley

ALEXANDER GREINER '14

Recycling Solid-Phase Peptide Synthesis Resin in the Context of PAR2 Antagonists

Medical applications of scientific research have come to the forefront of inquiry in the past decades. Whether it be genetics, proteomics, novel imaging methods, or creation of new drugs, many resources have been devoted to advance these fields. One of these fields is Solid-Phase Peptide Synthesis (SPPS), a novel method of creating long-chains of proteins (peptides), developed by Robert Bruce Merrifield, Ph.D. Peptides serve many important biological roles, including acting as signaling molecules and as pharmaceuticals. However, production of peptides can total in excess of thousands of dollars. This has prompted industrial-scale companies to develop methods to effectively recycle and reuse their resin. Many routes have been discovered and are utilized today. Created using SPPS, peptides named Protease-Activated Receptor 2 (PAR2) are of current interest due to their ability to alleviate pain. These PAR2 peptides act as a blocking mechanism, preventing a cell from being acted upon by stimuli that would normally result in pain. Successful recycling of the resin used to create PAR2 antagonists has not been well documented in scientific literature. This study involved devising a simple set of reactions to recycle the resin. These reactions were tested for effectiveness, cost, and amount of materials used. Preliminary results were promising, but not

conclusive. Discussion includes consideration of factors affecting the feasibility of recycling resins used to create PAR2 antagonists.

Faculty sponsor: Jodi Enos-Berlage

JONATHAN GRIEDER '12

A Civil Rights Presidency: Harry S Truman in the White House

Through an examination of federal documents, personal memoirs, and scholarly essays and books, this paper argues that President Harry S Truman helped effect serious civil rights gains for African Americans, from desegregating the armed forces to establishing a presidential commission on civil rights. Truman’s presidency witnessed many events both foreign and domestic that changed the world, including use of the first nuclear weapons, the emergence of the United States as a superpower, and a booming postwar economy. Unlike President Roosevelt, who utilized African Americans for electoral gain without offering much in return, Truman worked to keep African Americans within his electoral coalition while helping them make important gains in civil rights. While some scholars argue that Truman enacted civil rights initiatives based on the world’s view of the United States and to meet U.S. foreign policy needs, this study finds that Truman made civil rights decisions based on domestic political consideration as well as a change in personal attitudes, and that their utility in fostering a better image of the United States in the realm of foreign policy was not an overriding concern. This study opens up the potential for a more in-depth exploration of the role of presidents in the civil rights movement before 1960 and reexamination of the accepted history of the civil rights movement.

Faculty sponsor: Keona Ervin

MALLORY HEINZEROTH '12

The Business Ethics of Scientific Research: A Comparative Analysis of Funding for In Vitro Fertilization and the Human Genome Project

Over the span of 13 years, 1990-2003, some of the greatest scientific minds developed the first human genome, a magnificent outcome that allowed, for the first time, the human genome to be compared to the genomes of other mammals and organisms. Used to search for and discover the “disease” genes, the developed human genome is now essential to further research and development for treatments and screenings in the medical profession. An astonishing number

of ethical questions have arisen regarding the entire field of genetics as a result of mass amounts of medical information produced by the Human Genome Project. In this research, I compare and contrast the ethical dilemmas of two major scientific advancements of the past four decades from a business perspective: in vitro fertilization, and the Human Genome Project. There are broad-spectrum ethical concerns for any project of this sort, and each project calls for unique responses. In the commercialization and privatization of research development in the medical world, we find an entirely new set of challenges in the Human Genome Project than in in vitro fertilization. These scientific endeavors require individualized business approaches to ethical questions in each research advancement.

Faculty sponsor: Ramona Nelson

AARON HOFFLAND '12

The Saami Influence in Fennoscandia

Within the borders of Finland, Norway, Russia, and Sweden lives a group of indigenous people known as the Saami. Because they predate the modern borders of the nations that developed around them, this group has been forced to fuse its traditional lifestyle with that of the encompassing host nations. As a result, it has been a struggle to keep up some traditions as the Saami try to keep afloat in these northern regions and as they face a continuous battle to protect their lands from intruding industries. Although the Saami underwent some initial cultural assimilation as a result of this process, they have rebounded to become one of the strongest groups of indigenous people in the world. Best known for their traditional lifestyle as reindeer herders, these people have also been gaining popularity and rights after decades of struggling to keep their language and culture alive. They have achieved this through self-determination, connectivity, and luck. Through their experiences, they have come to serve as a good example for other indigenous groups to follow.

Faculty sponsor: Victoria Christman

KRISTI HOLMBERG '12

Seeking Common Ground for the Common Good: Eco-Justice as a Bridge for Interfaith Engagement

How can eco-justice be a bridge for interfaith engagement? How can diverse groups of people collaborate for social change? Climate change is a global problem with social, economic, and

environmental dimensions. As sea levels rise, storm cells intensify, and droughts worsen due to the earth's increasing temperature, climate instability will have a disproportionate impact on the world's most vulnerable people: the poor, women, children, and people of color. This social justice aspect of climate change creates an impetus for many religious and philosophical traditions to weigh into the environmental justice movement. Yet the possibility for dialogical democracy or social change in the United States is limited by a polarized political landscape and a pervasive economic system. This paper explores what role religion plays in politics in the United States in response to climate change. It observes the current economic and political barriers that religions face in responding to climate change, considers the complexity of religious identity in our pluralist society, and seeks to construct bridges for collective action through mutually transformative interfaith engagement.

Faculty sponsor: Wanda Deifelt

KATRINA HOUMES '12

The Essence of Beauty through Imogen Cunningham's Eyes

In her more than 70-year career, Imogen Cunningham worked under a variety of photographic styles, ranging from turn-of-the-century Pictorialism to the f64 movement of the 1930s. Throughout her career she was particularly drawn to portraits, and wrote that during a portrait shoot, "One must be able to gain an understanding at short notice and close range of the beauties of character, intellect, and spirit so as to draw out the best qualities and make them show in the outer aspect of the sitter." This paper will examine how, regardless of what style she worked in, Cunningham tried to find the internal beauty and essence of each of her subjects, whether it be a portrait of a person or a still-life photograph of a flower. She did this by focusing on each subject's true character and spirit, and trying to make these qualities visible in the negative.

Faculty sponsor: Kate Elliott

JILL HUGHES '12

Infinite Connections

This project is a look at the nature of the self and the universe using the mediums of creative writing, dance, and photography. To illustrate the notion that a part reveals the whole, or that the macrocosm may be found in the microcosm, I

have chosen 20 elements present in both the self and the universe. My presentation will describe my research process and the final performance, as well as explore several of the 20 elements in greater detail.

Faculty sponsor: Mark Muggli

MATTHEW IMHOFF '12

Historical Understandings for Contemporary Audiences: Scenic Design in *Spring Awakening*: A New Musical

Frank Wedekind's 1890 German play, *Frühlings Erwachen* (*Spring's Awakening*), is the source material for the 2006 Broadway musical by Steven Sater and Duncan Sheik. This discussion explores and identifies some of the primary differences between the contemporary treatment and the source material as well as the intermutual thematic objectives. In addition, it contextualizes Emma Goldman's 1914 literary and social theatrical deconstruction as a primary source, following Max Reinhardt's 1906 Berlin premiere of Wedekind's play. Through a comprehensive exploration of the historical foundations and critical response that surround the expressionist work, this analysis will synthesize how Wedekind's text, Goldman's critiques, and Sater's (modern) book and lyrics each informed the scenic design for Luther College's 2011 premiere of the musical while integrating the weighted influences of Karl Walsler's original design for Reinhardt's production, Christine Jones' Broadway design, and the collaborative process with the Luther production staff. It will also present a retrospective of the design process from initial responses, discussions, and early sketches through the final product while underscoring the importance of written, historical, and visual research in theatrical design.

Faculty sponsor: Jeffrey Dintaman

MELANIE KIRK '12

Analysis of Oregon's Death with Dignity Act: A Moral Conundrum

Oregon's Death with Dignity Act, passed in 1997, is a well-rounded and important legislative policy for the terminally ill patients in Oregon. It provides terminally ill patients who have been residents of Oregon for at least three years and who have six months or less to live the option of ending their own life via a prescription for a lethal dose of medication from their health care provider. This analysis uses medical, ethical, and law journals to research the history of this policy,

and explores the strengths and weaknesses of this policy. It explores what changes need to be made to improve the policy, and the potential national application of this policy in addition to the Death with Dignity Act itself. Is the policy as written moral, and could it be enacted nationally? This presentation will suggest that it is ethical to give individuals the option of ending their lives in a dignified way with safeguards in place, and will argue for providing this option to all people no matter their residency.

Faculty sponsor: Ginger Meyette

DANIELLE KOCH '12

***Second Eden*: A Novel**

This presentation is comprised of readings from my senior honors creative project, *Second Eden*. This year-long project is a short novel that explores the relationship between faith, family, marriage, and the unique relationship that develops between mother and daughter. Lissa Griffin, the main character, enlists in *Second Eden*, a catechism program that trains young girls for marriage. In these classes, Lissa confronts her mother's decision to leave her family. Was it a purely selfish move, or did her mother's abandonment show Lissa a way out? She also learns what it means to be defined only in relationship to someone else.

Faculty sponsor: Amy Weldon

BENJ KOST '12

The Singer's Formant: A Pedagogical Investigation

The singer's formant, recognized as the characteristic ring in the voice of a trained singer, is a quality valued by voice professionals in western music. Despite this, the singer's formant is rarely taught explicitly to students, rather it is achieved indirectly as a result of proper technique and efficient voice production. Though highly sought after, its acoustic origins are not entirely agreed upon in the voice community. This paper, while discussing the characteristics of the singer's formant and why it is valued in western classical vocal music, explores current theories as to the acoustic origins of the singer's formant, and lays out pedagogical ways to approach the singer's formant with students.

Faculty sponsor: David Judisch

PETER KRAUS '12

Daily and Monthly Patterns of Summer Aquatic and Terrestrial Insect Drift in a Northeast Iowa Trout Stream

Waterloo Creek is a high-quality trout stream in northeast Iowa that has undergone major streambank reconstruction and revegetation since 2005. Aquatic and terrestrial insects are the primary food for trout, and insect abundance in the stream can affect trout populations. The goal of this study was to determine 24-hour patterns of aquatic and terrestrial insects in the stream “drift” and the overall changes of abundances of different taxonomic groups from month to month. Aquatic and terrestrial insects were collected in nets from the stream drift at the surface and subsurface for four-hour periods beginning at noon for 24-hour sampling periods in June, July, and August 2011. There is a daily periodicity in aquatic insects in the drift, along with increasing abundance of insects over the summer. Results of this study are being compared to a study in 2005 before the stream banks were converted from primarily reed canary grass (*Phalaris arundinacea*) and box elder trees (*Acer negundo*) to native tallgrass prairie vegetation.

Faculty sponsor: Kirk Larsen

DONALD LEE-BROWN '13

The Amplitude Distribution of Pulsating Stars in the Field of Open Cluster M23

We have observed the field of open cluster M23 since 2003, resulting in nearly half a million images from approximately 350 nights that have passed photometric quality tests. The work has led to the detection of about 60 new variable stars. Here we describe our statistical test for pulsating variables with periods longer than about ten days. The test was developed after the 2009 data campaign. Comparing the results before and after the 2010 campaign allows us to test the robustness of our statistics and the threshold used to claim variability. Estimating our detection efficiency as a function of magnitude and variability amplitude allows us to estimate that approximately 10 percent of the field stars brighter than magnitude 15.5 are pulsating variables with an amplitude greater than 0.22 magnitude. The distribution of these stars as a function of amplitude rises sharply below about 0.5 magnitude, with a break in the amplitude distribution between about 0.8 magnitude and 1.2 magnitude.

Faculty sponsor: Jeff Wilkerson

ANTONIA LLITERAS ESPINOSA '12

Understanding Sex Trafficking: Prevention from the Treetops to the Grassroots

New York Times columnist Nicholas Kristof claims that every year in the twenty-first century more women are shipped into brothels than slaves were shipped into plantations in the eighteenth and nineteenth centuries. The problem affects more than 800,000 women who are trafficked across international borders every year. Women and children are prone to fall prey to sex traffickers primarily because they live in poverty and lack sufficient education. The United Nations, international agencies, and national governments have signed treaties and passed legislation to regulate sex trafficking. My research has shown, however, that this information fails to reach “at risk” populations. Such international treaties and national campaigns against sex trafficking are effective in bringing attention to the issue in more-developed countries and urban areas, but they fail to reach rural and less-educated communities, which are usually the populations most at risk. Therefore, to prevent sex trafficking, it is important to launch grassroots projects in the form of education for girls and provide opportunities for economic development in at-risk communities.

Faculty sponsor: Victoria Christman

ANTONIA LLITERAS ESPINOSA '12,
ALLISON CROAT '12, DANIELLE KOCH
'12, HANNAH LUND '12,
TONYA TIENTER '12

Buying and Selling the Body Through Words

Bellocq's Ophelia by Natasha Tretheway is a poetry narrative that asks readers to consider the humanity of black prostitutes living in the early twentieth century. With its lyric, letter-like description of “Ophelia’s” experience working in a brothel, the reader is immersed in her struggle for freedom. While Tretheway’s work indeed lifts the curtain off of certain stereotypes, we wonder if the text truly achieves its goal. As presenters of a panel, we have interrogated the text, asked ourselves, and questioned each other about whether *Bellocq's Ophelia* is advocating for Ophelia’s humanity or selling it with words. We examine how plot, history, and the artist’s agenda actually sell or free the human body. We look forward to audience involvement into our inquiries through short-writing exercises, a discussion, and collective reflection. We propose to leave it to the audience to consider if the body is rendered a product—a nonliving thing of

economy— in Tretheway’s book and also in our current times.

Faculty sponsor: Peter Scholl

EMMA LOFTHUS '14

Socio-political Implications in Victor Hugo’s *Le roi s’amuse* and Giuseppe Verdi’s *Rigoletto*

Amid the social unrest and political turmoil of mid-nineteenth century Europe, the arts still flourished. This wonder lies in consideration of the substantial censorship and banning of art that occurred in Europe during this time. Despite this, popular writers and musicians brought out poignant literature with strong messages and beautifully complex musical works. Among these are Victor Hugo’s play, *Le roi s’amuse* (1832), and Giuseppe Verdi/Francesco Maria Piave’s opera *Rigoletto* (1851). King Louis-Philippe I’s monarchy and the Austrian government respectively banned these works of art at their time of composition because of their politically subversive undertones. There is an accusatory air about these works, implicating corrupt, entitled leaders with weak moral standards. How can this play-turned-opera about lust and family tragedy have such socio-political implications? Familial love and honor, as well as lower-class insurrection to the aristocratic monarch, are the central concepts. In exposing their subversive ideas, Hugo, Piave, and Verdi respond to the atmosphere of revolution against leaders and repression of ideas. By expressing their *liberté de pensée* (freedom of thought) in popular artistic mediums, Hugo and Verdi forward their respective nations’ socio-political thought, founding the nations where future citizens will do the same.

Faculty sponsor: Anne-Marine Feat

SIRI LOKENSGARD '12

Policy Changes Targeted at Combating the Sex Trafficking Industry: A Historical Analysis

Each year, thousands of victims fall prey to the sex trafficking industry and are forced to have sex for money, enduring exploitation and abuse. Those affected most by these horrific crimes are trafficked victims themselves, young individuals from around the world. However, our entire nation also faces the repercussions when we allow this gender oppression to take place. The purpose of this historical analysis is to gain a better understanding of the policies that have been implemented in U.S. legislation to combat sex trafficking and examine the gaps that remain within each, illustrating the need

for change. This policy analyst examined the policy to determine the history of the policy, the strengths and weaknesses of the present policy, changes that need to be made within the policy, and application of the policy at the national level. In forming this analysis, the analyst examined government documents and legislation, scholarly journals and studies, recent books addressing this modern-day slavery, and trafficking websites from social service agencies around the country. This study suggests that without changes to the present policy, many more individuals will live and die in this modern form of slavery for years to come.

Faculty sponsor: Ginger Meyette

ANNA LOOFT '12

Augustine and Gender: Theoretical Constructs versus Personal Relationships

For a millennium and a half, women and men in the Western Christian tradition have been impacted by the legacy of Saint Augustine. While Augustine has had an enormous effect on Christians up to the present day, it is also important to consider the ways in which Augustine was, like all humans, the product of his particular historical context. The views concerning gender and social hierarchies in Roman society during his lifetime significantly shaped both his personal relationships and his theological convictions. Although it might seem consequential, Augustine’s lived experiences relating to gender relationships, which he described in his autobiographical account, the *Confessions*, did not necessarily correlate neatly with his theological ideology of gender. This possibility of discrepancy leads to the following question: How do Augustine’s actual relationships, described in the *Confessions*, relate to his theoretical constructs of gender? To answer this question, this paper compares Augustine’s treatise, *The Literal Meaning of Genesis*, with specific episodes in the *Confessions* that consider Augustine’s reactions to the loss of various intimate relations, both men and women, throughout his life. This comparison exposes ways in which Augustine’s notions of gender roles for men and women both conform to and also deviate from the written account of his experiences.

Faculty sponsor: Philip Freeman

HANNAH LUND '12

**“The Journey”: A Supernatural
Historical Tale**

In the Chinese folktale “The Eternal Prisoner under the Thunder Peak Pagoda,” a man falls in love with a beautiful maiden who’s actually a white snake in disguise. Their love angers a Buddhist monk, who eventually imprisons the white snake. The tale appeals to my fascination with the supernatural and with China and thus inspired my own work, “Journey Home,” except in reverse. In my version, a Chinese girl named Xiao Mei dies in the twelfth century one week before marrying the wrong man. She’s granted an early reincarnation to search for the one she loves, but only in the body of a white snake. Her quest intertwines with a Red Guard’s tale that unfolds some 700 years later in Communist China. This young Maoist has found a book containing Xiao Mei’s snake story. He and his fellow guards are dedicated to destroying old cultural relics, which includes her story and the press that printed it. Yet as he reads her story, preparatory to destroying it, he finds himself strangely enchanted by it. Whether or not he is Xiao Mei’s reincarnated lover is up to the reader to decide. However, one thing is certain—their stories are more than just fiction.

Faculty sponsor: Peter Scholl

CHELSEA LYNCH '12

**Laocoon: A Comparison of the Quintessence
of Hellenistic Sculpture and El Greco’s
Apotheosis of Toledan History**

In ancient Greek times, artists of the Hellenistic period carried over several themes from the Classical period. Most important of those was the Classical period’s emphasis on the human body in art as seen in the thousands of sculptures that have resurfaced from the Hellenistic era. Arguably, one of the greatest examples of Hellenistic sculpture is the *Laocoon and His Sons*, a Rhodian sculpture assumed to be a work of art by Hagesandros, Polydoros, and Athanadoros. In typical Hellenistic fashion, the work narrates a myth from the Trojan War featuring the Trojan priest Laocoon and his two sons being strangled to death by two serpents, and displays the Hellenistic style’s preoccupation with drama and theatricality as the sculptors attempted to trap the violence of motion in the physical forms. Interestingly, the Laocoon myth resurfaced in El Greco’s painting dating from the Spanish Renaissance, almost 1800 years later. Although the two works share a common subject, they are vastly different,

especially in El Greco’s metaphorical, rather than literal, retelling of the myth, which speaks to the way Greek culture was utilized in the Renaissance.

Faculty sponsor: Kate Elliott

EMILY LYNN '12, QUINN MEYER '12

Tool Use in Blue Jays

Though tool use was originally considered a human trait, many animals, including birds, use tools, and some even understand their function. Due to previous findings of spontaneous tool making in captive blue jays, we wanted to investigate the ability of blue jays to distinguish an appropriate functional tool, one that could always bring unreachable food within reach, from a non-functional tool, which couldn’t bring the food near. The tools included whole and cut pieces of cloth and pipe cleaner hooks. We presented four test trials per day of each of the three tool conditions over approximately 110 days to three birds, and two conditions over 26 days to a fourth bird. In all cases, we recorded their initial tool choices on each trial. During the whole cloth condition, three of the four birds were choosing the functional tool above chance levels on the majority of days. During the cut cloth condition, none of the birds chose the functional tool above chance on the majority of days. During the hook condition, one bird was choosing the functional tool 70 percent of the days above chance levels. This indicates that some birds had the ability to understand and learn the function of unknown tools.

Faculty sponsor: Kristy Gould

EMILY LYNN '12

**The Single Category Implicit Association Test
as a Measure of Gendering Mental Illness**

Using implicit association tests (IAT) can reveal findings of beliefs and opinions that would not be discovered otherwise using explicit measures. This study takes the well-documented use of implicit associations to examine beliefs on gendering mental illnesses. To gather implicit data, a single category IAT was used to investigate the associations between males and females and words associated with three types of mental illness: substance abuse, eating disorders, and schizophrenia. Participants also provided explicit self-report data on belief in Protestant work ethic, perception of mental illnesses, and gender roles to investigate relationships between implicit and explicit reports. There were approximately 50 undergraduate participants in this study.

We predict an association between “Male” and “Substance Abuse” and “Female” and “Eating Disorders” to be found implicitly, as well as correlations between scores on explicit gender role measures and Protestant work ethic and implicit association. These findings are discussed as support for the single category IAT and in regard to what the larger effects of gendering mental illness could be.

Faculty sponsor: Stephanie Travers

JIMMY MARTY '12

Late-Holocene Lake-level Changes in the Northwestern Wisconsin Sand Plain: Examining Local Climate Variability Using Plant Macrofossil Analysis

In fire-prone ecosystems such as the northwestern Wisconsin sand plain (NWSP) of the Upper Great Lakes region, understanding interactions between vegetation, fire, and climate is crucial for effective conservation and restoration management. However, climatic changes over the last 1,000 years were not synchronous across the Upper Great Lakes region nor the NWSP, and therefore it is necessary to gain an understanding of how local climate influenced shifts in vegetation and fire regime during the MWP and LIA. This study used plant macrofossil analysis of a wetland sediment core to investigate lake level changes at Cheney Lake in the NWSP to obtain a local climate record of the area for comparison with regional changes in vegetation and fire regimes. A shift in aquatic community composition from emergent to submerged vegetation was observed from 121-61 cm in the core, possibly indicating the cooler, moister climate of the LIA. This suggests that the NWSP experienced the climate change associated with the MWP and LIA, consistent with changes in vegetation to a more mesic environment during this period. Conservation and restoration managers can use this information to set realistic goals, as the future NWSP climate may more closely resemble the warm, dry MWP than the LIA or present climate conditions.

Faculty sponsor: Beth Lynch

THATO MASIRE '12

A Plan to Contribute and Advance the Provision of Tertiary Education in Botswana

Botswana is regarded by many as the model African state. The midsize country is considered one of the most democratic and stable countries in Africa. Furthermore, Botswana is an

economically healthy country, moving from one of the poorest countries at independence to one of the world's fastest-growing economies decades later. While Botswana is doing well economically by African standards, the country is lagging behind in other sectors. As a country that intends to keep moving forward, Botswana will need to make sure other sectors are developed. One sector that is lagging behind is tertiary education. Botswana has spent several billions educating its citizens abroad for tertiary courses, but almost five decades after independence, the country does not yet have enough local institutions. The very few institutions of higher learning in Botswana have limited offerings, and only a few are up to international standards. My research looks at the current state of education in Botswana. Based on this study, I will propose a model for higher education revision to serve Botswana's needs.

Faculty sponsor: Don Jones

ASHLEY MATTHYS '12

The “Forgotten Mourners”: Sense-making in Sibling Survivors of Suicide

Much has been written within the Communication Studies field about suicide loss and grieving, yet not about sibling survivors of suicide, often called the “forgotten mourners” because of the focus on the grieving process of parents, children, and the spouse of the deceased following a suicide. Though research on suicide survivor grief has increased significantly in recent years, it is limited due to the hesitancy of researchers to ask the bereaved to take part in studies (Linn-Gust, 2010). This qualitative study of in-depth interviews uses the sense-making methodology (Dervin, 1998) to reveal how participants make sense of a suicide using the seven sense-making assumptions developed by Weick (1995): identity, retrospection, extracted cues, social, enactment, ongoing, and plausibility. Although there is no one correct way to deal with a loss, a deeper understanding of the ways sibling survivors of suicide make sense of their loss can be potentially powerful in assisting bereavement counselors and support groups working with families after a suicide.

Faculty sponsor: Kim Powell

NIKKI McDERMOND-SPIES '13
**Effect of Management on Insect Diversity
in Simple and Diverse Prairie Plantings
in Anderson Prairie**

Anderson Prairie is a reconstructed tallgrass prairie that was planted by Luther College in two stages. The older planting (1988) was a simple mix of 18 native species, and the newer planting (1998) was a diverse mix containing 76 native species. To maintain tallgrass prairies, natural periodic disturbances such as fire and grazing are essential. Anderson Prairie is managed with prescribed fire and mowing (to mimic grazing). The goal of this study was to compare the effects of burning and mowing treatments of simple and diverse prairie plantings on butterfly (herbivore) and ground beetle (predator) communities, both significant components of the overall biodiversity of tallgrass prairies. Sampling for plants, butterflies, and ground beetles occurred from June through September 2011 with three replicates in each of the four treatment combinations (simple burned, simple mowed, diverse burned, and diverse mowed). Species richness, overall abundance, and Shannon diversity indices of the plant, butterfly, and ground beetle communities, as well as overall plant productivity were determined. As expected, plant species richness was greatest in the diverse plantings, with the fewest species found in the simple mowed treatment. There was a higher abundance and diversity of butterflies and ground beetles in the diverse mowed treatments, indicating that fire may have a detrimental impact on insect biodiversity.

Faculty sponsor: Kirk Larsen

DELANEY McMULLAN '14, CLASS REPS:
ANNA LOOFT '12, TANYA MAAS '14,
SARAH NOLTE '14, SETH RUMAGE '13
**One Girl: Creating Educational Opportunities
in Sub-Saharan Africa**

Our God and Gender class will use our session to present the goals, context(s), methods, and results of a semester-long interdisciplinary project to support the education of women and girls in Sub-Saharan Africa who lack opportunities and/or access to education. We will articulate the process that our project moved through from theory and discussion of gender-based education issues to application by helping to create gender equality in education in countries in Africa. Our session consists of presentations on the following aspects of the project: 1) Articulation of the larger problem of the limited educational options

available to women/girls around the world and the consequences for both the women/girls and their families and communities; 2) Investigation of how this problem is connected to the material we have studied in class—the formation and depiction of gender in religious texts, primarily Jewish, Christian, and Muslim; 3) Development of criteria for determining an organization to support and the elaboration of our vision statement; 4) Profile of the organization we chose—how we selected it, what it does, and why we think its efforts are important; 5) Implementation of our plan to create awareness and bring educational opportunities surrounding the issue to our friends, families, and communities, and to raise funds with a goal of \$2,000; and 6) Reflection on our learning along the way.

Faculty sponsor: Karla Suomala

ERIN McWILLIAMS '12
**Effects of Bibliotherapy on Adjustment
of First-Year College Students**

This study examined the effects of bibliotherapy (i.e., the use of published information as therapeutic material) on the emotional and academic adjustment of first-year college students to college life. Students (N = 112) in a Fitness and Wellness course at Luther College in Decorah, Iowa, rated the use of the book, *College of the Overwhelmed* (Kadison and DiGeronimo, 2005) as part of the course, which also included various lectures on adjustment to college. Ratings indicated that the students who read the book found it quite valuable to their experience in the Fitness and Wellness course. There were significant differences for every item rated as it related to adjustment to college life (e.g., stress, drinking, etc.). Results support continued use of the book, although the possibility that students compliant to reading the book are predisposed to reading in general and other healthy behaviors needs to be taken into consideration in such findings.

Faculty sponsor: Joseph Breitenstein

LAURIE MEDFORD '12
**Unfit and Incapacitated: Aging and Medical
Illness among Union Civil War Veterans of
Company "C," Eighth Wisconsin Volunteers**

Although the United States had established a military pension system as early as 1818, the scope of the American Civil War forced the nation to reconsider its obligations to veterans. In the 1880s, the federal government accepted

unprecedented responsibility for supporting the aging, and sometimes disabled, population of former Union soldiers. This presentation is part of a longitudinal study of veterans from Company "C" of the Eighth Wisconsin Volunteer Infantry, exploring life transitions, aging, and medical problems soldiers experienced throughout their postwar lives. Federal Military Pension Records from the National Archives provide the key to understanding aging processes among veterans. By examining the pension files' contents and disability ratings assigned by the pension office, trends in the duration and severity of soldiers' aging and medical experiences emerge, indicating the nature of the burden they placed on society. Analysis shows that many soldiers experienced illnesses in old age, which they attributed to the lingering effects of military service. Such conditions were usually chronic, debilitating, and worsened over time, necessitating additional outside assistance for survival. This study presents new, in-depth empirical evidence showing long-term treatment of veterans' illnesses and the government's responsiveness to these concerns. As soldiers returned from the wars of the twentieth century, the government's reactions to Civil War veterans set precedent for assisting new generations of veterans.

Faculty sponsor: Edward Tebbenhoff

LAUREN MEINTSMA '14
Theatricality, Sexuality, and the Representation of Women's Identity

Women overcome their long history of being seen as inferior by reclaiming power in the public sphere as they demonstrate the necessity for sexual freedom of women. By stepping on the public stage, they challenge the limited implications of gender that institutions traditionally advance. Sarah Bernhardt emerged in the 1880s as the first French woman to dramatically challenge society's expectations of femininity through her public presence as an actress. Bernhardt's modern complement is Lady Gaga, who also seems to reject in her performances simple binary gender distinctions. In my research, I analyzed modern performances and historical accounts of performances to understand how theatricality allowed Bernhardt and Gaga to challenge gender assumptions and how these two women, representative of the past and the present, made statements that empower women on and off the theatrical stage. Readings by Susan Maslan, Judith Butler, and Theodore Gracyk were also used to identify how identity

can be successfully portrayed in the social and public sphere.

Faculty sponsor: Anne-Marine Feat

CALLI MICALÉ '13

What the Soul Ate

In America today, people commonly compartmentalize what is of the body and what is of the soul. This dualistic ideology underlies personal, social, and ecological problems facing individuals. The creative process and product draw from Christian, Buddhist, and Islamic traditions. At the onset of the creative process, each performer reflected on a selection of writings from poetry to scholarly essays to create images and movement vocabulary, conveying their own journey. The journey begins with the recognition of separation between body and soul. Then the soul begins the ongoing process of turning inside out. Through movement, text and imagery, the dancers examined the body-soul relationship and current dualist ideology. In a 15-minute performance, the seven dancers deconstruct their own compartmentalization. The dance embodies the process of soul-making, and demonstrates the body's inseparable and constitutive belonging to the very essence of the individual.

Faculty sponsor: Amanda Hamp

AMANDA MORAN '12

Body of Stories: Expressing Lived Experience through Storytelling and Movement

Children hold experiences within their bodies. Often, these are not reflected upon or explored emotionally, physically, or intellectually. Instead, experiences often lie latent within children and are not uncovered, explored, or understood until later in life, if ever. My work with children over the past nine years and my somatic dance training propelled me into my senior honors project. This practice-based research investigates how children can express their emotional experiences through storytelling and create dances inspired by those stories. My developing methodology guides children to remember an emotional experience, draw, write, and/or tell a story about that experience. Then, the drawn, written, and/or spoken material becomes building blocks for children to make their own creative dances about that specific emotion. In this research presentation, I will practice the method with the audience and present drawings, video, and voice recordings to share how the children I work with experience this method.

Faculty sponsor: Jane Hawley

MIKE MORAN '12

Movement Fundamentals in Film

Movement Fundamentals is a dance artist training curriculum created by Luther College's Associate Professor of Dance Jane Hawley that challenges traditional techniques for teaching dance. Since its formation and integration into the Theatre/Dance department in 2001, students of Luther College have experienced the conceptual and physical practices of movement fundamentals, and their experiences have revealed the impact of the curriculum on their dancing, movement, and lifestyle. Through an academic administrative assistantship grant with Hawley, I investigated how movement fundamentals can be promoted to prospective students of Luther College. Through interviews with various professionals across the United States and research in the classroom with Hawley, I gathered visual and conceptual elements of the training program and synthesized these elements to create short films. My films aim to increase the visibility of and discourse about movement fundamentals among academia and prospective high school students. This presentation will emphasize my research processes of obtaining a clear perspective on the curriculum and the practice-based research process of filmmaking. I will also present one of my films and discuss its significance for dance at Luther and my own artistic development.

Faculty sponsor: Jane Hawley

ABBY NANCE '12

Kingly Boys, Subservient Girls: Gendered Hierarchies in Harry Potter and Narnia

Literature reflects and creates society. Young adult readers rest on the edge of becoming active participants in society. Popular young adult literature therefore has the important opportunity to help readers imagine alternative ways of constructing the world around them. The fantasy genre of literature uniquely allows authors to imagine new worlds—worlds free from the cultural norms and constraints of society as we know it. In the Harry Potter and Narnia series, J.K. Rowling and C.S. Lewis create young characters who are capable of dazzling feats of magic, bravery, and authority. However, while Rowling and Lewis ask readers to suspend disbelief and enter a world of dragons, evil witches and wizards, and talking animals, they fail to imagine a new way of “doing” gender. Instead, both series reflect a medieval value structure of male hierarchy and chivalry. Girls and women are granted agency, but only under male-run

friendships, families, and institutions. Thus young readers see worlds where magic is not only possible but commonplace, yet the gender roles explored in these texts are entirely traditional. This paper explores how the Harry Potter and Narnia series reimagine the impossible as possible, but are nonetheless unable to radically reimagine gender roles, leading worlds of magic into hierarchical, male-dominant structures.

Faculty sponsor: Lise Kildegaard

KRISTINA NIENHAUS '13

St. John Nepomucene: Music in the Making

Hymns, history, and hometown homage: During the January Term course, “Music in the Shape of Pear,” we students researched contemporary composers and performed their works. We also each selected a topic of interest pertaining to contemporary music and completed a project based on it. I saw this opportunity as an ideal way to learn more about the musical history of my hometown church and inform my class about this genre of contemporary music. My project involved creating a documentary that focuses on the musical history of my church, St. John Nepomucene Catholic Church in Fort Atkinson, Iowa. I have been the accompanist at my church for more than seven years, thus have a personal view of its contemporary music. I also incorporate much information on a neighboring historical church, St. Wenceslaus, in Spillville, Iowa. In this 15-minute documentary, which I compiled, narrated, and recorded music for, the viewer learns about the history of two small Catholic churches in northeast Iowa, highlighting how both of these churches were constructed by primarily Czech Catholic immigrants and how liturgical and cultural musical history have shaped where they are today.

Faculty sponsor: Brooke Joyce

MICHAEL NOLTNER '12

Event Importance of the Elite Ironman Triathlon

When competing at the highest level for one of the most grueling endurance races on the planet, what events are most important? Every year in Kailua-Kona, Hawaii, the premiere Ironman triathlon takes place with 1,800 competitors who swim 2.4 miles, bike 112 miles, and run 26.2 miles. Fifty professionals participate in this race every year, each vying to reach the top of the podium. While it is not essential to be the best in every event, each triathlete must perform at a

proficient level in all three events. Which event is most important in determining overall placement relative to other professionals? It is often debated that running and cycling are the two most important events, but little statistical analysis has gone into proving any of these claims. Modeling 50 professional triathletes and applying statistical methods of analysis of variance, correlation, and prediction intervals will not only give insight as to which events are more critical for a higher overall placement but will also provide predictions as to how the competitor will finish based on a range of placements in a single or multiple events. With time and energy scarce, the triathlon events of running and biking should be trained more intensely than swimming when attempting to outperform competitors because of relative energy expenditures.

Faculty sponsor: Steve Holland

KAYLA NORMAN '12

Europe's Failure to Integrate: The Revolt of Second-Generation Muslim Immigrants

Rates of Muslim immigration into Europe in the past few decades and public perception of these immigrants have sparked harsh feelings of xenophobia around the continent. These views of Muslims have resulted in racist legislation that has not only failed to integrate Muslim immigrants, but has challenged the identity of individual states and of Europe as a whole. Through an interdisciplinary consideration of immigration, specifically in the key locations of Germany, France, and Malta, this paper examines the failure of policies intended to integrate immigrants. It finds that these policies consequently lead to resentment and anger among second-generation Muslim immigrants, and ultimately challenged the group and national identities of all parties involved.

Faculty sponsor: Victoria Christman

ANDREA OLDFIELD '12

"The Linguist": Storytelling, Science Fiction, and the Theatre

When you think science fiction, where does your mind take you? To little green men and shiny metal space ships? To the flash of light and zing of a light saber? Or maybe to a future filled with binary code, robots, and ray guns? Each of these fantastic visions of the future, technology, and new frontiers communicates new worlds through a distinctive blend of elements. In this presentation, I will examine the process and craft of storytelling

in the science fiction genre and how, as a theatre artist, I have utilized various artistic mediums to create and convey a world beyond our own in my senior project, "The Linguist." The presentation will chart my journey through the process of writing, directing, and performing an original multimedia performance work focusing on the storyteller's purpose and use of the sci-fi genre and the challenges of bringing a new world to life on the stage. The presentation will conclude with the performance of a brief scene from "The Linguist."

Faculty sponsor: Bob Larson

PHUC PHAN '13

Transcribing and Arranging Music: Process and Product

The concept of transcribing or arranging a piece of music has been a quite common process, significantly since Liszt started his own "genre" of transcriptions for piano. The process involves rewriting a piece of music for a set of instruments different from those originally intended. The new colors created by this different set of instruments sometimes work out marvelously, and sometimes, not so well. Nevertheless, the work of exploring all the various options is truly fascinating. In this project, two of my own arrangements will be presented. They are both soundtracks taken from two popular Japanese animations: "Kiki's Delivery Service" and "Howl's Moving Castle." In the first case, the arrangement is for an ensemble of 11 cellos, an arrangement very similar to the composer's own arrangement for 9 cellos in 2003. I have access to that performance, thus the process is more one of dictating, with a few alterations. The arranging process for the second piece involves listening to the original (which is for symphony orchestra) and analyzing a piano transcription by E. Davis. It is for piano and 11 cellos. I will talk briefly about the process of arranging the two works, and the Luther College Symphony Orchestra cello section will perform the two works.

Faculty sponsor: Eric Kutz

ANNE PROESCHOLDT '12, MIKAELA BELLAND '12, ASHLEY MATTHYS '12 How Prominent Women Use Media to Effect Socially Sustainable Change

In an increasingly globalized world, where the definition of "media" is expanding to include a variety of social media, women leaders play an integral role in reshaping social values in the Western world. This roundtable discussion

will focus on four women with a strong media presence in the United States and globally, embodying empowering messages of tolerance and understanding. By redefining the popular understanding of what it means to be a woman, they have helped broaden opportunities for future generations of women in media. We will begin with participants examining commonalities in how pop singer Lady Gaga, internationally renowned journalist Mona Eltahwy, talk show host and entrepreneur Oprah Winfrey, and news reporter Diane Sawyer exhibit characteristics of strong women leaders, suggesting that while each of these women operates in different spheres of media and uses unique forms of rhetoric, each demonstrates an ability to connect with audiences to shape a sustainable media environment for women. We then will engage roundtable attendees in discussion of how these women have expanded leadership opportunities for women in media by disseminating messages of tolerance, empowerment, compassion and understanding. Discussion will focus on how, unlike messages that serve to perpetuate hierarchies, reaffirm oppression and downplay the importance of women, these women serve to reinvent traditional modes of communication, thereby sustaining, rather than destroying, positive images of women in media.

Faculty sponsor: Kim Powell

HAILEY PUNKE '12

Using Local Food as a Lens into Ethical Eating

The answer to eating ethically, according to a rapidly growing movement, is to eat locally produced food. This food has traveled fewer miles, is fresher, more sustainable, and more supportive of the communities local farms are embedded within. Although the label “local food” has many positive images associated with it, the term itself does not necessarily imply that it is the most ethical choice, because it only applies to the distance food has traveled and ignores other facets of food production. After examining the arguments and their counters for eating local food, this paper suggests that local food is often an ethical choice, not because of the distance food has traveled, but because of the transparency within local food chains and the connection of the consumer to this system. Determining an ethical food choice involves more than considering the consequences of food production; it must also include personal involvement in the food system itself.

Faculty sponsor: Jon Jensen

INGA ROHDE '12

Adapting the California School Garden Model to Iowa Schools and Standards

When asking kids to identify tomatoes or carrots, responses such as ketchup or baby carrots are surprisingly common. School gardens are part of a growing movement to help connect students to the food they eat and the natural world. School gardens also foster interdisciplinary learning in mathematics, science, and literacy. In January 2012 I investigated seven robust school garden programs in Berkeley, California. This project takes the strengths of the well-established California school garden model and adapts it to the climate and educational needs of Iowa. A handful of schools in northeast Iowa have already overcome the first hurdles of breaking ground for gardens. However, the challenges of community attitudes, climate, financing, and school accountability for content standards leave these programs at risk. My research involves interviews with area teachers to discover how these first gardens have enhanced their established curricula, and what support is needed to further garden learning opportunities. It includes a careful analysis of the Iowa Core Curriculum standards to reveal how school garden lessons can integrate key content and skills. School gardens can mitigate the growing disconnect between kids and the food they eat while promoting a standards-based curriculum.

Faculty sponsor: Birgitta Meade

AARON ROSELL '12

Chainsaw Ethnography

In 2000, American journalist Patrick Tierney published what would become one of the most controversial pieces of literature in modern anthropology: *Darkness in El Dorado*. The book claims that scientists and anthropologists were responsible for devastating the Yanomami, an Amazonian group located in Venezuela and Brazil, during the mid-late twentieth century. Tierney's criticisms land most heavily on Napoleon Chagnon, an American anthropologist and easily the leading Yanomami ethnographer/fieldworker. One of his allegations is that Chagnon's repeated bartering of weapons for information enabled (and even encouraged) war within the group. This presentation will pivot on that notion of anthropological bartering, using Chagnon's interactions with the Yanomami as its case study. My talk will explore the ethnographic advantages and disadvantages underscoring the trading of goods for information, as well as the implications

that Chagnon's interactions with the Yanomami have for modern fieldwork.

Faculty sponsor: Jon Wolseth

JESSICA SAWDY '14

Eliminating Transfer Errors: The Role of Metalinguistic Awareness in Third Language Acquisition

In principle, learning a second foreign language is easier than learning a first one because the learner is familiar with the process of foreign language acquisition. At the same time, learning a second foreign language can be harder because, research shows, learners transfer grammatical structures and lexical items from the first foreign language to the second, even though they may be incorrect. What can a learner do to avoid this complication? Drawing on research and personal experience, I show that metalinguistic awareness, being aware of how languages work grammatically and lexically, can allow the learner to eliminate any incorrect transfer while allowing the speaker to produce the desired/correct grammatical structures and lexical items.

Faculty sponsor: Laurie Zaring

JASON SCHMIDT '12

Portraits and Perceptions: The Art of Vincent van Gogh

When Vincent van Gogh moved to the south of France in February 1888, he envisioned a place where he could experience a rough and rural lifestyle away from the big city, living with fellow artist Paul Gauguin and being able to work on his art in peace and without stress. Van Gogh's initial response to this move to the French city of Arles was positive; his health began to improve, and he eagerly began to work, producing many paintings in the months following his arrival. However, as the months went on, van Gogh's relationship with Gauguin and the citizens of Arles became strained, leading eventually to the infamous ear-cutting incident in December of 1888 and, in May 1889, Van Gogh committing himself to a mental institution. My research examines the period between his arrival in Arles until his departure with regard to his mental state, specifically looking at his relationships with those around him and how he portrayed them in his art. It includes formal analysis of two paintings with similar subjects, but how they are painted differently. Is his deteriorating mental stability evident in his work, based on how he portrayed his subjects? I

provide evidence and examples to argue yes to this question.

Faculty sponsor: Kate Elliott

ETHAN SCHULTZ '12

Encouraging the Next Generation: A High School Leadership Curriculum

Leadership is an ever-changing, multi-layered quality that develops with time and experiences. Though leadership has no one definition, certain skills/attributes propel leadership success. I started researching leadership development to discover the knowledge, skills, and attributes successful leaders have, and then began creating an eight-week high school leadership curriculum. I coded themes from leadership literature into knowledge, skills, and attributes categories, while using the lens of how learners could experience and connect to successful leadership. This research project has grown out of an opportunity I had in 2010 to travel to Namibia. My time there inspired me to support Namibian students, and over time I became a leader myself through Empowering Learners (a philanthropic project that assists Namibian learners). This curriculum began as a way to further support the students I met, but it may serve many more. I hope to pilot this curriculum in Namibia, revise it, and then publish it for worldwide use. Leadership matters. It matters because it moves us forward in individual and communal ways. Because leadership matters, the development of leaders carries enormous weight, and this curriculum aims at aiding students in their development. This talk will present the product and process of my leadership curriculum.

Faculty sponsor: Deb Fordice

ELEANOR SCHUMAN '14

Music Psychology: Why Music Makes Us Feel Good

Music affects the brain in both psychological and biological ways. My research began with an investigation of the physical process that occurs when people listen to music. Preliminary reading framed my inquiry into why and how music impacts the human mind both physically and emotionally. I began my research with two books, *This is Your Brain on Music*, by Daniel Levitin, and *Musophilia*, by Oliver Sacks. The first book established a foundation in music psychology. It describes what happens to the brain when someone listens to music, both physically and emotionally. The second book provided stories

about people's lives that have been changed by the psychological affects of music. I read additional scholarly articles to look deeper into the connections between music's emotional, developmental, physical, and psychological effects. Based on these readings, I believe that the mind predicts and anticipates during music listening. Further, music meets social needs, encourages better developmental and emotional health, and not only stimulates emotions, but creates them.

Faculty sponsor: Bill Fordice

JAKE SEIBERT '12, NICHOLAS ANDRESEN '12, MARGARET MICHENFELDER '12, MITCHEL OBEY '12, KATHERINE PERSCHBACHER '13

Investigation of Internal mRNA Methylation as a Potential Regulatory Mechanism in Gene Expression

Regulation of gene usage determines development, tissue specificity, and intensity of a given trait. Gene regulation is complex, and there are several known mechanisms involved. We are interested in the potential intersection of two of these mechanisms: mRNA methylation and RNA interference. Internal N6-methyladenosine (m6A) is a naturally occurring post-transcriptional mRNA modification that is exhibited in all higher eukaryotes and viruses that replicate inside a host's nucleus (Narayan and Rottman, 1992). N6-adenosine methyltransferase is the enzyme that catalyzes the nucleotide modification only at certain five nucleotide consensus sequences, which have been identified as AGACU/A and AAACU in bovine prolactin mRNA. (The underlined adenines undergo the methyl addition.) (Narayan, 1994) However, little is known about the function or the purpose of the nucleotide modification and only hypotheses have been formulated to try to explain the phenomenon. Our research consists of investigating the role of internal RNA methylation as a potential regulatory mechanism in gene expression, namely its effect in RNA interference. Since the methyl addition occurs at a hydrogen-bonding site in adenosine, it could interfere with the base pairing between an mRNA molecule and a microRNA molecule that is part of a RISC complex. If this is the case, then the internal methylation could serve as to inhibit cleavage of the mRNA molecule it is located in, which would prevent complete silencing of the

protein product. Implications with this research will be outlined in our presentation.

Faculty sponsor: Marian Kaehler

HANNAH SHATZER '13

An "Island of Brilliance": Absolute Pitch in Musical Savants

In individuals with profoundly low intellectual functioning, an incredible amount of talent in one particular area can sometimes emerge in the form of savant syndrome. These savant skills may manifest themselves in persons with autism or other serious mental disabilities, and musical talent is the second most common savant ability. Nearly every musical savant also possesses the skill of absolute pitch, the ability to hear and correctly identify the pitch of any note without pause or outside comparison. Absolute pitch is incredibly rare worldwide and is estimated to occur in fewer than one person in ten thousand, yet almost inexplicably seems to be present in the vast majority of musical savant individuals. This project presents a compilation of research on the nature of absolute pitch in musical savants and explores the current controversy on whether absolute pitch is necessary in seriously mentally disabled individuals for the development of musical savant skills.

Faculty sponsor: Joseph Breitenstein

KELSEY SIMPKINS '12

The End of the World: A Personal Exploration of Conceptual and Environmental Art

Both the Conceptual and the Environmental Art movements originated during the second half of the twentieth century. In this paper I reflect on the history of both movements and how they influenced my decisions in creating artwork, the process of conceptualizing and producing the art, and the maintenance of the art in an interactive show. Both Conceptual and Environmental Art are very broad categories, and I spent much time examining the limitations and abilities of each, as well as working to overcome challenges they posed in my philosophies and creative work. This talk will discuss these ideas and how they played into the success and shortcomings of *The End of the World*, my solo art show that was exhibited this spring.

Faculty sponsor: Kate Elliott

STEFAN SNYDER '12, PATRICK HUSSEY '12
Pulmonary Shunting in a Rat Model

Previous work from our lab determined that the perfusion pressures of isolated rat lungs were reduced following exercise, suggesting vascular alterations are likely associated with such a model of sustained increases in flow. The goal of the current study was to determine whether shunting (blood flow from arterioles to venules, bypassing capillaries) might be increased with exercise, and thus be contributing to the reduction in baseline resistance. An increased degree of shunting could alleviate some of the capillary pressure associated with increased flow, but might also limit gas exchange in the lung. We utilized a saline-perfused rat lung model, and studied the ratio of 5 or 15 nm microspheres in our perfusate both before and after flow through the pulmonary circuit. Given that the approximate diameter of pulmonary capillaries is about 8-10 nm, we reasoned that 15 nm spheres would not be present in the effluent unless a significant degree of shunting was occurring. Further, from studying the concentration of 5 nm spheres in the effluent, we hoped to determine any changes in capillary perfusion associated with differing flow rates. Our results from control (no exercise) lungs suggest that no significant degree of pulmonary shunting is occurring in the rat.

Faculty sponsor: Mark Eichinger

EMMA SPOON '12

Effect of the Highway 52 Roadside Prairie Planting on Plant and Insect Communities

In fall of 2008 the Iowa DOT planted prairie in the roadsides of U.S. Highway 52 north of Decorah. The goals of planting native prairie in the roadsides include increasing biodiversity, controlling soil erosion, improving aesthetics, and reducing the need for roadside maintenance. Since the summer of 2008, Luther biology has been monitoring the diversity and abundance of plant, ground beetle, and butterfly communities at nine sites to determine the effectiveness of this restoration. Three sites were unplanted controls, three sites were not treated with herbicides before planting (organic treatment), and three sites were sprayed with herbicides to control weeds prior to the prairie planting (spray treatment). After several years of mowing to control weeds during planting establishment, 2011 was the first year that no mowing occurred and increased diversity and abundance of native plant, beetle, and butterfly species was expected. In 2011, beetle and butterfly abundances were greater in the spray

plots compared to the organic and control plots. Beetle species richness was also greater in spray plots. Although there was no similar trend with plant and butterfly species richness, plant and butterfly species richness were significantly greater in 2011 than in previous years.

Faculty sponsor: Kirk Larsen

SHANE STEELE '12

Plant Communities in Northeast Iowa Hanging Bogs

Hanging bogs are small, isolated wetlands surrounded by upland forests. They occur where water moving through fractured limestone reaches the impermeable Decorah Shale and is forced to move laterally, ultimately creating groundwater seeps. Wetlands with distinctive plant communities occur at these sites. The purpose of this study was to survey the vegetation of eight seeps near Decorah, Iowa. I found sites using a geological map and by contacting landowners for known locations with skunk cabbage (*Symplocarpus foetidus*), marsh marigold (*Caltha palustris*) and black ash (*Fraxinus nigra*), all of which are common in these habitats. In each site, I sampled vegetation in one 10x10m plot during the summer of 2011. Overall, I identified 100 native plant taxa. Species richness per plot ranged from 15 to 45. Two of the plant species identified are documented as rare in northeast Iowa. Eight species had a high coefficient of conservatism, a measure of floristic quality. Relatively few non-native species occurred in the sites surveyed. The survey results suggest that these small habitats are ecologically important, contributing disproportionately to regional biodiversity. They should be protected to maintain an important part of the ecology of northeast Iowa.

Faculty sponsor: Beth Lynch

SCOTT SUNDSTROM '12

Using Charity/Government Aid to Help Finance Youth Tennis Programs in Both France and the United States

Historically, sport has been a great way to integrate minorities into mainstream society and to help construct a strong national identity which, as sociologist Mike Cronin says, "can permit the blurring of differences and serve to unite a multi-ethnic people behind a single national ideal." Today, there are many tensions between minority groups trying to integrate into French society, as recent events in Toulouse highlight. However, sport can serve as a means of integrating this

sector of the population into society, particularly through the sport of tennis. Nonetheless, tennis is now most often played and available to the privileged socioeconomic groups, so currently there are few opportunities for minorities to play. Last fall, I studied in Nantes, France, and conducted interviews on the role tennis could play in promoting diversity and a stronger French national identity, as well as analyzing associations sponsored by the French Tennis Federation and reviewing sociological works on sports and nationalism. I have found that tennis diversity programs must be connected with primary and secondary education so that a wider audience can be reached and so that these programs can be better linked with the construction of a French national identity.

Faculty sponsor: Anne-Marine Feat

LAURA SWANSON '13, MELENE THOMPSON '14, ERIN VOELSCHOW '12
Calcium-regulated Gene Expression in *Vibrio parahaemolyticus*

Although calcium is known to play a role in a number of bacterial processes, including gene expression, how and why bacteria sense and respond to calcium is still poorly understood. *Vibrio parahaemolyticus* is a gram negative marine bacterium that is a major cause of gastroenteritis worldwide. This organism experiences significant and fluctuating calcium levels in its natural environments, which include the ocean, estuaries, and the human GI tract. To investigate possible roles for calcium in *V. parahaemolyticus*, we screened 4,000 random mutants to identify genes that might be turned on or off by calcium. Disrupted genes were identified by amplifying and sequencing DNA adjacent to the transposon, and gene expression phenotypes were quantitatively characterized by measuring gene activity over time. Collectively, these analyses resulted in the identification and classification of 40 calcium-regulated genes, including 26 genes turned on by low calcium conditions and 11 genes turned on by high calcium conditions. Since a number of the regulated genes had functions predicted to be involved with iron acquisition, we tested whether iron might also influence activity of calcium-regulated genes. Results indicated that the vast majority of calcium-regulated genes were also regulated inversely by iron. These results suggest that calcium and iron are relevant environmental signals for gene regulation in *V. parahaemolyticus*,

and further, suggest a relationship between these two signals.

Faculty sponsor: Jodi Enos-Berlage

SONJA THOMPSON '12
Where Does One Draw the Line When Doing Participant Observation? Participant Observation as Anthropological Method

Anthropology is a complex discipline with many areas of focus, movements, theories, methods, and ideas about the best way to study people and human cultures as a whole. However, when it comes to doing fieldwork, participant observation is the most important method one can utilize to study a group of people. No culture is the same as another in every area of life, and no human being thinks, believes, or behaves in the same way as another. It is clearly impossible to say that there is one precise way to study and analyze any and every different group of human beings anywhere in the world. To attempt to uncover the most successful path to learning why people behave the way they do in their societies, this presentation involves a background and examination of controversial anthropologist Tobias Schneebaum's work with tribal people in Peru and New Guinea. This talk will provide background on and analysis of Schneebaum's method of participant observation in comparison with the standards of the American Anthropological Association, as well as select passages from some of Schneebaum's personal letters in order to discuss the ethical consequences, controversial outcomes, and the benefits that can result from an intensely intimate amount of participant observation.

Faculty sponsor: Maryna Bazylevych

JOSEPH THOR '12
Sovereignty and the Supernatural: An Exploration of Divination and Political Power in First-Century B.C. Rome

This paper analyzes the connection between the supernatural and sovereignty in Rome in the first century B.C. by exploring the concepts of *divinatio*, *imperium*, and *potestas*. This period was a transitional era as Rome's political structure shifted from an oligarchical republic to the centralized empire under the *imperator*. The question is how divination rituals were used as an informal means to challenge or bolster political power, sovereignty of magistrates, and, later, emperors in this period. *Divinatio*, or divination, refers to formulaic rituals that attempted to reveal divine knowledge. One form was augury,

which focused primarily on the flight of birds. Augurs would take the auspices prior to elections, military campaigns, and the building of temples. Cicero's *De Divinatione* acts as a skeptic's guide to divination. Along with Cicero, the historian Livy and Suetonius published works connecting augury to sovereignty, focusing on its role in the time of the kings (753-509 B.C.) and the era of the emperors beginning in 31 B.C. I argue that divination was a central, though informal, mechanism within the Roman constitution that allowed a necessary check to both forms of political power, *potestas* and *imperium*.

Faculty sponsor: Robert Christman

EMILY TINJUM '12, HANNAH HAN '12, MICHANDA HOFFMAN '12, JAMES SWANSON '12, BRITTA PEDERSON '12, JESSICA MALLAMS '12, ALLAN SWEET '12
Nursing and Leadership Response

to Sentinel Events

The Joint Commission, a nonprofit organization responsible for the accreditation of hospitals and other medical care facilities, defines a sentinel event as "an unexpected event involving death or serious physical or psychological injury, or the risk thereof." The event is called a sentinel event because it is so significant that it warrants immediate investigation and response. In the health care setting, nurses are often considered the last line of defense against medication errors and patient safety concerns. In many facilities, nurses are involved in root-cause analysis and in the creation of policy or product that helps prevent a recurrence of the sentinel event. This presentation dramatizes a real-life error, safety concern or other sentinel event affecting the health and well being of a patient or patients. Students will show how this incident is discovered and the process nursing and facility leadership go through to determine the root cause and to implement system-wide changes to ensure patient safety in the future. The challenge in this case: With a move to keep patients in their home as long as possible, patients are often taught to administer medications and treatments themselves. What happens when patients do not understand what they are taught, and how can nurses and other care providers prevent medication error and injury?

Faculty sponsor: Janna Edrington

MOLLY TULKKI '12

Mosaics of Light

Who we are is sculpted by our relationships to the people and places around us. In reacting to and reflecting on these relationships, we gather bits of light from all we encounter. One bit of light we may gather comes from the land. As we intimately get to know the land around us, we also get to know ourselves in a little different way. This process may challenge our very definition of "landscape." Landscape becomes no longer separate from ourselves, but something we are a part of inherently. We live in landscapes and are immersed in them. Over the past year, I have taken monthly camping expeditions to Yellow River State Forest (Allamakee County, Iowa) to get to know this area of land and explore my relationship with it through painting landscapes I encounter there. These immersive paintings are scenes of the physical land informed by my experience within the landscape. *Mosaics of Light* is an exhibition of these oil paintings.

Faculty sponsor: Ben Moore

ALICIA VERMEER '12

Irish Resistance to Secularization

Beginning in the nineteenth century, Europe entered into a period of religious decline. The predominant explanation for this decline since the 1960s has been the theory of secularization. While the phenomenon caught the attention of early sociological thinkers such as Auguste Comte, Karl Marx, Max Weber, and Emile Durkheim, it was a new generation of sociologists led by Peter Berger and Bryan Wilson who developed the contemporary theory of secularization. According to this theory, modernity and modernization have led to a decrease in the influence of religion in European societies, both at a societal and individual level. But one problem often noted in the classic theory of secularization is that not all of Europe experienced such significant decline in the modern era. Ireland is one country that has never fit neatly into the secularization paradigm. In this project, I provide an overview of Irish history and explain that the reason Ireland held onto its religious identity is because religious identity became strongly linked with national identity. In other words, this connection meant that being Irish also meant being Catholic.

Faculty sponsor: Marv Slind

LINDSEY WEAVER '12

Examination of Leadership and Athletics' Role in Authentic Leadership Development among Female Youth

With professional athletes making multimillion dollar paychecks, National Collegiate Athletic Association (NCAA) Division I Men's March Madness bringing the NCAA more than \$500,000,000 in revenue, and events like the Tiger Woods affair and the Superbowl taking news precedence over international and national crises, it is clear that our nation is obsessed with sports and their heroes. Today it is all too common to define sports and athletes by their ability to entertain, and define their success by a winning percentage. With the current controversies surrounding big revenue college sports, and the national dwindling of financial resources, many have suggested that we cut sports programs from colleges and high schools all together. But what about the girls? Do sports have more to offer than medals, scandals, trophies, and heroes to our future generations of female youth? In surveying, synthesizing, and analyzing the relevant research in the areas of leadership theory, female leadership, and the current barriers our culture presents to girls in their self-development, I explored athletics' potential to offer meaningful experiences that can transform female youth into leaders confident in their selves and abilities. I argue that maximizing athletic opportunities for female youth can be an avenue for deliberately providing experiences that foster the attitudes and skills necessary for confident and competent leadership.

Faculty sponsor: Richard Halverson

GEORGIANNA WHITELEY '13,

RACHEL HODAPP '12

The Preservation and Application of Medicinal Plant Knowledge Among the Maasai in Tanzania

This research was conducted in Summer 2011 by Luther College students and faculty and their Maasai partners in northern Tanzania as part of a long-term project documenting Maasai plant-based medicines. The research team spent eight weeks collecting and verifying data in collaboration with students and teachers at Noonkodin Secondary School in rural Eluwai village, Monduli District. Twenty-five individual interviews and three focus groups were conducted with local Maasai elders and 18 medicinal plants were documented in detail. The researchers also developed laboratory methods for extracting

essential oils from medicinal plants and using the oils to make soap. These procedures are helping Noonkodin establish a soap-making cottage industry whose revenues will benefit the school and its students. The soap project also provides Noonkodin students with the opportunity to explore their cultural and intellectual heritage and discover how traditional knowledge may be used in innovative ways. Finally, the printed guide to medicinal plants and traditional medicines produced in Fall 2011 will serve as a textbook for the Noonkodin Indigenous Knowledge curriculum and will be distributed to local elders and traditional healers who served as project consultants. In this way, the project will help to preserve knowledge of traditional practices that are often the only treatment option for rural people without access to biomedical health services.

Faculty sponsor: Lori Stanley

JACI WILKINSON '12

The Voice of Fanny Butcher: A New View of Chicago's Literary History through the Lens of the Newberry Library's Butcher Papers

Fanny Butcher was a vital figure as a literary critic in Chicago from the 1910s through the 1960s. In the course of her career as a literary critic and journalist, Butcher created a voice that was a product of such factors as her community, gender, employers, and education. Butcher also deliberately formed this voice to attract a certain audience. Her body of work consists of lectures, interviews, diaries, letters, and, most importantly, reviews and columns from her 60-year career at the *Chicago Tribune*. In 1972 she also published an extensive and problematic memoir titled *Many Lives, One Love*. I had the opportunity to study these primary materials in Fanny Butcher's papers at the Newberry Library in Chicago for three months. Based on my work with this archival material, my presentation will provide an analysis of the development of the voice that molded Butcher's literary output.

Faculty sponsor: Mark Muggli

SHANE WILSON '13

Two-Sex Deer Population Dynamics with Effects from Seasonal Harvesting

Considering the changes in deer population throughout the year, is it possible to use mathematical tools to track the population? We seek to formulate a mathematical model to

approximate a county's population of deer at a given time. The fluctuations in population are dependent not only on the carrying capacity of the environment and the proximity to fawn birthing season, but also on the number and variety of hunting licenses issued. In the formulation of our model, we assume that there are three types of licenses issued: archery, general firearm, and doe-only firearm. We further assume that the length of the archery season is significantly longer than the firearm season and the ratio of general to doe-only firearm licenses is predetermined; these assumptions allow us to segment the year into the deer's natural breeding season and the hunting seasons. The model is sex-specific, allowing us to track both doe and buck populations. By employing numerical methods to approximate the system of ordinary differential equations, we determine how many hunting licenses should be issued to establish a stable population of bucks and does.

Faculty sponsor: Kyle Fey

JENNIFER WINDER '12

Women in Transition: The Effect of Immigration on Religion

This original research examines the religious beliefs of self-identified Catholic women who have immigrated to the United States from Mexico. Although the fundamental beliefs of the Catholic faith are the same in the United States as they are in Mexico, most of the women interviewed for this study expressed some degree of change in the way they view or practice Catholicism. Through interviews and background research on the issues of religion and immigration, this study examines the many factors that have caused these women to change the way they view or practice their faith.

Faculty sponsor: David Thompson

JACOB WITTMAN '12, ANDREW WECKWERTH '12

Exploring the Dry Run Creek Watershed: Molecules, Microbes, and Macroinvertebrates

The Dry Run Creek Watershed is a 20,000-acre watershed just southwest of Decorah. This watershed, which drains through the Twin Springs Campground and empties into the Upper Iowa River just inside the city limits, has been designated as impaired by the state of Iowa because of elevated bacteria levels. A monitoring program was established to measure a variety of water quality parameters, including

pH, turbidity, conductivity, dissolved oxygen, E. coli, macroinvertebrates, and nitrogen and phosphorus-containing compounds. Monitoring was performed at 13 sites over two seasons (April–November in 2010 and 2011), with regular sampling scheduled each month and after heavy rains. Results suggest that rain events significantly increase levels of multiple parameters, including E. coli, and that several sites appear to be more significant contributors of chemical and bacterial load. Significantly, the more prominent sites for bacterial concentration exhibited some fluctuation when comparing rain versus non-rain events, suggesting different types of contributing sources. These data are being shared with Dry Run Creek landowners to assist with decisions and grant applications in regard to land-use changes.

Faculty sponsor: Jodi Enos-Berlage

DALLAS WULF '12

Life at the Bottom

One of the fundamentally beautiful features of the physical universe is the structure observable involving the tiniest building blocks that make up matter, particles known as quarks and leptons. By studying the simplest of these structures, involving just a pair of quarks, elementary particle physicists have the ability to draw significant conclusions about the composition of matter and the forces that govern its architecture. In this talk, I will attempt to paint a portrait of the methods employed in elementary particle physics and the goals of this branch of science, discuss in general terms about the goals of the study of elementary particles, and highlight some of the work I have had the opportunity to participate in with two international teams of physicists conducting experiments in Japan and at Cornell University in New York.

Faculty sponsor: Todd K. Pedlar

DALLAS WULF '12

Searching for Radiative Transitions in $h_b(nP)$ Bottomonium States

Quarks and anti-quarks of the same variety can form systems known as quarkonia, or bottomonia in the case of bottom quarks. However, these systems are not stable and, shortly after being formed, decay to systems that are energetically lower and more stable. Identifying these decay transitions, as well as measuring the frequency with which they occur, known as a branching fraction, offers valuable insight into the mediating

interaction responsible for decays, which, in the case of quarkonia, is the strong nuclear force. In this presentation, I will present the method I explored as part of my senior project to identify and measure the branching fraction of the transition from the $h_b(2P)$ bottomonium state to the $n_b(1S)$ bottomonium state via the emission of a photon. Such transitions are known as a radiative transitions.

Faculty sponsor: Todd K. Pedlar

JENNA YEAKLE '12

Faith Convictions and Environmental Commitment: An Interfaith Dialogue

Interfaith environmental efforts seem to be a growing social sphere, and peoples of faith have an important role because of their particular ways of viewing the world. This qualitative and highly exploratory research project focuses on individuals' thoughts and concerns about the current ecological crisis in light of their faith and understanding of the world. By interviewing six people in the Decorah community, I was able to find how these individuals came to understand their way of viewing the environment, what particular environmental issues they thought most important, and how their faith convictions are influential to those concerns. Then, I brought those six individuals together to further the discussion of faith and the environment by facilitating an interfaith dialogue. There were four dominant themes throughout the discussions, which included waste production, global poverty, food consumption, and concern for the future. However, each individual had a particular approach to the matter and based their beliefs on varying foundations, such as personal relationships, textual references, or life experiences.

Faculty sponsor: James Martin-Schramm

DI YIN '12

Conceptual Art in Photography: Expression of Time and Change, Evidence in Chinese Contemporary Art with Global Influences

In this two-fold presentation, I address and reflect on current themes in the conceptual art of Ai Weiwei, Maleonn, and Xu Bing, paying particular attention to the importance of place and memory in the work of these contemporary luminaries in Chinese art. By way of reflection on the way memory and place shapes us in profound and subtle ways, this presentation is accompanied by

photographic work I completed in China during the Summer 2011 for the exhibition, **物是人非** (It is. It isn't.)

Faculty sponsor: Richard Merritt

LUTHER COLLEGE