

# Student Research Symposium

Friday, May 8, 2015





# LUTHER COLLEGE

To the Luther Community:

Welcome to the annual Student Research Symposium at Luther College, one of the highlights of our academic year. The day will be filled with oral presentations, posters, hands-on demonstrations, and artistic performances that demonstrate 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. This year we have chosen two outstanding—and inter-related—student research projects to be presented together as our “keynote address.” These projects, by seniors Benjamin Nordquist and Margaret Steinberg, represent the kind of complex, interdisciplinary learning that Luther fosters to help our students and our society identify, understand, and address significant issues in our world. Their presentation will offer both insight into their projects and some reflection on their broader intellectual journeys at Luther. We are also pleased to be able to present a celebratory brass composition commissioned by our music program—a piece entitled “Homage,” by composer Mike d’Ambrosio, performed by the students of the Luther trumpet studio. A rousing chorus by our select first-year choirs, Aurora and Norsemen, will send us out across campus.

Following the opening session, the day will unfold with 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 listing sessions that illustrate the kind of lively and intriguing research being done in our common first-year spring course, Paideia 112: Enduring Questions.

The day will conclude with two evening performances: a full production of Mozart’s classic opera *The Magic Flute*, performed by students in our music program’s opera workshop; and a contemporary play, *Metamorphoses*, by Mary Zimmerman—based on Ovid’s classic poem—presented by students in our program in the visual and performing arts.

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

Sincerely,



Kevin Kraus  
Dean of the College

## STUDENT RESEARCH SYMPOSIUM DAY-AT-A-GLANCE

**SESSION I: 9:00–9:45 A.M.**

**OPENING EVENT: CELEBRATION AND KEYNOTE ADDRESS**

*Center for Faith and Life Main Hall*

- Research Reflections: Benjamin Nordquist '15, Margaret Steinberg '15
- Recognition of Symposium Participants: Kevin Kraus, dean of the college
- Luther College Trumpets (John Cord, conductor)
- Aurora and Norsemen (Jennaya Robison and Andrew Last, conductors)

**SESSION II: 10:00 A.M.–11:00 A.M.**

<i>Dahl Centennial Union, Mott-Borlaug</i>	<i>Dahl Centennial Union, Hammerskjold</i>	<i>Center for Faith and Life Recital Hall</i>	Valders 206	Olin 101	Olin 102	Olin 107	Preus Library, Hovde Lounge	Valders classrooms
Genes, Disease, and Survival	All About Rights	Composition and Performance	Change and the State	Accounting for Life	Notification Tools	Influential Art	Where the Heart Is	Paideia 112 Research (see separate brochure)

**SESSION III: 11:15–12:15 P.M.**

<i>Dahl Centennial Union, Mott-Borlaug</i>	<i>Dahl Centennial Union, Hammerskjold</i>	<i>Center for Faith and Life Recital Hall</i>	Valders 206	Olin 101	Olin 102	Olin 107	Preus Library, Hovde Lounge	Valders classrooms
Landscape, Starscape, Firescape	Inside International Conflict	The Power of Rhetoric	Real Life	Trade, Oil, and Chocolate	Information Organization	Dealing with Death	Myth, Mystery, and “Home”	Paideia 112 Research (see separate brochure)

**LUNCH BREAK: (12:15–1:00 PM)**

*Community Dessert Gathering: Complimentary desserts and ice cream novelties, Bentdahl Commons, Central Campus*

**SESSION IV: 1:00–2:00 PM**

Dahl Centennial Union, Mott-Borlaug	Dahl Centennial Union, Hammarskjöld	Center for Faith and Life Recital Hall	Valders 206	Olin 101	Olin 102	Dahl Centennial Union, Gallery (note location)	Preus Library, Hovde Lounge	Valders classrooms
Small Things: Up Close and Physical	Considering Conformity	Conflicts Within and Without	What Does Your Religion Say?	Nationalism and Politics	High Functioning Computers	Mother Mary? (Gallery Talk)	Spiders, Mermaids, and PBR	Paideia 112 Research (see separate brochure)

**SESSION V: 2:15–3:15 PM**

Dahl Centennial Union, Mott-Borlaug	Dahl Centennial Union, Hammarskjöld	Center for Faith and Life Recital Hall	Valders 206	Olin 101	Olin 102	Olin 107	Preus Library, Hovde Lounge	Valders classrooms
Biological Diversity	Diplomacy and Debate	Stereotypes, Archetypes, and Character	Decorah Documentaries	Global Human Development	Movement and Track(ing)	Needs of the Child	Islamophobia and the West	Paideia 112 Research (see separate brochure)

**SESSION VI: 3:30–5:00 P.M.**

Poster Session in Sampson Hoffland Laboratories Carlson Atrium/Valders Hall of Science Concourse (with refreshments and chamber music)

**EVENING EVENTS: 7:30 P.M., 9:30 P.M.**

7:30 p.m. Opera Performance: *The Magic Flute* (Center for Faith and Life Main Hall)  
 9:30 p.m. Theatre Performance: *Metamorphoses* (Center for the Arts Jewell Theatre)

## SYMPOSIUM SCHEDULE

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9:00–9:45 A.M.  
SESSION I

*Center for Faith and Life Main Hall*  
**Opening Convocation Celebration and  
Keynote Address**

- **Research Reflections:** Benjamin Nordquist '15, Margaret Steinberg '15
- **Recognition of Symposium Participants:** Kevin Kraus, dean of the college
- **Luther College Trumpets** (John Cord, conductor)
- **Aurora and Norsemen** (Jennaya Robison and Andrew Last, conductors)

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10:00–11:00 A.M.  
SESSION II

*Dahl Centennial Union, Mott-Borlaug*  
**Genes, Disease, and Survival**

*Faculty Moderator: Stephanie Fretheim*

**Sara Maronde '15**

**Matthew Borchart '16, Meg McClure '15**  
The Impact of Methyladenosine on mRNA  
Regulation by miRNA-RISC

**Jenna Johnson '16**

The Formation and Persistence of a  
Hydrogen Sulfide Cellular Memory  
in *C. elegans*

**Casey Liveringhouse '15**

Exposure to Excess Iron Citrate Decreases  
the Concentration of Glutathione in  
*Caenorhabditis elegans* Lacking daf-16

*Dahl Centennial Union, Hammarskjold*  
**All About Rights**

*Faculty Moderator: Ginger Meyette*

**Emily England '15**

“Simply Irrepressible”: The Conflicting  
Identity of Lucy Parsons

**Joshua Davis '15**

Norwegian Prisons: A Model for Change?

**Margaret Kienitz '16**

Abortion Access in Northeast Iowa

*Center for Faith and Life Recital Hall*

**Composition and Performance**

*Faculty Moderator: Anne-Marine Feat*

**Sarah Bauer '18**

**Patrick Pauloski '16, Sara Ranscht '16,  
Peter Swanson '15**

“Sonata for Two Cellos in C Major” by  
Boccherini

**James Deignan '15**

“i am a little church”: Music by James  
Deignan, with Text by e.e. cummings

**Tim Komatsu '15**

**Josh Harper '16**

Should We Empty the Theatre?

*Valders 206*

**Change and the State**

*Faculty Moderator: Rita Tejada*

**Lenny Ulloa Silva '16**

Multiculturalism and Immigration:  
Integration in Barcelona, Spain

**Joie Tanaka '16**

Kamidana in the Household during Meiji  
Japan

**Jordy Barry '15**

**Emily Sena '15**

A Post-Gender Society? Worldwide  
Newspaper Coverage in Dilma Rousseff's  
2014 Presidential Campaign

*Olin 101*

**Accounting for Life**

*Faculty Moderator: Don Jones*

**Jacqueline Kayeba '15**

Income and Wealth Inequality in the U.S:  
The Relationship between Business Strategies  
Employed by Some Corporations in Low-  
Wage Industries and the Increasing Income  
Inequality in the U.S.

**Libby Logsdon '15**

Beyond the Numbers: The Value of an  
Accounting Degree from a Liberal Arts  
College

**David Zalk '15**

The Effective Strategies of Behavioral  
Taxation: An Analysis of Modern Efforts  
to Incentivize Rational Decision Making

Olin 102

**Notification Tools**

(Computer Science Capstone Projects)

Faculty Moderator: Kent Lee

**Cadence Sawyer '15**

**Henry Jungbauer '15, Isabelle Krogh '15,**

**Laura Mesadieu '15**

Yodel: Location-Based Agenda and

Budgeting Tool

**Isaac Davis '15**

**Jacob Albee '15, Emily Platts '15**

PyDucker: Static Analysis Tool for Python3

Olin 107

**Influential Art**

Faculty Moderator: Kate Elliott

**Aaron Budihis '15**

Opera Performance as Subject Constitution:

Recognition, Fractured Truth, and the

Singing Body

**Callie Sonnek '15**

Martin Luther and Art

**Jill Hess '15**

Olaf J. Fosso Collection: A History of Galerie

Maeght Represented in Print

Preus Library, Hovde

**Where the Heart Is**

Faculty Moderator: Amy Weldon

**Sarah Rickertsen '16**

Hogwarts, a Home

**Jordan Blank '16**

The Repression of St. John Rivers

**Walker Nyenhuis '15**

Writing the Woods: Wilderness Encounters

in Contemporary American Nonfiction

Valders classrooms

**Paideia 112 Research**

(see separate brochure)

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11:15 A.M. – 12:15 P.M.

**SESSION III**

Dahl Centennial Union, Mott-Borlaug

**Landscape, Starscape, Firescape**

Faculty Moderator: Angela Kueny

**Bjorn Myhre '16**

**Evan Sowder '15**

*The Architecture of Sand and Stone*

**David Pfothenauer '15**

Searching for Secular Evolution

in Semi-regular Variable Stars

**Katelyn Storey '15**

Reconstructing Early-Holocene Fire

Regimes, Vegetation, and Extinct Megafauna

Populations in Northwest Wisconsin

Dahl Centennial Union, Hammarskjold

**Inside International Conflict**

Faculty Moderator: Laurie Iudim-Nelson

**Katherine Vorderbruggen '16**

A Warning to Everyone: An Examination

of Russian Foreign Policy and International

Implications of the Russo-Georgian War of

2008 and the Current Crisis in Ukraine

**Betsy Fawcett '17**

Counter-terrorism and Civil Rights

Infringements

**Emily Sena '15**

Diamonds are a Terrorist's Best Friend:

Breaking Down the Relationship Between

Commodities and Terrorist Financing

Center for Faith and Life Recital Hall

**The Power of Rhetoric**

(Communication Studies Senior Projects)

Faculty Moderator: Mark Johns

**Neal Abbott '15**

John 8:32- An Ideological Criticism of the

Representation of the Catholic Church in

Today's Media

**Jacob Lembezeder '15**

Rhetorical Criticism of the Anti-Semitic

Rhetoric of Nazi Germany

**Shelby Nelson '15**

Analyzing Main-Channel and Back-Channel

Tweets During the October Church of Latter

Day Saints General Conference

**Maia Pugh '15**

Building a Competitive Brand: How Food

Cooperatives are Meeting the Challenges of

the Growing Natural Food Industry while

Simultaneously Adhering to Principles that

Discourage "Big Business"

**Emily Stumpf '15**

"Greenwashing" and Environmental Rhetoric

in Advertising

Valders 206

### **Real Life**

*Faculty Moderator: Thomas Johnson*

**Carly Ellefsen '15**

*Jess Zottola: A Short Subject Documentary on a Gap Year*

**Nathan Bloechl '16**

**Dan Wheelock '15**

*It Gets Better: The Story of Dalton Ray*

**Emily Tope '15**

*American Storytellers: Exploring the Power of Writing in American Society*

Olin 101

### **Trade, Oil, and Chocolate**

*Faculty Moderator: Michael Engelhardt*

**Linnea Peterson '18**

*To Baghdad: The Economic Impacts of a Capital Shift*

**Nana Ama Odame '15**

*What Are the Effects of Hershey's Business on the West African Countries that Produce Cocoa?*

**Melody Elele '15**

*Oil, Political Power, and Diversification: Nigeria's Horror Story*

Olin 102

### **Information Organization**

*(Computer Science Capstone Projects)*

*Faculty Moderator: Kent Lee*

**Erik Dotseth '15**

**Kevin Bren '15, Gage Dykema '15, Collin Richman '15**

*One4All: The All-in-One Website*

**Nathan Lee '15**

**Timmah Kamoto '15, Chris Kempf '15**  
*Blue News*

Olin 107

### **Dealing with Death**

*Faculty Moderator: Robert Christman*

**Joie Tanaka '16**

*Religious Reactions to the Black Plague in Late Medieval Europe and 19th-century China*

**Melissa Tholen '15**

*The Plague and the Restoration Government: How the Plague of 1665 Affected the Public Opinion of Charles II and the Cavalier Parliament*

**Maja Proescholdt '15**

*The Fate of Joy: The Solitary Survivor of the Romanov Massacre*

*Preus Library, Hovde*

### **Myth, Mystery, and "Home"**

*Faculty Moderator: Laurie Zaring*

**Cassandra Misseldine '15**

*Milton's Female Eden: The Implications of Gendered Personification in *Paradise Lost**

**Callie Sonnek '15**

*The Frescos of Room Five in the Villa of the Mysteries*

**Cydney Haaland '15**

*Myth as a Shield: Shelley and Keats' Use of Classical Mythology as a Vehicle for Political Ideals*

*Valders classrooms*

### **Paideia 112 Research**

*(see separate brochure)*

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1:00–2:00 P.M.

### **SESSION IV**

*Dahl Centennial Union, Mott-Borlaug*

### **Small Things: Up Close and Physical**

*Faculty Moderator: Todd Pedlar*

**Amanda Hayden '16**

*An Exploration of Single Electron Capture*

**Zachary Stottler '15**

*Charm Meson Production in Decays of Bottomonium*

**Steve Sorenson '15**

*Modification of Aluminum Oxide Surfaces through Friction and Wear*

*Dahl Centennial Union, Hammarskjold*

### **Considering Conformity**

*Faculty Moderator: Holly Moore*

**Marley Crossland '15**

*"You Can't Change What I Never Chose": Choice and Change in the Disciplinary Mechanism of Conversion Therapy*

**Jesus Lucero '16**

*"Ain't I a Woman?" The Confines of Conformity*

**Marley Crossland '15**

*"Cartography of the Other"*

Center for Faith and Life Recital Hall  
**Conflicts Within and Without**  
(Communication Studies Senior Projects)  
Faculty Moderator: Kim Powell

**Anthony Chase '15**  
The Narrative Paradigm and Conflict  
Resolution

**Elliot Horst '16**  
The Bullied: An Autoethnography

**Nick Rauch '15**  
Identifying Gender Differences in Coaching  
Communication: How Players and Coaches  
Evaluate Their Communication Patterns  
with each Gender

**Josh Sirios '15**  
Privacy Boundary Turbulence Among  
Collegiate Athletes and the Media

**Rachel Skinner '15**  
Changing the Definition of Beauty: An  
Ideological Criticism of Dove's *Real Beauty*  
Sketches

Valders 206  
**What Does Your Religion Say?: Family,  
Faith, and Politics**  
Faculty Moderator: David Thompson

**Kate Gerike '16**  
Murray Bowen's Family Systems Theory and  
Application in the Church

**Anders Lund '15**  
Jews and Christians as a Part of American  
Buddhism

**Rachel Williams '15**  
Lobbying in Christ's Name: The Effect  
of Public Policy Advocacy on Christian  
Congregations and Churches

Olin 101  
**Nationalism and Politics**  
Faculty Moderator: Lori Stanley

**Calvin Waller '15**  
The Regional Implications of Hindu  
Nationalism in India

**Matthew Sullivan '15**  
Chinese Nationalism and Its Political  
Ramifications

**Michona Johns '15**  
*Maghrébin* Identity in France: Sociocultural  
Perceptions in Politics and Film

Olin 102  
**High Functioning Computers**  
Faculty Moderator: Michael Johnson

**Ales Varabyou '17, Stephen Becklin '15,  
Kirby Olson '17, Robbie Nesmith '16,  
Zechariah Smith '17, Ellen Widerski '16**  
Pink Autonomous Low-cost Multi Rotor  
(PALMR)

**John Doorenbos '16**  
Web-Enabled Datasets: Opening the Door to  
Computing Education Research

Dahl Centennial Union, Gallery  
**Mother Mary? (Gallery Talk)**  
Faculty Moderator: Ben Moore

**Jacob Clausen '15**  
The Virgin Commodified: A Critical  
Examination of the Madonna

Preus Library, Hovde  
**Spiders, Mermaids, and PBR**  
(Creative Writing)  
Faculty Moderator: Megan Strom

**Margaret Yapp '15**  
Strings: What Does it Mean to Grow Up?

**Laura Hayes '15**  
"In the Sight of the Spiders": A Short Story

**Katharine Hale '15**  
"Through the Glass": Setting and Realistic  
Detail in a Long Work of Fiction

Valders classrooms  
**Paideia 112 Research**  
(see separate brochure)

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2:15–3:15 P.M.  
SESSION V

Dahl Centennial Union, Mott-Borlaug  
**Biological Diversity**  
Faculty Moderator: Molly McNicoll

**Dan Gibson '15**  
Safety in Diversification: Predator Size and  
Species Diversity Increases Prey Survival

**Claire Dembsky '15**  
Effect of Flower Diversity on Bee Diversity in  
Three Tallgrass Prairies of Northeastern Iowa

**Kimberly Howell '15**  
Fungi that Benefit Plants: The Effect of  
Fungal Endophytes on the Competitive  
Ability of Indian Grass

*Dahl Centennial Union, Hammar skjold*  
**Diplomacy and Debate**

*Faculty Moderator: Matthew Simpson*

**Hannah Burmahl '16**

**Jordy Barry '15, Isaac Heins '18, Jake Putnam '15, Sarah Sturm '16, Katie Vorderbruggen '16**

Heroin, Sad Clowns, and the Russian Embargo: Luther's Speech, Competitive Acting, and Debate Showcase

**Jordy Barry '15**

**Raleigh Sims '16, Lydon Smit '15, Katie Vorderbruggen '16**

Small States and Their Sphere of Significance: The Imperative Role New Zealand Plays in the United Nations

*Center for Faith and Life Recital Hall*  
**Stereotypes, Archetypes, and Character in Film**

(Communication Studies Senior Projects)

*Faculty Moderator: Derek Sweet*

**Tyler Anderson '15**

When Masculinity Knocks: A Narrative Criticism of *Breaking Bad*

**Ethan Dahlquist '15**

Militarization of Police Forces and the Rise of the Warrior Cop Mentality

**Allyson Fillmore '15**

*To the Baltic*

**Robert Patino '15**

"You are Out of Your Element!": Defining Masculinity in *The Big Lebowski*

**Joshua Swanson '15**

The Virile Sword, Bow, and Axe

*Valders 206*

**Decorah Documentaries**

*Faculty Moderator: Thomas Johnson*

**Cody Arndtson '17**

*Nocturnal Designs: A Short Subject*  
Documentary on Decorah Artist, Jordan Kjome

**Neal Abbott '15**

*Ironhead (2015): Faculty/Student Collaborative Research Project*

**Emily Tope '15**

*Our Eagles: A Documentarian's Path to Discovery*

*Olin 101*

**Global Human Development**

*Faculty Moderator: Maryna Bazylevich*

**Holly Harris '15**

Striving for Human Development: A Study of the Growing Youth Population in Jordan

**Amalia Mongiat '16**

Adoption, Orphanages, and the Exploitation of Children in Cambodia

**Imsouchivy Suos '15**

The Impact of Innovation on K-12 Education in Cambodia

*Olin 102*

**Movement and Track(ing)**

*Faculty Moderator: Jayme Nelson*

**Abbey Syme '16**

*Fundamental Movements with Jenn Schmidt*

**Sara Maronde '15**

Getting in the Zone: The Thinking Behind a Detached State of Awareness for Runners and Dancers

**Hunter Prueger '18**

*The Phantom Carriage: A Film Score*

*Olin 107*

**Needs of the Child**

*Faculty Moderator: Lea Lovelace*

**Jennifer Bonnell '15**

**Lars Johnson '16**

Infusing Contemporary Art in the K-12 Curriculum

**Jenna Darsee '15**

Creating Strong, Effective Pre-Service Programs

**Paige Clark '15**

Heartbreaking and Brilliant: Parents' Journeys in Raising Children with Developmental Disabilities

*Preus Library, Hovde*

**Islamophobia and the West**

*Faculty Moderator: Todd Green*

**Benjamin Nordquist '15**

Intolerance and Islamophobia: Practices of Exclusion, Discrimination, Prejudice, and Violence in the West

**Margaret Steinberg '15**

The Politics of Saving Muslim Women: Rethinking Native Informant Narratives on Islam and Misogyny

Valders classrooms

**Paideia 112 Research**  
(see separate brochure)

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3:30–5:00 P.M.

**SESSION VI**

*Sampson Hoffland Laboratories Carlson Atrium/  
Valders Hall of Science Concourse*

**Poster Session**

Posters, with refreshments  
and chamber music

*Faculty Moderator: Claude Mertzénich*

**Anuradha Anantharaman '15**

Core Self Evaluations, Workload,  
and Counterproductive Work Behavior:  
The Benefits of a Positive Personality

**Zoe Bachman '16**

Non-native, Invasive *Rhamnus cathartica* and  
Its Relationship with Native Understory  
Plant Species in Oak-Hickory Forests in  
Northeast Iowa

**Allison Bird '15**

Cortisol Response to Ice Bath Treatment  
as a Function of Oral Contraceptive Use  
in Female Collegiate Athletes

**Clare Brandt '16**

A Comparison of the Grimms' Fairy Tale  
"Rapunzel" and the Disney movie *Tangled*

**Timothy Bumpus '15**

**Matthew Holcomb '15**

Titanium and Tantalum Complexes Bearing  
Optically Active Tartrates as Catalysts for the  
Polymerization of D,L-lactide

**Timothy Bumpus '15**

**Matthew Holcomb '15**

Towards the Synthesis of a Copper-based  
Catalyst Library for Use in Stereoselective  
Henry Reactions

**Kyrie Dailey '15**

Ponatinib May Reduce Ovarian Cancer  
Resistance to Saracatinib by Targeting  
Receptor Tyrosine Kinases

**Megan Feltes '16**

*Hoodwinked* is a Good Modern  
Representation of "*Rotkäppchen*" (Red Riding  
Hood)

**Kristen Flick '15**

The Effects and Implications of Stereotype  
Threat at Luther College

**Debra Hansberry '15**

The Influence of Human Familiarity  
and Attentional State on Eating Behavior  
in Blue Jays

**Kristianna Harris '15**

A Comparison of the Original Grimms' Fairy  
Tale "Cinderella" and the popular 1998 film  
*Ever After: A Cinderella Story*

**Anders Hopkins '15**

The Motives for Julius Caesar's British  
Invasions

**Brianna Hopp '15**

Luther College Nursing Students: The Stress  
Experience and Recommendations for Stress  
Reduction

**Brianna Hopp '15**

Describing Carbapenem-Resistant  
Enterobacteriaceae (CRE) and Its Implications  
in Health Care: A Literature Review

**Travis Houle '15**

Adaptability of Key Phytoplankton Species  
to Ramped Ocean Acidification: Implications  
for Marine Diversity and the Global Carbon  
Cycle

**Devon Hovey '15**

Spectral Evolution of Sea Surface  
Temperature Change in the Southwest  
Pacific from 3 Million Years Ago to the  
Present

**Katherine Huska '15**

Evolution of Pacific Meridional and Zonal  
Temperature Gradients over the Plio-  
Pleistocene

**Jonathon Kaupa '17**

Grimm's "Frau Holle" in the DEFA film:  
Promoting Communism?

**Logan Kochendorfer '15**

Mom and Dad's Influence: Daughter-  
Guarding, Attachment, and Mating  
Preferences

**Pablo Lopez Alonso '17**

The Declarative-Procedural Model: Scientific  
Evidence for Better Language Learning

**Jessica Mara '15**

ObesiTV: A Public Health Nursing  
Perspective on Childhood Obesity  
and Screen Time

**Colin Martin '15**

"Hansel and Gretel": Humperdinck's Opera  
and Grimm's Fairy Tale

**Alayna Nelson '16**  
Black Death in England

**Kara Pedersen '15**  
Black Plague: Impacting More Than Just Bodies

**Laura Post '16**

**Robert Manges '15**  
The Effect of a calR Mutation on *Vibrio parahaemolyticus* Gene Expression under Varying Calcium and Iron Conditions

**Maia Pugh '15**

**Lenny Ulloa Silva '16**  
"Without Others, We Don't Exist": Applying Symbolic Interactionism Theory to Evaluate the Cyclical System of Racism and Discrimination in the Spanish Film, *Princesas*

**Alexandra Scharmer '16**  
Psychological Well-Being Differences Between Atheists, Agnostics, and Fundamentalists

**Jennifer Schmidt '15**  
Smallpox and the Effect It Had on Our World

**Mary Schmidt '15**  
A Multidisciplinary Approach to Explore the Benefits And Barriers of Family Presence During Resuscitation

**Mary Schmidt '15**  
Ebola in Our World: Identifying Factors and Situations that Promote This Emerging Disease

**Claire Seitzinger '16**

**Laura Boran '16, Reed Johnson '16**  
Lactones Derived From Fatty Acids: New Monomers for the Production of Bioplastics

**Stephen Shatzer '16**  
*La Cenerentola*: The Italian Operatic Interpretation of Charles Perrault's Cinderella Story

**Clare Slagel**

**Anne Turco '16**  
The Effect of Celiac and Renal Denervation in Angiotensin-Induced Hypertension

**Mitchell Stenoien '17**  
Hans Christian Andersen's "The Snow Queen" and *Frozen*

**Daniel Stover '16**

**Clare Slagel '16, Kolin Walker '15**  
Investigating the Selective Autophagy of Ubiquitinated Proteins in *Saccharomyces cerevisiae*: Implications for Neurodegenerative Diseases

**Dylan Winston '15**  
Spin Torque through pi and 2pi Domain Walls

**Chrisann Zuerner '15**  
Grimms' "*Aschenputtel*" and Rogers and Hammerstein's 1957 TV film *Cinderella*

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

Biology 232: Microscopy

Biology 250: Restoration and Conservation Biology

Biology 354: Evolutionary Biology

Biology 367: Endocrinology

Mathematics 328: Applied Statistics

Mathematics 395: Independent Study

Nursing 295: Directed Readings

Nursing 490: Senior Project

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7:30 P.M.

**Opera Performance:**

***The Magic Flute***

Center for Faith and Life, Main Hall

Students from our music program will present *The Magic Flute* by Wolfgang Amadeus Mozart. Though he excelled in many musical genres, Mozart's mastery in composing for the lyric stage is perfectly showcased in this, his final opera. *The Magic Flute* takes place in a magical world that parallels our own Medieval period. It tells the story of a young prince, Tamino, who sets out to rescue Pamina, the daughter of the Queen of the Night. He is joined in his quest by the bird catcher Papageno, and the heroes are aided by Tamino's magic flute and Papageno's magic bells. Their quest leads them to discover that all is not as it seems, and the Queen is in fact the villain of the story. Tamino and Pamina instead seek out wisdom, and Papageno seeks a girl of his own.

Directed by Jacob Lassetter, assistant professor of music (stage director), and Karen Kanakis, associate professor of music (musical preparation), the performances will be sung in English, and accompanied by the Luther College Chamber Orchestra, conducted by Daniel Baldwin, professor of music.

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9:30 P.M.

**Theatre Performance:**

***Metamorphoses***

Center for the Arts, Jewell Theatre

Freely adapted from Ovid's narrative poetry, Mary Zimmerman's *Metamorphoses* recreates ancient myths in decidedly contemporary fashion. In some cases, she transports characters into our time: King Midas is recast as a corporate mogul, and Phaeton tells his tragic story to his therapist. Furthermore, the series of vignettes experiment with storytelling itself: the myth of Eros and Psyche unfolds through a series of questions, narrators mix with the action to tell stories, and Zimmerman encourages an overall staging that "should provide images that amplify the text, lend it poetic resonance, or, even, sometimes contradict it." This production of *Metamorphoses* takes Zimmerman's last exhortation as a jumping-off point for exploring physicalization in storytelling and in staging these myths to speak to our time. We have tried to create physical vocabularies that both lend emotional power to the scenes and stimulate a kind of productive bafflement in the audience. Our hope is to create an emotionally charged ambiguity that will engage the audience even after they have left the theater.

Presented by students from our visual and performing arts program and directed by Robert Vrtis, assistant professor of theatre.

## 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)

NEAL ABBOTT '15

### **John 8:32- An Ideological Criticism of the Representation of the Catholic Church in Today's Media**

The Roman Catholic Church is one of the most powerful religious bodies in the world, serving more than 1.2 billion Catholics across the globe. Because of the church's rich history, tradition, and population, the ways in which the church, its leaders, and its doctrine are presented in today's media warrant examination. Using the ideological method of rhetorical criticism, this project seeks to define the media's representation of the church in recent months, following the Extraordinary General Assembly of the Synod of Bishops in the fall of 2014, while simultaneously analyzing the "controversial" rhetoric of Pope Francis that preceded it. The broader implications of this project involve how the media frames the Roman Catholic Church, which ties directly into the ways messages about it are sent into the public sphere for consumption and conversation.

*Faculty sponsor: Thomas Johnson*

NEAL ABBOTT '15

### ***Ironhead* (2015): Faculty/Student Collaborative Research Project**

*Ironhead* (2015) documents the creative artistry of Kelly Ludeking (ironmonger, sculptor, and teacher), as well as the Down on the Farm Iron Pour, a gathering of local, regional, and international artists collaborating to make cast iron art, held annually at the Ludeking farm in Decorah, Iowa. Produced by Thomas Johnson, assistant professor of communication studies, and Neal Abbott, communication studies student, with music by Brooke Joyce, associate professor of music and composer-in-residence, and color by Aaron Lurth, director of visual media, this film stems from a student/faculty collaborative research project the Dean's Office was kind enough to fund this past summer. In this presentation, Abbott will discuss all of the phases of production and particular challenges faced in the process, in addition to screening a few select scenes from the film itself.

*Faculty sponsor: Thomas Johnson*

### **ANURADHA ANANTHARAMAN '15 Core Self Evaluations, Workload, and Counterproductive Work Behavior: The Benefits of a Positive Personality**

Counterproductive work behaviors such as employee theft and withdrawal have become an important concern in most workplaces due to the negative impact they have on the social climate and overall performance of an organization (Dalal, 2005). Core self-evaluations—broadly defined as an individual's appraisal of his/her self-worth and abilities—represent a relatively new personality construct that has been shown to lead to important work outcomes (Judge *et al.*, 2003). However, no research to date has been conducted on core self-evaluations in relation to counterproductive work behaviors. Accordingly, the present study hypothesized that employees with high core self-evaluations would engage in less counterproductive work behavior. Additionally, we examined whether core self-evaluations would moderate the relation between a common work stressor—employee workload—and counterproductive work behavior. The results showed a significant main effect of core self-evaluations on counterproductive work behavior. Additionally, the interaction between core self-evaluations and workload approached significance, suggesting that core self-evaluations may be impacting the relationship between workload and counterproductive work behavior. The present study advances previous research by examining a novel personality construct in the context of work stress and counterproductive work behavior research.

*Faculty sponsor: Justin Sprung*

TYLER ANDERSON '15

### **When Masculinity Knocks: A Narrative Criticism of *Breaking Bad***

*Breaking Bad*, a crime drama that aired on AMC from 2008 to 2013, is one of the most popular and critically acclaimed television series of the past five years. The series, which tells the story of cancer-stricken chemistry teacher turned ruthless meth manufacturer Walter White, can serve as a launching point for discussions about numerous aspects of American society. *Breaking Bad*, through its portrayal of Walter as a husband and father

within a nuclear family, reflects certain pressures put on men in the United States regarding their relationships with both their families and society as a whole. This study addresses how *Breaking Bad* serves as a critique of expectations of masculinity by showing how these expectations, taken to an extreme, lead to harmful effects. Through the method of narrative criticism, this study will analyze the characters and events of *Breaking Bad*'s first season and uncover ways in which expectations of masculinity shape the narrative. It will also shine a light on how the narrative of *Breaking Bad* can be used to inspire discussions about expectations of masculinity in the real world.

Faculty sponsor: Thomas Johnson

CODY ARNDTSON '17

**Nocturnal Designs: A Short Subject Documentary on Decorah Artist, Jordan Kjome**

Produced by Cody Arndtson, *Nocturnal Designs* (2014) is a short subject documentary film chronicling Decorah resident, Jordan Kjome. A self-taught light painting photographer, Kjome's work involves the use of light tools and long exposure to capture night-time images. The aim of this film is to expose audiences to Kjome's process and work. In this presentation, I will offer key insights into the filmmaking process, screen the entire film, and conclude with final reflections.

Faculty sponsor: Thomas Johnson

ZOE BACHMAN '16

**Non-native, Invasive *Rhamnus cathartica* and Its Relationship with Native Understory Plant Species in Oak-hickory Forests in Northeast Iowa**

*Rhamnus cathartica* (European buckthorn) is an invasive woody species in the upper Midwest that creates high-density infestations in native communities. Two ways *R. cathartica* may negatively impact the native plant community include: dense foliage that shades the forest understory from spring to late fall, and through the production of emodin, a secondary chemical compound that has been shown to inhibit growth of frogs. Despite anecdotal observations of low understory diversity where *R. cathartica* is abundant, it is unclear whether native plant species can coexist with high densities of *R. cathartica*. In this observational field study, in June 2014 late spring and early summer flora were assessed in native oak-hickory forest with and

without *R. cathartica* infestation. Species richness and abundance of the understory were quantified and the presence of *R. cathartica* was correlated with a lower native herbaceous abundance and richness. This study is important in order to determine the relationship between *Rhamnus cathartica* and native species, and data from this study will be used as a baseline for future studies of *Rhamnus cathartica* control during the restoration process of the research site.

Faculty sponsor: Molly McNicoll

JORDY BARRY '15

RALEIGH SIMS '16, LYDON SMIT '15,  
KATIE VORDERBRUGGEN '16

**Small States and Their Sphere of Significance: The Imperative Role New Zealand Plays in the United Nations**

The Model United Nations team represented Luther at the American Model United Nations International Conference in Chicago, where they were announced as the Outstanding Top Delegation for the second year in a row. Students represented committees addressing a number of issues, including economic and social issues, humanitarian issues, legal negotiations between countries, debates on disarmament, discussions about cultural issues, and the simulation of the Security Council of 1993 (following the actual events that happened that year). Students were partnered up and conducted in-depth research about international issues from the perspective of the small island nation of New Zealand. Despite the state being small in size, New Zealand played a pivotal role in the passing of multiple resolutions at the conference, including human trafficking, the rule of law at the international and national levels, strengthening humanitarian assistance, and external debt sustainability. Luther students who actively worked on resolutions and engaged in dialogue at the conference will share their findings from their research and through their dialogue with students from across the country.

Faculty sponsor: Pedro dos Santos

JORDY BARRY '15

EMILY SENA '15

**A Post-Gender Society? Worldwide Newspaper Coverage in Dilma Rouseff's 2014 Presidential Campaign**

The re-election of Brazilian president Dilma Rouseff in October of 2014 was the most contested election since that country's return to

democracy. It was also one of the most eventful campaigns in recent memory. Dilma's second-round election win over Aécio Neves saw the smallest margin of victory in the seven democratic presidential races of the modern Brazilian democratic period. The election also featured a first-round campaign marked by the death of a candidate and the meteoric rise and fall in the polls of the replacing candidate, Marina Silva. Nevertheless, one of the most impressive aspects of this election was not widely discussed in the media: the fact that two women were among the contenders and that a woman won (for the second time) the presidency of a country notorious for its *machismo* culture and low participation of women in politics. In the context of the power held by the media that permeates public perception of electoral candidates, we conducted cross-national comparative research of 54 newspapers spanning 18 countries. We found that gender permeates media portrayals of women candidates in subtle ways, and that news coverage on Brazil's election varies greatly across countries. We will discuss in more detail the curious case of the *Wall Street Journal's* coverage of the the election, a coverage that showed clear bias and subtle gendered tones.

*Faculty sponsor: Pedro dos Santos*

SARAH BAUER '18  
 PATRICK PAULOSKI '16, SARA RANSCHT '16,  
 PETER SWANSON '15  
**“Sonata for Two Cellos in C Major” by Boccherini**

The four of us participated in Cello Daze, an event that happens once a year in Iowa City where cellists of many different ages, skill levels, and institutions come together and play music. It is not very common to have the opportunity to play music meant specifically for cellos with so many people. In the spirit of what we learned at Cello Daze, we will present “Sonata for Two Cellos in C Major” by Luigi Boccherini. While the title is “Sonata for Two Cellos,” a more accurate title would be “Sonata with Two Cello Parts”; it was common for such a piece to be treated more as an ensemble piece than a duet. We will play the first and last movements of the sonata, which have an upbeat and melodic character.

*Faculty sponsor: Eric Kutz*

ALLISON BIRD '15

**Cortisol Response to Ice Bath Treatment as a Function of Oral Contraceptive Use in Female Collegiate Athletes**

Cortisol, a steroid hormone released from the adrenal gland in response to stress, is known to reduce inflammatory responses. It is also known that sustained, high levels of cortisol can be detrimental to the immune system. Cold-water bath treatments are commonly administered to athletes following training or competition, and are believed to aid post-exercise recovery. It is likely that part of the benefit obtained from the cold-water treatment may be due to elevated cortisol levels. Other investigators have shown that the use of oral contraceptives may interfere with the cortisol response to certain stimuli. The purpose of the current research was to determine whether the cortisol response in female collegiate athletes to an ice bath stimulus is affected by the use of oral contraceptives. Female athletes were recruited and placed in two groups based on self-reported use/non-use of oral contraceptives. All participants submerged themselves from the waist down in 50° F water for 10 minutes, during which intermittent salivary samples were collected for cortisol concentrations. Additionally, cortisol concentrations were determined 15 and 30 minutes after exiting the bath. Results indicate a significantly higher cortisol response in the 15- and 30-minute post-exit samples in those using oral contraceptives.

*Faculty sponsor: Mark Eichinger*

JORDAN BLANK '16

**The Repression of St. John Rivers**

While psychoanalysis is controversial in the field of psychology, it remains a viable form of criticism for literary analysis, chiefly due to its usefulness for analyzing a character's motivations. This form of literary criticism is particularly useful in analyzing the character St. John Rivers from Charlotte Bronte's 1847 novel *Jane Eyre*. St. John Rivers represses his feelings of love and attraction and develops psychological defenses to avoid those desires. I analyzed St. John's dialogue and interactions with other characters, specifically Jane Eyre and Rosamond Oliver, to determine why he does not pursue a romantic relationship with the latter. Using psychoanalytic techniques and scholarship, I determined that St. John represses his desire for Rosamond and develops the psychological defenses of fear of intimacy, denial, and projection to maintain

his repression. Ultimately, St. John projects his desire for Rosamond onto Jane, leading him to pursue a marital relationship with Jane. Textual and psychoanalytic analysis provides insight into St. John's motivations for his actions concerning these two women. An understanding of St. John's repression can further illuminate the motivations and actions of other characters in *Jane Eyre* and subsequently persons within the larger context of Victorian-era England.

*Faculty sponsor: Amy Weldon*

NATHAN BLOECHL '16

DAN WHEELOCK '15

### ***It Gets Better: The Story of Dalton Ray***

Emphasizing verbal commentary and an argumentative logic, as well as interaction between filmmaker and subject, *It Gets Better: The Story of Dalton Ray* is a short subject documentary film produced by Nathan Bloechl and Dan Wheelock that aims to chronicle the life of Dalton Ray, a former high school football player from Edgerton, Wisconsin, who, while still playing, revealed to his coaches, his teammates, and his community that he is gay. Because sport is so prevalent within society, we often exalt athletes, and when they talk, we listen. When an idea or belief is accepted in the world of sport, it is often accepted in society. Sport, then, is a place for cultural discussion and, in some cases, social change. Today, the ideas of masculinity and femininity, as well as sexual orientation, leave little room for people who do not fit societal gender norms. Sport has the opportunity to alter that. We argue that if the hyper-masculine domain of football can accept gay and lesbian athletes, the broader public can rightfully acknowledge gender and sexual diversity as well. In this presentation, we will discuss our script and research, pre-production, production, and post-production, and screen select scenes/footage from the film.

*Faculty sponsor: Thomas Johnson*

JENNIFER BONNELL '15

LARS JOHNSON '16

### ***Infusing Contemporary Art in the K-12 Curriculum***

In our current educational climate, teachers are expected to meet national standards, meet student interest, explore current technology trends, and differentiate for all learners while operating on a very small budget. Infusing contemporary art into the curriculum may seem like a daunting

challenge on top of it all. This presentation will highlight how K-12 educators may meet the standards, make easy cross-curricular connections, and be relevant with students just by incorporating art of the now into their current curriculum. This presentation was accepted and presented at the annual Art Educators of Iowa Conference in October 2014.

*Faculty sponsor: Lea Lovelace*

CLARE BRANDT '16

### ***A Comparison of the Grimms' Fairy Tale "Rapunzel" and the Disney movie Tangled***

The 1812 story of Rapunzel is the quintessential tale of a damsel in distress, locked in a tower, powerless and helpless, waiting for a Prince Charming to come to her rescue. Situations such as this are common in the Brothers Grimm fairy tales. The romanticized idea of the maiden waiting for the perfect man to come to her rescue was a literary device in Grimm tales for promoting a patriarchal society. Since that time, however, many of their classic tales have been reimagined, preserving the gist of the story, but changing some of the themes to appeal to a modern audience. My project compares the original Grimms's fairy tale and the 2010 Disney movie *Tangled*. In the original tale, Rapunzel's hair represents a device with which her captors control her, since it brings the witch and then Rapunzel's Prince Charming up to her tower in order to exploit her. In the modern film, however, Rapunzel's hair appears as a device that gives the young woman agency, since, with its magical powers, she is able to help herself and others. My poster shows an examination of the major differences between the two versions and focuses on the role of Rapunzel's hair as it transforms "Rapunzel" from a tale of a damsel in distress into a feminist statement in *Tangled*.

*Faculty sponsor: Ruth Kath*

AARON BUDIHAS '15

### ***Opera Performance as Subject Constitution: Recognition, Fractured Truth, and the Singing Body***

This paper will explore opera as a site of subject constitution, where various discourses and power relations interact with, and are influenced by, both audience and performer. Hegel's notion of the desire for recognition is applied as the central theoretical framework behind performance. Hegel's idea of the origin of the self-aware subject is complicated and enriched by more contemporary understandings of the self. Michel

Foucault's work on confession and "techniques of the self" provide a useful lens through which we can interpret the process of preparing for, and executing, a performance. The ideas of both Hegel and Foucault are synthesized and expanded upon through the work of Judith Butler, who brings the role of the body and the limits of confession into the discussion. Opera performance will be shown to involve the creation and expression of many, potentially contradictory, subjects and truths.

*Faculty sponsor: Holly Moore*

TIMOTHY BUMPUS '15  
MATTHEW HOLCOMB '15

### **Titanium and Tantalum Complexes Bearing Optically Active Tartrates as Catalysts for the Polymerization of D,L-lactide**

The physical properties of polylactide (PLA), especially its rates of chemical and biological degradation, are determined by the three-dimensional orientation of the substituents along the polymer chain (*i.e.*, its microstructure). Considerable effort has been devoted to controlling PLA microstructure, and numerous catalysts have been developed towards this end; notably, many of these catalysts possess optically active ligands. Recently, attention has been paid to the development of titanium- and tantalum-based lactide polymerization catalysts due to their potential for both high activity and biocompatibility. We report the preparation and ability of titanium and tantalum complexes bearing optically active tartrate ligands to catalyze the polymerization of D,L-lactide. Specifically, we discuss the effect of ligand architecture upon the rate of the polymerization reactions, as well as on the microstructure of the resultant polymers.

*Faculty sponsor: Brad Chamberlain*

TIMOTHY BUMPUS '15  
MATTHEW HOLCOMB '15

### **Toward the Synthesis of a Copper-based Catalyst Library for Use in Stereoselective Henry Reactions**

Compared to its homogenous analog, a heterogeneous, supported catalyst allows for higher recovery of the catalyst following a chemical process; this, in turn, leads to (a) a product free of trace metallic contaminants, and (b) lower consumption of environmentally limited resources (such as the precious or semi-precious metals often used in catalysts). Increasingly, asymmetric catalysts employing chiral supports are being investigated; often,

bio-based, enantiopure amino acids are used to construct the chiral supports. Herein, we present (1) our construction of a library of chiral catalyst supports using the amino acids valine, proline, and tryptophan; and (2) the use of these supports in the asymmetric, copper-catalyzed Henry (nitroaldol) reaction. Particular attention is paid to the effect of the chiral support on the yield and stereoselectivity of the reaction.

*Faculty sponsor: Brad Chamberlain*

HANNAH BURMAHL '16  
JORDY BARRY '15, ISAAC HEINS '18, JAKE PUTNAM '15, SARAH STURM '16, KATIE VORDERBRUGGEN '16

### **Heroin, Sad Clowns, and the Russian Embargo: Luther's Speech, Competitive Acting, and Debate Showcase**

Throughout the 2014–2015 competition season, the Luther Forensic Speech, Debate, and Competitive Acting team has traveled throughout the country performing in platform, interpretation/acting, extemporaneous, and debate categories. Topics will range from parliamentary debates on the possibilities of a Russian embargo, dramatic interpretation on alcoholism, program oral interpretation of depression amongst the comedian community, prose on the effects of heroin in the entertainment world, and impromptu speeches performed from a randomized quotation. Students will perform sections of their pieces in a humorous, dramatic, and informative light. The overarching goal of these performances is to leave the audience with a greater sense of understanding over a wide myriad of issues that impact members of the Luther community and as global citizens.

*Faculty sponsor: Kim Powell*

ANTHONY CHASE '15  
**The Narrative Paradigm and Conflict Resolution**

Walter Fisher's Narrative Paradigm is based on the assumption that all humans use narrative to communicate with one another. Fisher believed all people possess an equal ability when determining whether an event/story is good or bad. Mainly featured in the Narrative Paradigm are the evaluation criteria of Narrative Rationality and Narrative Fidelity. However, Fisher's paradigm does not deal with interpersonal conflict resolution. This absence is problematic due to Fisher's belief that the Narrative Paradigm

has the potential to be used in every possible communication instance. If Fisher doesn't include a prescriptive approach for conflict resolution, which is an everyday part of life for many people, then how can the Narrative Paradigm be universally applied? This analysis of the Narrative Paradigm adds to conversation regarding the paradigm's applicability.

*Faculty sponsor: Kim Powell*

PAIGE CLARK '15

### **Heartbreaking and Brilliant: Parents' Journeys in Raising Children with Developmental Disabilities**

Parenting usually means putting the needs of your child before your personal desires. Yet, this sacrifice does not mean that social workers and other service providers should ignore the experiences of parents, especially those who are raising children with developmental disabilities. Considerable research is devoted to how parenting techniques affect the well-being of a child, but little is studied about the parents' experience of coping and adapting to raising a child with developmental challenges. This qualitative study is conducted by performing five in-depth, semi-structured interviews with parents whose child struggles with a developmental disability, in hopes of understanding parents' experiences. The purpose of this study is to begin to fill the gap of research about how parents and families are affected by a child's disability. After analyzing the data, this study investigates four themes that arise from the interviews: misunderstanding, education, social support, and the wide range of feelings that go along with raising a child with disabilities. This research will enhance the quality of service that parents of children with developmental disabilities receive from helping professionals.

*Faculty sponsors: Britt Rhodes, Ginger Meyette*

JACOB CLAUSEN '15

### **The Virgin Commodified: A Critical Examination of the Madonna**

Throughout the history of religious art, particular modes of representation and symbols have been used in various artistic portrayals of the Virgin Mary. When examined through a critical lens, these symbols and forms of representation appear to be quite sexual and, by extension, misogynistic in nature. In response to my research I have created an art series that exemplifies these themes and aims to invite critical discourse and

conversation. This presentation will function as an artist's talk, with a focus on my art and the research that informs it. My examination analyzes the existence of Mary as the saintly Madonna and the reduction of her identity to child-bearer and virgin, void of sexuality. It is argued that her role is necessarily virginal and perpetuates femininity as passive receptivity. My research explores the numerous depictions of sexuality found within Marian imagery and the misogyny that often accompanies it. Utilizing the writings of psychoanalyst Julia Kristeva, Luce Irigaray, and the works of various other scholars, this examination explores themes of motherhood, corporeal boundaries, bodily fluids, eroticism, and virginity.

*Faculty sponsor: Ben Moore*

MARLEY CROSSLAND '15

### **"Cartography of the Other"**

In "Cartography of the Other," I utilize intersectional narratives from the margins to give representation to the diverse experiences of gender and sexuality minority students. Influenced by *The Vagina Monologues*, which I directed in spring of 2014, this piece highlights intersectional queer identities as well as contemporary queer political issues through the stories of queer college students, and displays the varied ways that queer is enacted in the college setting. Through this work of creative non-fiction, I explore questions of self, identity, and queer politics while recognizing and affirming marginalized identities. I seek to communicate the ways in which experience as a gender and sexuality minority (GSM) may be different from common representations and tropes of GSM people, and the ways in which it exceeds both mainstream gay politics and queer theory. To explore these tensions, I have given voice to the subjects of these experiences so that narrative may be used politically to foster social understanding and intelligibility.

*Faculty sponsor: Amy Weldon*

MARLEY CROSSLAND '15

### **"You Can't Change What I Never Chose": Choice and Change in the Disciplinary Mechanism of Conversion Therapy**

In this essay, I examine the practice of conversion therapy, which seeks to cure homosexuality, through using a Queer Theoretical framework. I focus especially on Foucault's analysis of disciplinary mechanisms, arguing that conversion therapy might be seen as a practice of corrective

punishment in a system of sexual discipline, which operates to correct deviant sexuality and train non-heterosexual people, especially gay men, to perform hegemonic masculinity—thus forming them into model, docile citizens. I employ this framework to investigate what societal values lie behind the practice of conversion therapy, to rethink the way in which people discuss and debate conversion therapy, and to recommend ways in which one might take action against this damaging practice. This research focuses primarily on a theoretical and ethical consideration of conversion therapy, and while I invoke legislation as a way to confront conversion therapy, the paper does not cover an in-depth legal analysis of any bills that are discussed, since this has been investigated by others. However, evaluating contemporary queer political issues such as conversion therapy through a Queer Theoretical framework is crucial because it opens up new modes of thinking about and finding ways to engage these issues.

*Faculty sponsor: Holly Moore*

ETHAN DAHLQUIST '15

### **Militarization of Police Forces and the Rise of the Warrior Cop Mentality**

Using rhetorical criticism and the works of Kenneth Burke, this paper highlights the militarization of the U.S. police forces and the constancy that exists in relation to the U.S. military as evidenced in three films. Themes evident throughout the films *Homefront*, *White House Down*, and *Sabotage* shed light on a disturbing trend in American film—the glorification and normalization of the “warrior cop” mentality—and illustrate how this trend poses a threat to contemporary democracy. Discrepancies between police and civilian statements, and the recurring incidences of excessive force and brutality by police, have strained the relationship between some communities and the people tasked with serving and protecting those communities. Unpacking the mediated normalization of the warrior cop mentality in film provides a starting point by which to call for increased transparency and accountability on behalf of police departments and SWAT units across the nation. Bringing attention to this emerging representation might serve as an additional voice advocating for widespread investigations into police brutality and misconduct, thereby improving the chances for significant reform.

*Faculty sponsor: Derek Sweet*

KYRIE DAILEY '15

### **Ponatinib May Reduce Ovarian Cancer Resistance to Saracatinib by Targeting Receptor Tyrosine Kinases**

This study addresses the inherent resistance of several ovarian cancer cell lines to the chemotherapy drug saracatinib. Biomarkers of resistance and sensitivity would greatly improve our ability to treat extremely aggressive ovarian cancers by enabling the use of personalized medicine. Increased expression of pituitary tumor transforming gene 1 (PTTG1) correlates with the resistance of certain ovarian cancer cell lines to saracatinib and is therefore thought to be a biomarker of resistance toward this drug. Saracatinib targets phosphorylated Src (p-Src) protein (a product of the proto-oncogene Src), which interacts with many receptor tyrosine kinases (RTKs). Fibroblast growth factor receptors (FGFRs) (and specifically FGFR2) are one of several types of RTK families that contribute to successful cell proliferation and motility in ovarian cancers. The goal of this project was to treat saracatinib-resistant cell lines with ponatinib (a drug targeting multiple RTKs) or AZD4547 (a drug targeting FGFRs only) as a possible means to make resistant cell lines sensitive to saracatinib, therefore increasing effectiveness of treatment with saracatinib. Ponatinib and saracatinib were found to have a synergistic effect on IC50, decreasing it and bringing it close to clinically attainable amounts, but did not decrease Src or PTTG1 levels. This outcome suggests that one or multiple RTKs other than FGFR2 are inhibited by ponatinib and interact with a biomarker other than PTTG1.

*Faculty sponsor: Marian Kaehler*

JENNA DARSEE '15

### **Creating Strong, Effective Pre-Service Programs**

With an abundance of growing resources for pre-service educators in all disciplines, it is important for art educators to follow the same implementations as others. In this presentation, as pre-service representative for the state of Iowa, I consider the challenges and offer solutions to creating and retaining a more engaged pre-service body of art educators at the collegiate and state level. Current pre-service programs were studied at both levels to ensure preparation of the most effective student-led organizations. The presentation focuses on ways to grow accountability, membership, and opportunities for student-led education organizations both at the

state level and in their individual schools, based on my experience working with the Art Educators of Iowa and resurrecting the Luther Art Educators Association on campus.

*Faculty sponsor: Lea Lovelace*

ISAAC DAVIS '15

JACOB ALBEE '15, EMILY PLATTS '15

**PyDucker: Static Analysis Tool for Python3**

Python is a programming language that does not strongly enforce rules about correctness of the code before execution time. This lack of static analysis leads to the possibility of errors when a Python program is running. In contrast, programs written in other programming languages where tools and procedures that statically check to see if code is correct have fewer chances of encountering run-time errors. Our project was to write a tool that statically checks for the possibility of errors in Python programs. To do this, we require users to add additional hints about their code. Our project builds a tree structure out of a programmer's code, which our project then analyzes for type errors. Our presentation will showcase this tool and describe the process we used to create it.

*Faculty sponsor: Kent Lee*

JOSHUA DAVIS '15

**Norwegian Prisons: A Model for Change?**

The recent growth in the American correctional system is a severe and costly problem. An unprecedented one out of every 108 U.S. adults were incarcerated in 2012, and 68 percent of the people released from prison in 2005 were rearrested within three years of their release. At the same time, the Federal Bureau of Prisons is requesting nearly \$7 billion to fund this system. In an attempt to examine alternatives, I spent a month exploring the correctional system in Norway. By visiting diverse facilities and interviewing staff, inmates, and professionals, I observed surprising connections between the two countries. This presentation will describe these connections and explore potential changes that could advance the status of American corrections.

*Faculty sponsor: Britt Rhodes*

JAMES DEIGNAN '15

**"i am a little church": Music by James Deignan, with Text by e.e. cummings**

It feels like my first choral composition, "i am a little church," has been "in gestation" since

freshman year. Through years of training in Nordic Choir, in theory and ear training courses, and through immersion in Luther culture, I have finally found the products I am producing to have attained a quality of which I can be proud. I have been most concerned with my use of counterpoint, with finding a harmonic language that feels personal and uniquely my own, and with obtaining the compositional chops necessary to write a piece that I hope is a mature beginning to an aspect of my professional life. I spent more than 50 hours analyzing the text to create an honest and impactful rendering of the masterful words of e.e. cummings. I spent many more hours prior to this (over the course of years) tinkering with various melodic and harmonic ideas at the piano, many of which would come together to create this piece. I also found my long history of ensemble singing informing many of my choices as a composer. The outcome is a choral piece of which I am proud and that has served as an educational beginning to my compositional life.

*Faculty sponsor: Brooke Joyce*

CLAIRE DEMBSKY '15

**Effect of Flower Diversity on Bee Diversity in Three Tallgrass Prairies of Northeastern Iowa**

Pollinators play a vital role in ecosystem health and for the production of many food crops, but habitat loss and pesticide use have contributed to a decline in native bee populations. Prairie remnants and reconstructions support native bee communities, but may differ in the availability of flowers as a nectar resource. Floral resources are flowers that provide pollen and nectar for bees. Three tallgrass prairies were studied to determine the effects of floral resources on bee population diversity. Chipera Prairie is a remnant prairie with 64 different species of flowers. Jewell Prairie is a reconstructed prairie with 65 different species of flowers. Schemp Prairie is also a reconstructed prairie, with 27 flower species. We compared the floral and bee species richness at each prairie to determine the effects of varying floral resources on bee population diversity. Collections were done using a directed search method as well as bee bowl pan trapping. Flowers were quantified using meter by half-meter quads. We found that both remnant and high diversity restoration prairies supported rare or "in decline" Bombus species. We hope to use this information to provide recommendations to others for how to best reconstruct prairies that support native bee populations.

*Faculty sponsors: Kirk Larsen, Molly McNicoll*

JOHN DOORENBOS '16

**Web-Enabled Datasets: Opening the Door to Computing Education Research**

In studying how students learn and understand computer science, large data sets are essential to computing education research, as they allow for analysis of educational methodologies on a large scale. Online textbooks are an effective means of gathering large quantities of data that track students' progress through the learning process. This presentation discusses the preparation and use of a web-enabled data set to analyze the learning habits of introductory computer science students. The research project focused on the online textbook, *How to Think Like a Computer Scientist*, which now experiences over 9,000 users a day and has logged more than 29,800,000 events in the three years it has been in operation. A major part of this research was auditing the data set and developing a cleansing workflow that would automatically clean the data. Data auditing included removing data that was anomalous or otherwise unsuitable for evaluation, and standardizing the data set for ease of analysis. This dataset, among the largest of its kind, will open the door to the study of computer science education.

*Faculty sponsor: Brad Miller*

ERIK DOTSETH '15

KEVIN BREN '15, GAGE DYKEMA '15,

COLLIN RICHMAN '15

**One4All: The All-in-One Website**

With the recent removal of Google's i-Google homepage, and the lack of clear and easy-to-use replacements, the Internet has been in need of a tool to aggregate a wide variety of users' content into one simple, quick, and easy to use site. To solve this dilemma, our team has developed a tool called One4All. One4All's goal is to collect and organize the most popular websites within one browser window to create a sleeker and cleaner way to browse the Internet. Through websites such as Twitter, Facebook, Reddit, and Youtube, users can essentially create a personalized central hub on one page with their own unique customizations. Users can choose which websites to display on their page, as well as how the web pages are organized within the window. To achieve this goal, One4All uses a combination of web languages such as HTML, CSS, JavaScript, and PHP to aggregate and display content from various websites. This allows our site to gather all of the content users wish to see, and then display

it in their own website, in the manner the users wish. Our presentation will showcase our project and describe the process we used to create it.

*Faculty sponsor: Kent Lee*

MELODY ELELE '15

**Oil, Political Power, and Diversification: Nigeria's Horror Story**

Nigeria's economy is one of the strongest on the African continent. Seventy percent of the wealth it has accumulated since 1973 has come from the exploration and trade of crude oil. Evidence on the concentration and distribution of that wealth suggests, however, that Nigeria today should be placing more attention on other resources and markets. I use historical evidence on Nigeria's distribution of wealth, organization of industry, corruption, coups, and political violence to explore the potential value to be reaped from diversification of the nation's industries and its sources of income. The evidence suggests that while oil will, and should, continue to be important, an emphasis on expanding other sources of income is critical as Nigeria moves deeper into the 21st century. With emphasis upon improved agriculture in the north, expansion of coal and other resource-based industries, and other changes of market focus, Nigeria could gain income, reduce environmental risks in the Niger River Delta, and increase its political stability.

*Faculty sponsor: Wade Shilts*

CARLY ELLEFSEN '15

**Jess Zottola: A Short Subject Documentary on a Gap Year**

This six-minute short subject documentary produced by Carly Ellefsen is about Luther graduate Jess Zottola. Zottola concentrated her studies in art and art history during her time at Luther, and has been living in Decorah since graduation in May 2014. The film looks at the challenges of pursuing art, building a portfolio for graduate school, and generally navigating what path to take after graduation. It celebrates the uncertainty of careers and further education at the green age of 23, and displays a different story of someone where the right choice was to take a gap year between graduation and "real life." Her seemingly unusual position—working as a waitress, saving money, and making paintings in her garage—was the smartest, best decision she has made. In this presentation, I will first offer information pertaining to the early stages of filmmaking, then screen the film in its entirety,

and finally, reflect on the broader implications of the film.

*Faculty sponsor: Thomas Johnson*

EMILY ENGLAND '15

**“Simply Irrepressible”: The Conflicting Identity of Lucy Parsons**

While tensions rose between the working class and their capitalist industrialist bosses in America ca. 1870–1920, those in power discouraged the working class from joining the labor movement, especially its radical factions espousing violence, by creating prejudicial images based on racial stereotypes and inhuman activities. Radical labor activist Lucy Parsons publicly combated this anti-radical smear campaign and responded to various claims against her by capitalizing on certain aspects of her identity and changing others throughout her life. By examining the figure of Lucy Parsons as her contemporaries saw and described her, how she presented herself in response to their claims, and the following scholarly treatment of her, or lack thereof, this research shows Lucy Parsons as a perfect study in how an individual can shape his or her identity in response to historical settings and how scholars navigate between the individual’s claimed identity and the identities imposed upon that person by their historical contemporaries. Lucy Parsons’s activism is largely relegated to passing mentions and footnotes in scholarly works, showing the complicated effects of identity politics. By reducing the complexity of a carefully and purposefully constructed identity such as Lucy’s, scholars end up with incomplete, oversimplified, and/or overly biased works of scholarship.

*Faculty sponsor: Edward Tebbenhoff*

BETSY FAWCETT '17

**Counter-terrorism and Civil Rights Infringements**

Counter-terrorism policies are at the forefront of politics throughout the world. Every country is attempting to prevent large-scale attacks on their civilians at home. Unfortunately, in this race to reduce damages, many Western countries are creating counter-terrorism policies that infringe on the rights of whole communities. My research focuses on counter-terrorism in the United Kingdom and investigates in particular the effectiveness and the appropriateness of the “Prevent” strategy—one part of the UK’s four-part counter-terrorism policy—which aims to prevent

home-grown terrorists from radicalizing. This goal, while noble and seemingly virtuous, has been carried out in ways that have legalized the infringement on innocent citizens’ civil rights. The policing strategies being used include racial profiling and stereotyping, along with making some religious expression illegal. Policies such as Prevent also hinge on the Conveyor Belt Theory of Radicalization, which has been criticized for broadly painting fundamentalist Islam as a danger to democracy. Based on discussions during January Term 2015 with leaders in Europe, including Prevent officers, along with people who have experienced the effects of counter-terrorism policies, and employing other background research, my study suggests that counter-terrorism policies such as Prevent are neither effective nor appropriate.

*Faculty sponsor: Victoria Christman*

MEGAN FELTES '16

***Hoodwinked* is a Good Modern Representation of “Rotkäppchen” (Red Riding Hood)**

Many people are familiar with fairy tales, especially those collected and arranged by the Brothers Grimm. Over the years, many of these fairy tales have been turned into films. Some are close to the original tale, while others are very different. For my research project, I wanted to find out how much of the original tale had been kept in one particular film plot, so I focused on the similarities and differences between the Brothers Grimm fairy tale, “Rotkäppchen” (Red Riding Hood), and the Cory Edwards film *Hoodwinked* of 2005. I defined a “good representation” as having similar qualities, such as similar characters and story plots. I studied “Rotkäppchen” and *Hoodwinked* closely, focusing on comparisons between the story and film. My analysis revealed that despite the differences between them, both the original book and its filmed version share the same basic goal. The findings suggest that the most successful modern versions of fairy tales contain qualities similar to the original work.

*Faculty sponsor: Ruth Kath*

ALLYSON FILLMORE '15

***To the Baltic***

Sports are raw and dramatic. There is an exciting, unpredictable aspect of the story and how it turns out to be very different from the planning stage to the final product. As a videographer, I find being able to capture stories of perseverance

and overcoming obstacles both intriguing and inspiring. This short subject documentary, produced for my senior project, looks at Luther College runner and seven-time All-American, Tricia Serres. The film covers Serres in her junior season of indoor track as she copes with a long-term injury that caught her off guard. In this presentation, I will offer a brief introduction, screen the film, and close with final thoughts in which I emphasize to the audience how Serres got where she is, how she juggles life as a student athlete, and finally, her future goals.

*Faculty sponsor: Thomas Johnson*

KRISTEN FLICK '15

### **The Effects and Implications of Stereotype Threat at Luther College**

This study investigates the effects of stereotype threat on women and math. Women's math performance is often affected by the stereotype that men are better than women at math. To test this effect, 66 undergraduate students (50 females, 16 males) participated in either the stereotype threat group, which included the stereotype in the test directions, or the neutral group, which stated there are no gender differences in the directions to a multiple choice math test. After completing the math test, participants completed a modified Collective Self-Esteem Scale, the State-Trait Anxiety Scale, and the Math Self-Concept Scale, and answered a question rating their beliefs about the existence of the stereotype. There were no differences in math scores between males and females. Correlations showed a significant relationship between gender identification and anxiety levels in the testing setting, as well as between math self-concept and performance on the math test. Findings indicated that women who identify more with their gender experienced more anxiety in the test setting. Also, women who identify as more mathematical performed better on the test, suggesting the stereotype has less of an effect. Practical implications are discussed regarding further understanding and combating stereotype threat.

*Faculty sponsor: Stephanie Travers*

KATE GERIKE '16

### **Murray Bowen's Family Systems Theory and Application in the Church**

I researched the Bowen Family Systems Theory and its application to church congregations. Through the study of the interrelated and mutually influencing parts of a family system,

Bowen identified the source of familial dysfunction as anxiety, which results from disrupted homeostasis and the need to balance separateness and togetherness. MacLean's work in the field of neurobiology contributed to the theory by identifying the human brain as three distinct parts. These parts cannot communicate with one another, causing unconscious anxiety. Bowen's theory has become a prominent tool in the church world, complicated by the role of the pastor and of God, grace, forgiveness, generational transmission of dysfunction, and congregational missions. To examine these processes at work in the church, I completed two case studies—one of a church with knowledge of the Bowen Family Systems Theory, and one without this knowledge. I found that knowledge of Bowen's theory provided a means to productive problem solving in times of congregational distress that the church without a background in Bowen's theory lacked. The theory cannot be successful unless members of the system are willing to fully participate. Further research might include a more systematic way of evaluating progress in congregations.

*Faculty sponsor: Stephanie Travers*

DAN GIBSON '15

### **Safety in Diversification: Predator Size and Species Diversity Increases Prey Survival**

Food webs assign trophic roles to a species at only one size. However, many species increase in size as they develop, and they may occupy several trophic positions during their lifespan. Another complication is intraguild predation (IGP), where two competitors also interact as predator and prey. This study examined the effects of intraspecific size-structure and species diversity of predators in a fishless pond ecosystem. Three large insect predators, a dragonfly, diving beetle, and water bug, were used in various combinations in experimental mesocosms with a smaller dragonfly species available as shared prey. I hypothesized that both size-structure and species diversity of the predators should reduce predation rates on shared prey. Predation rates in size-structured and species diverse treatments were significantly lower than expected by an additive model. The largest reduction in predation rates was seen in the size-structured, species-rich predator treatment. These results can be explained by cannibalism and IGP among predators and by changes in predator foraging patterns in the presence of other predators. This study highlights the complexity of an intraguild predation system and demonstrates

that future experiments should consider both size structure and species diversity together to understand these non-additive effects of multiple predator interactions.

*Faculty sponsor: Kirk Larsen*

CYDNEY HAALAND '15

**Myth as a Shield: Shelley and Keats' Use of Classical Mythology as a Vehicle for Political Ideals**

The Romantic Period was a time of great political discontent across the European continent, and Great Britain was no exception. Europe-wide events such as the French Revolution and the Greek War for Independence fueled a call for political reform in Britain, which was expressed in the writing of the time, particularly by the younger generation of British Romantic poets. Early writings were met with immediate repercussions, the suspension of *habeas corpus*, allowing the British government to arrest and imprison with impunity. Those who wished to express their political beliefs and ideals through their writing, therefore, were required to hide these ideas and rely on symbolism and metaphor. For Percy Shelley and John Keats, two of the most well-known British Romantic poets, allusion to Greek and Roman mythology provided the perfect medium for transmitting their political opinions while reducing the chance of governmental retribution. This paper explores the ways in which Keats and Shelley expressed these opinions through mythology and why they used the types of myths that they did in their writing.

*Faculty sponsor: Dan Davis*

KATHARINE HALE '15

**"Through the Glass": Setting and Realistic Detail in a Long Work of Fiction**

In a loose retelling of "The Little Mermaid," "Through the Glass" tells the story of a mermaid performer who falls in love with a man whose life is in danger. The woman has three days to complete a task or lose her beloved forever. My great struggle with this topic became how to write a long work of fiction that believably depicts New York City, a place I have only visited once, and the life of a mermaid performer, a job with which I have no experience. Through the process of drafting, discussion, reading, and revision, I am developing a work of fiction set in New York City. By using Google street view and other forms of Internet research, I hope to bring New York City and the mermaid profession to life through the

use of small details. The symposium presentation will include a reading from the piece.

*Faculty sponsor: David Faldet*

DEBRA HANSBERRY '15

**The Influence of Human Familiarity and Attentional State on Eating Behavior in Blue Jays**

Animals are sensitive to the familiarity of humans interacting with them, and some are sensitive to the attentional state of humans (e.g., dogs and horses). We combined these two attributes in a study looking at the amount of time it takes blue jays to eat food in the presence or absence of a person. One manipulation was familiar versus unfamiliar person, and another manipulation was varying the attentional state of that person (looking at, looking down, back turned, eyes closed). When looking at the overall means, we found familiarity and proximity of the person to the cage impacted the time it took the birds to eat. The attentional state of the person had no impact on their behavior. However, looking at individual bird behavior, one bird was much more sensitive to the attentional state of the person and another bird was sensitive to the presence versus absence of a person. These individual differences in behavior due to the presence of a human experimenter suggest that in experiments where humans need to interact with the birds, results can be heavily influenced by the individual temperaments of the birds in the study.

*Faculty sponsor: Kristy Gould*

HOLLY HARRIS '15

**Striving for Human Development: A Study of the Growing Youth Population in Jordan**

"Youth" has become a buzzword in the Middle East-North Africa region since the Arab Spring in 2011. The youth population is increasing rapidly, leading to a youth bulge in the region, which creates both challenges and opportunities. This research examines the effects of a growing youth population in Jordan, specifically from a human development perspective. My research question is: what impact does the youth bulge have on achieving human development in Jordan, and how can Jordan help youth reach their potential, thereby utilizing the strengths of this demographic to meet its goals? I use an appreciative inquiry approach to examine data on demographics, health, employment, and education from human development reports as well as data gathered through interviews I

conducted while in Jordan. The conclusions from my research show how the human development perspective is important to understanding the effects of the youth bulge in Jordan. Youth play a vital role in the overall development process of Jordan, and there is a need for strong institutions in Jordan that foster an environment where youth can flourish and reach their individual potential.

*Faculty sponsor: Victoria Christman*

KRISTIANNA HARRIS '15

**A Comparison of the Original Grimms' Fairy Tale "Cinderella" and the popular 1998 film *Ever After: A Cinderella Story***

The Brothers Grimm collected and arranged fairy tales from all over Europe during the 19th century. One of the best-known, "Cinderella," has been the subject of numerous adaptations over the years, including the new 2015 Disney movie *Cinderella*. My study focused on the 1998 film adaptation, *Ever After: A Cinderella Story*, comparing the film to the original tale. In the original Grimms' version, Cinderella has lost her mother, and her father has married someone new with two stepdaughters; a tree grows on the grave of Cinderella's mother and provides her with many things, including a gown, but the stepmother tries to prevent Cinderella from going to the ball; Cinderella loses her shoe at the end of the night, and the prince uses it to search for her; and in the end, the stepsisters are punished severely for their cruelty to the young woman. In the film, however, the Prince and Cinderella have met many times before the ball (though she lies to him about her identity); the giving tree is completely missing; after the ball, the prince knows exactly where Cinderella is to be found, and finally, there is no retribution against the cruel stepsisters. My poster documents the differences in story and explores their meaning, emphasizing major events missing from the movie.

*Faculty sponsor: Ruth Kath*

AMANDA HAYDEN '16

**An Exploration of Single Electron Capture**

There are many applications of single electron capture from neutral atoms and molecules by passing charged ions. This type of interaction occurs when ions from the sun pass through material surrounding a comet, which emits X-rays. This interaction gives valuable information about the sun. Methods exist to calculate what

happens during these types of interactions, but computational results agree best with experimental results for atoms rather than for molecules, due to how the electrons are modeled. This investigation studies single electron capture by bare oxygen, neon, and argon ion projectiles from a neutral H<sub>2</sub>O molecule. The Classical Trajectory Monte Carlo (CTMC) Method was used to calculate the cross section for single electron capture. The water molecule is modeled as a single, positively charged target center orbited by a single electron. The projectile energies range from 0.01keV/amu to 100keV/amu. Unlike the usual CTMC method, the random initialization of the active electron was weighted by an estimated wave function of a water molecule electron. The energy states into which the active electron is captured were calculated, and it was found that projectiles with lower energies largely captured the electron into one of a few energy states, whereas those with higher energies captured the electron into many energy states.

*Faculty sponsor: James Perez*

LAURA HAYES '15

**"In the Sight of the Spiders": A Short Story**

While I have had the privilege of presenting this short story at the Sigma Tau Delta Convention, "In the Sight of the Spiders" began during Introduction to Creative Writing. We received a prompt to write a scene based off of a photo, and my professor at the time, Dr. Weldon, distributed a series of pictures. One of the photos depicted a woman getting escorted out of her home by the Gestapo. Throughout my education, I have read memoirs and stories of Holocaust survivors (including works such as Elie Wiesel's *Night*), yet I had never truly considered the role of the people who harbored the victims of the Nazi regime. Thus, "In the Sight of the Spiders" was born. This short story explores the relationship between those who hid and the hidden. The story follows Christian von Richter, a prominent member of the Nazi party, who moves to Vienna after the *Anschluss* in 1938. After a Jewish man, Levi, saves the life of his wife, Ilse, Christian decides to return the favor. This story examines the social pressures that one had to face as a member of the Nazi party. Christian must decide where morality exists in the face of conflicting social norms.

*Faculty sponsors: Amy Weldon, Nancy Barry*

JILL HESS '15

### **Olaf J. Fosso Collection: A History of Galerie Maeght Represented in Print**

Amie Maeght opened Galerie Maeght in Paris in 1946, with the goal of promoting, collecting, and dealing art for the up-and-coming artists of the modern movement. For each exhibition at the gallery, Maeght's print studio, Editions Maeght, produced promotional posters. Olaf J. Fosso, an alumnus of Luther College, collected many of these posters, which date from 1950 to about 1966. His widow donated his collection to Luther College in 1971. These posters are an important part of modern art history as they represent the work of well-known artists active in Europe during the post-World War II era. Their artwork is transcribed into a form that makes it accessible to many people. Until now, the Fosso Collection has not been comprehensively studied. I aim to give an understanding of its importance to the context of 20th-century art history, and to give further clarity to its position in the Luther College Fine Arts Collection.

*Faculty sponsor: Kate Elliott*

ANDERS HOPKINS '15

### **The Motives for Julius Caesar's British Invasions**

In the years 55 and 54 BCE, Julius Caesar invaded the island of Britain. In the midst of his 10-year campaign in Gaul, this was quite the daring endeavor, not only due to the tumultuous nature of the newly conquered Gaul, but also because of the logistical challenges of moving an army across the unpredictable English Channel. In the first century BCE, sailing to Britain with 800 ships and 40,000 troops and campaigning in an unknown land would have been an enormous undertaking. In fact, Britain was so foreign to the Roman world, that many Romans did not believe it even existed! What did Caesar hope to gain by taking the risk of invading such a mysterious place? The answer is entirely political. Of the members of the First Triumvirate—Caesar, Pompey, and Crassus—Julius Caesar was the most junior, possessing the least wealth and military success. His decision to cross Oceanus (the English Channel) and to make war on a new people (the Britons) was made in an attempt to establish himself as the foremost of the powerful Triumvirs. The results of Caesar's British Expeditions contributed to the Fall of the Roman Republic and thus the development of Western civilization.

*Faculty sponsor: Dan Davis*

BRIANNA HOPP '15

### **Luther College Nursing Students: The Stress Experience and Recommendations for Stress Reduction**

It has been brought to the attention of the nursing profession that students are reporting increased levels of perceived stress throughout their nursing education. Luther nursing students are particularly vulnerable to stress during their junior year because it is a year with limited resources, challenging academic experiences, and high levels of perceived stress. This study aimed to find the perceived stressors of the junior year nursing students while also diving further into the ways students manage this stress. An interview process yielded one student's stress story. Later, two online surveys were conducted to gain more insight into the daily perceived stressors and coping strategies used by junior nursing students. The surveys also delved further into the resources students would like to have in the Rochester year to help decrease their perceived stress. Results showed that students are currently using individual coping strategies to relieve their perceived stress while they would like social support resources. This is concurrent with the results found in the introductory literature review. With these findings the Luther Nursing department will have a better understanding of student stress and resources to help their students.

*Faculty sponsor: Angela Kueny*

BRIANNA HOPP '15

### **Describing Carbapenem-Resistant Enterobacteriaceae (CRE) and Its Implications in Health Care: A Literature Review**

Recently, great medical advances of the past have been tested and proven ineffective by the emergence of drug-resistant organisms. This project explores the state of antibiotic resistance in the U.S., using the example of one of the world's newest antibiotic-resistant superbugs, Carbapenem-resistant enterobacteriaceae (CRE). It also documents the political battle of policy-making regarding the use of antibiotics in medical, veterinary, and agricultural settings that recently has been set in motion by the World Health Organization's International Surveillance Report on antibiotic resistance and the World Health Assembly's resolution urging countries to take immediate action to combat resistance. The response of medical professionals and health-care consumers to outbreaks of organisms like CRE is also included. Results focus on the chain of research publications, bill submission, and

executive decisions leading to the March 2015 release of the U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria, along with the concern for public and patient safety surrounding the Centers for Disease Control and Prevention's (CDC) investigation into UCLA's Ronald Reagan Medical Center's recent outbreak of CRE spread by contaminated medical scopes. This information may guide further understanding of current events in policy and news reports on the U.S.'s battle with bacteria resistant to antibiotic therapies.

*Faculty sponsor: Jayme Nelson*

ELLIOT HORST '16

### **The Bullied: An Autoethnography**

Bullying is something that everyone has seen at some point in their lives. What people do not see is how it affects the person being bullied. This study will look at how bullying affects people and how they choose to communicate to people about being bullied. Focusing on my own experience as a bullied student, I will focus my personal reflections and related analysis on two questions: 1) How does silence function as a form of communication; and 2) how does self-harm function as a form of communication? Using autoethnography, a self-reflexive methodology that positions the researcher as the object of study, I will use my own experiences with bullying to explore how my communication strategies—silence and self-harm—worked as a flawed coping mechanism. In an attempt to avoid drawing attention to myself, and escape further scrutiny from those doing the bullying, I withdrew. By bringing attention to silence and self-harm as flawed communication strategies sometimes employed by the bullied, I hope others might be able to see these practices as potential warning signs and offer much-needed assistance.

*Faculty sponsor: Derek Sweet*

TRAVIS HOULE '15

### **Adaptability of Key Phytoplankton Species to Ramped Ocean Acidification: Implications for Marine Diversity and the Global Carbon Cycle**

Ocean acidification, the drop in oceanic pH as a result of increased atmospheric CO<sub>2</sub>, poses a large threat to marine ecosystems globally. Recent laboratory studies have demonstrated the potential for adaptation in the coccolith producing phytoplankton *Emiliania huxleyi*, a major primary producer in marine systems that plays a significant role in nutrient transport and the global carbon cycle. Although laboratory

culturing experiments have explored the physiological responses of *E. huxleyi* and other marine organisms to ocean acidification, the focus on short-term responses has largely ignored the evolutionary potential for such organisms to adapt, while also not directly probing the effect that the rate of pH change has on adaptation ability. The present study examined the potential for adaptation of *E. huxleyi* to acidic conditions in a single clone multigeneration laboratory experiment. Cultures were exposed to treatments at ambient, elevated, and gradually ramped CO<sub>2</sub> levels. This experimental design allows us to examine the impact that incremental increases in CO<sub>2</sub>, and thus decreases in pH, may have on the ability of *E. huxleyi* to adapt to ocean acidification. We tested for this ability by examining changes in growth rate as well as the production of organic and inorganic carbon per cell. These results may have implications for marine diversity and global carbon cycle processes under projected increases in atmospheric CO<sub>2</sub>.

*Faculty sponsor: Laura Peterson*

DEVON HOVEY '15

### **Spectral Evolution of Sea Surface Temperature Change in the Southwest Pacific from 3 Million Years Ago to the Present**

Though it is fundamentally understood that orbital cycles exert a strong influence on the climate system, major unknowns remain about how different parts of the system respond to orbital forcing and why the overall response of the climate system to orbital forcing has evolved from the so-called 41 thousand year (kyr) world of the early Pleistocene (0.8 to 2.7 million years ago, Ma) to the 100 kyr world of the late Pleistocene (0-0.8 Ma). Many of the climate records that we use to better understand these questions are from sites in the tropics and the northern hemisphere (NH), whereas few records exist from the southern hemisphere (SH), particularly from the extra-tropical Pacific Ocean. Here we present an alkenone-based sea surface temperature (SST) record and accompanying oxygen isotope stratigraphy from Ocean Drilling Program Site 1125 in the southwest Pacific from 3.0 Ma to the present, which we use both to document SH temperature patterns and to compare the SH response to orbital forcing to that of the tropics and NH. Our orbital analysis of Site 1125 SST change provides valuable insight into the response of the SH to orbital forcing throughout the Pleistocene.

*Faculty sponsor: Laura Peterson*

KIMBERLY HOWELL '15

**Fungi that Benefit Plants: The Effect of Fungal Endophytes on the Competitive Ability of Indian Grass**

Plants compete with their neighbors for soil nutrients and light, benefitting from traits that allow them to grow faster and consume more resources. Many plants form associations with fungi including fungal endophytes in the leaves, but it is unclear if these fungi affect a plant's ability to compete with neighbors. In this study, I examined the effect of two species of fungal endophytes on the competitive ability of Indian grass, a prairie grass native to Iowa. Indian grass seedlings either had no endophytes or had one of two endophytes experimentally added. They were then planted with either a fungus-free Indian grass plant or a plant with the other fungal endophyte and were allowed to grow in the greenhouse for approximately three months. Plant growth varied in response to presence and type of endophytes, but plants with one endophyte species were larger than those without endophytes. This result suggests that the effect of hosting an endophyte depends at least in part on the neighboring plants and their associated endophytes. Endophytic fungi appear to play some role in a plant's competitive ability, but their effect is complex and remains poorly understood.

*Faculty sponsors: Molly McNicoll, Dawn Reding*

KATHERINE HUSKA '15

**Evolution of Pacific Meridional and Zonal Temperature Gradients over the Plio-Pleistocene**

**Authors: Katherine Huska, Devon Hovey, Laura C. Peterson (Luther College), Kira T. Lawrence, Hollis Miller (Lafayette College), Rocio Caballero-Gill (Brown University)**

The Pliocene (2.7-5.0 Ma) is the most recent sustained warm period in Earth history and represents a potential analog for future climate conditions; however, many aspects of Pliocene climate remain poorly understood. Two major questions are how higher temperatures were maintained with atmospheric CO<sub>2</sub> concentrations around or below 400 ppm, as well as what caused the transition from the Pliocene to the colder, more variable conditions of the Pleistocene (0-2.7 Ma). The lack of continuous climate records from the southern extra-tropical Pacific has made it difficult to test the relationship between tropical and extra-tropical dynamics in both hemispheres during the Plio-Pleistocene transition. Here we

present the first continuous record of SST change in the southern extra-tropical Pacific, extending from 4.4 Ma to the present. When compared with northern and equatorial Pacific SST records, our alkenone-based SST record from ODP Site 1125 reveals strong hemispheric symmetry in the evolution of Pacific meridional temperature gradients throughout the entire Plio-Pleistocene. Furthermore, temperature gradients between Site 1125 and the western equatorial Pacific and between the western and eastern equatorial Pacific are very tightly coupled throughout the entirety of the last 4.4 Myr.

*Faculty sponsor: Laura Peterson*

MICHONA JOHNS '15

**Maghrébin Identity in France: Sociocultural Perceptions in Politics and Film**

People of North African descent make up one of the largest ethnic groups in France today. Immigrants are often discussed in the French cultural discourse as being "others" who do not belong in France because they do not fit the dominant discourse of a French national identity. *Maghrébins*, as they are referred to by the French, are discriminated against, isolated, and ultimately prevented from properly assimilating and contributing to their host country's culture, as represented in *Maghrébin* unemployment estimates of 28.5 percent. This current anti-*Maghrébin* discourse, popularized by presidents Chirac and Sarkozy, is being challenged by contemporary artists. This study focuses on the work of the Tunisian-born French film director, Abdellatif Kechiche, who represents *Maghrébins* in his films as people in "ordinary" life situations, in contrast to stereotypical representations by earlier filmmakers of *Maghrébins* as terrorists (e.g., *Battle of Algiers*, 1966). Drawing on both contemporary and 18th-century debates about a French "national identity," and especially current right-wing French political discourse, this study demonstrates how Kechiche's characters attempt to negotiate an identity of being both French and *Maghrébin*. Kechiche's films offer insights into the ongoing discourse on *Maghrébin* assimilation in France and what it means to be "French" in today's society.

*Faculty sponsor: Anne-Marine Feat*

JENNA JOHNSON '16

**The Formation and Persistence of a Hydrogen Sulfide Cellular Memory in *C. elegans***

Hydrogen sulfide (H<sub>2</sub>S) is the second most common cause of fatal gas inhalation. We have discovered that in *Caenorhabditis elegans* the response to the toxic gas hydrogen sulfide (H<sub>2</sub>S) forms a cellular memory, which we are deeming an H<sub>2</sub>S memory, that is maintained throughout development. We discovered that transient acclimation to sub-lethal concentrations of H<sub>2</sub>S allows for survival when exposed to otherwise lethal concentrations. Animals that have established the H<sub>2</sub>S cellular memory exhibit a more robust transcriptional activation of H<sub>2</sub>S-inducible genes when re-exposed to H<sub>2</sub>S. We hypothesized that chromatin modifiers contribute to the formation and persistence of this H<sub>2</sub>S memory. To test this we performed a candidate screen of mutant animals that had defects in chromatin modifications. We discovered that the machinery involved in H3K4me2 (SPR-5 and SET-2) is required for the maintenance of this cellular memory. SET-2 and SPR-5 promote the elevated transcriptional reactivation required for survival of subsequent exposure, suggesting that changes in H3K4me2 patterns are responsible for H<sub>2</sub>S memory. Based on our findings, we propose a mechanism by which acclimation to H<sub>2</sub>S complex changes methylation of histones at H<sub>2</sub>S-inducible promoters, thereby modifying the transcriptional response in the event that H<sub>2</sub>S is encountered again.

*Faculty sponsor: Brad Chamberlain*

JONATHON KAUPA '17

**Grimm's "Frau Holle" in the DEFA film: Promoting Communism?**

"Frau Holle," a traditional German fairy tale, stresses the virtue of hard work that has become a trademark of the German people over time. It tells the story of a stepmother's two daughters—one diligent, one lazy—who are tested and rewarded accordingly by the mystical Frau Holle in a land of fantasy. It has been told through many different mediums, most notably in the Brothers Grimm's *Kinder- und Hausmärchen*. Another form of the tale came from the former East German film corporation known as the DEFA. There are big differences between these two versions of the tale, which point to the purposes behind each narrator's telling of the story. Jakob and Wilhelm Grimm's main goal in the crafting of *Kinder- und Hausmärchen* was to preserve German culture and values through stories that would be familiar

to the common family, while the DEFA, as an organization founded for the primary purpose of creating and distributing propaganda, carefully corrupted the tale with communist symbols and values. This subject prompts reflection on how the lens through which information is presented to us can alter our understanding of the world around us.

*Faculty sponsor: Ruth Kath*

JACQUELINE KAYEBA '15

**Income and Wealth Inequality in the U.S: The Relationship between Business Strategies Employed by Some Corporations in Low-wage Industries and the Increasing Income Inequality in the U.S.**

For more than 30 years, income inequality levels have been rising in the United States. "The rich get richer while the poor get poorer" is now a popular saying. In 2010, the bottom 40 percent of the U.S. households earned 11.8 percent of the nation's income while the top 5 percent earned approximately 21.3 percent. This research examines the relationship between low-wage industries' business strategies—such as wage and compensation structures, costs and profit management, labor union support, and domestic outsourcing of human resource management—and the increasing levels of income inequality in the United States. Wal-Mart and McDonald's corporations were researched as examples for strategies employed by low-wage industries. U.S. Bureau of Labor Statistics and U.S. Census Bureau data also support conclusions. With 30 percent of the work force earning poverty-wage salaries, while CEO earnings and compensation are at an all-time high, this research explores whether the strategies employed are perpetuating the problem, have no role at all, or reduce the problem. Finally, suggestions on how to improve the inequality situation are offered.

*Faculty sponsor: Mona Nelson*

MARGARET KIENITZ '16

**Abortion Access in Northeast Iowa**

Abortion in the United States has become increasingly difficult for women to access. Precedent, set by the Supreme Court in *Planned Parenthood v. Casey* (1992), requires that no undue burden is to be put on a woman in receiving an abortion before viability, however state law and judicial affirmation question what qualifies as an "undue burden." With the definition of an "undue burden" narrowing,

abortion providers are facing new pressures that make it difficult to maintain a working practice. State legislature and federal rulings regarding abortion have made significant changes to the rhetoric surrounding the ever-present abortion debate in this country. Examining these legal and political shifts, I analyze how the women of northeast Iowa are affected by these standards.

*Faculty sponsor: Maryna Bazylevych*

LOGAN KOCHENDORFER '15

### **Mom and Dad's Influence: Daughter-Guarding, Attachment, and Mating Preferences**

Previous research has found that parents are more likely to control their daughters' sexual behavior, report emotional upset over daughters' sexual activity, and control their daughters' mate choice relative to their sons'. Research has also explored evolutionary-based differences in male and female mating preferences—men desire more partners and are willing to engage in intercourse sooner than women. However, these two lines of research, to our knowledge, have not been combined. The present study seeks to explore the relationship between parental daughter-guarding behaviors and individuals' mating preferences. To do this, Mechanical Turk, a survey distribution website, was used to recruit subjects who filled out several questionnaires including the ECR-RS and the Daughter-Guarding Questionnaire. Results showed that daughters perceived higher levels of guarding behavior from their parents, and that guarding significantly influenced all four mating desire variables for women, but only willingness to have intercourse in the long term for men. Future research should seek to replicate and expand upon this study in order to validate these results, and grow the field.

*Faculty sponsor: David Njus*

TIM KOMATSU '15

JOSH HARPER '16

### **Should We Empty the Theatre?**

One of the most visceral reactions I have ever had to theatre was when I was in a production of Samuel Beckett's *Waiting for Godot* in middle school. The production seemed to attempt to alienate the audience as much as possible (running at just under three-and-a-half hours), and as it was the first time I had experienced Beckett, I assumed that the text was just "too weird" for me to enjoy. However, upon reading the text again more recently, I realized how much

I enjoyed the script, and how incredibly human the show is. This change of mind led me to produce and perform Beckett's *Endgame*. I believe that the play, despite being "absurd," is capable of connecting to audiences. While the desperation the characters experience is unpleasant, it is very likely that audience members can connect to it in some way. Similarly, the characters's futile efforts to find meaning in their lives can be both humorous and heartbreaking at the same time. *Endgame* is a show about how people act when their hope is almost gone—I want the production to entice people to question whether they should laugh or cry. Our presentation will include a discussion of themes of and a 10-minute scene from *Endgame*.

*Faculty sponsor: Jane Hawley*

NATHAN LEE '15

TIMMAH KAMOTO '15, CHRIS KEMPF '15

### **Blue News**

Blue News is a website that provides news at a more personal level. It makes use of Twitter and IBM's User Modeling service to evaluate a journalist's values and personality, and then uses that evaluation to match that journalist with an audience. Users of the website are able to follow their preferred journalists through a Twitter feed and can browse through their preferred journalist's articles. Users can also explore new journalists that the website has matched to their profile. The matching is done using a machine learning model, which is a way for computers to learn from previous user preferences. Blue News was built using Bluemix, IBM's cloud services platform. Our presentation will showcase this website and describe the process we used to create it.

*Faculty sponsor: Kent Lee*

JACOB LEMBEZEDER '15

### **Rhetorical Criticism of the Anti-Semitic Rhetoric of Nazi Germany**

The propaganda campaign launched by Nazi Germany leading up to and during World War II is arguably the most successful propaganda effort the world has ever seen. The Third Reich was able to convince an entire population that the Jewish people were the root cause of the problems facing German society, and the only way to solve those problems was to find a solution for "The Jewish Question." When the answer to that question became genocide, many Germans still did not question the policies of their government.

At best they were willfully ignorant, and at worst they were complicit in one of the greatest catastrophes in the history of humankind. The Holocaust claimed the lives of between five and seven million of Europe's nine million Jews throughout the duration of the Nazis' "Final Solution." This paper will examine the racial and anti-Semitic propaganda released by the Nazi party leading up to and during World War II, in an attempt to understand how it made an effort to justify genocide and why it was so successful in that justification in the eyes of the German people.

*Faculty sponsor: Mark Johns*

CASEY LIVERINGHOUSE '15

**Exposure to Excess Iron Citrate Decreases the Concentration of Glutathione in *Caenorhabditis elegans* lacking daf-16**

Exposure to excessive amounts of, or impaired regulation of, essential metals, such as iron, are thought to be associated with the development of neurodegenerative diseases. Recently, expanded knowledge of the cell's protective mechanisms against oxidative species such as iron has provided evidence that certain biochemical pathways and their interactions with essential metals might play a role in the development of neurodegenerative diseases. A widely studied example of such a pathway is the PI3K/Akt/FOXO pathway, which is known to play an extensive role in regulating the cell's response to oxidative stress as well as the process of aging. In this study, the small nematode *Caenorhabditis elegans* was used as a model system to examine the interactions of the PI3K/Akt/FOXO pathway and exposure to excess iron, with specific emphasis on the resulting oxidative state of the cell. The cellular concentration of glutathione, a tripeptide with an important protective role, was used to approximate the oxidative state of the cell. The results are consistent with previous knowledge of the PI3K/Akt/FOXO pathway, and suggest that defects in the pathway when combined with exposure to excess iron may lead to a damaging oxidative state.

*Faculty sponsor: Stephanie Fretham*

LIBBY LOGSDEN '15

**Beyond the Numbers: The Value of an Accounting Degree from a Liberal Arts College**

With a rapidly changing financial environment and increased scrutiny related to ethics, the accounting profession reevaluated the competencies necessary to be successful within the profession. The change in the 1980s to the 150-hour credit requirement for becoming a certified public accountant encouraged accounting professionals to take a wider range of courses and changed recruiting practices for public accounting firms. This study explores the correlation between desired competencies of accountants and the accounting curriculum at liberal arts institutions. Through studying the history of professional changes and the desired professional competencies, comparing private liberal arts curriculum to universities and business schools, and by conducting interviews, this study will determine how well the liberal arts curriculum prepares accounting majors to develop the desired competencies. This study has the potential to change perceptions of what best prepares an undergraduate accounting major for professional success. Additionally, it has implications for guiding the recruitment of prospective accounting students to liberal arts institutions.

*Faculty sponsor: Mona Nelson*

PABLO LOPEZ ALONSO '17

**The Declarative-Procedural Model: Scientific Evidence for Better Language Learning**

Memory plays an important role for second language (L2) learners as one must not only learn vocabulary, but also internalize grammatical rules. Ullman's (2001) Declarative Procedural memory model makes empirically testable predictions for understanding language learning scientifically. In particular, it predicts that L2 learners must first learn grammatical rules overtly, before internalizing them. Further, it predicts that there is no difference between how L1 and L2 speakers process vocabulary. How can we use this model to our advantage? My research argues that more practice is better in L2 learning and that L2 learners actually have an advantage when it comes to learning vocabulary. Support for this agreement comes from Rodriguez-Prieto (2009), who found that with practice, L2 learners internalized (or proceduralized)

L2 rules after just one year of exposure. Last, I propose ways in which we can take control of this proceduralization. Overall, this model grants us insight on how we can use scientific evidence to become better language learners, while underscoring the link between cognitive science and language acquisition.

*Faculty sponsor: Laurie Zaring*

JESUS LUCERO '16

### **“Ain’t I a Woman”: The Confines of Conformity**

The death of Bri Golec, a 22-year-old stabbed to death by her father, marks the sixth transgender woman to be murdered in the United States since the beginning of 2015. This paper will provide cross-cultural comparison of three transgender communities in different cultures: the Hijras of India, the Kathoey of Thailand, and women living in the U.S. who identify as transgender. I will demonstrate the variability of the growing and alarmingly prominent lack of security that transgender women are facing globally, taking into account the difficulties associated with living in unwelcoming societies. Using statistical data as well as firsthand accounts, I will argue that the American transgender women are faced with violence and oppression more severe than what this minority group experiences in the developing world. I will also show that American culture is less accepting of the transgender community in general. With this paper, I hope to create a bridge of understanding for the transgender community that needs decisive action and advocates to break the silence and stigma.

*Faculty sponsor: Maryna Bazylevych*

ANDERS LUND '15

### **Jews and Christians as a Part of American Buddhism**

Interest in Buddhism has grown significantly in the U.S. in recent decades. This paper looks at two prominent American authors, Sylvia Boorstein and Paul Knitter, who have addressed this move towards Buddhism in their personal search to fully realize their own religious identities. These two authors reflect an educated and reflective segment of the Jewish and Christian population who are turning to Buddhist ideas and practices to augment their respective religions. My research explores elements of Buddhism that

they have found compelling, influencing their ideas on meditation, a deeper understanding of God, developing a compassionate mind, and understanding suffering, as a means of understanding what has attracted a growing number of Christians and Jews to Buddhist ideas and practice.

*Faculty sponsor: Karla Suomala*

JESSICA MARA '15

### **ObesiTV: A Public Health Nursing Perspective on Childhood Obesity and Screen Time**

In America, average daily screen time in households has doubled, while childhood obesity has quadrupled—both since 1950. Each additional hour of screen time increases children’s risk of becoming obese by 20 to 30 percent. Furthermore, children who are obese have a greater chance of being obese as adults; therefore, they are more likely to suffer from adult health problems associated with obesity, such as cardiovascular disease, type 2 diabetes, stroke, and several types of cancer. The purpose of this presentation is to examine one cause of childhood obesity, screen time, through the lens of Bronfenbrenner’s Bioecological Systems Theory. By understanding not only the complex interrelationships between risk factors for childhood obesity (overeating, lack of exercise, etc.), but also their influence on screen time itself, nurses are able to better develop and implement interventions that will have a large impact on preventing and reducing childhood obesity. Using a systematic review of literature, evidence-based recommendations for public health nursing practice, research, and education at each system level will be discussed.

*Faculty sponsor: Angela Kueny*

SARA MARONDE '15

### **Getting in the Zone: The Thinking Behind a Detached State of Awareness for Runners and Dancers**

Creativity can be defined as the ability to produce both novel and adaptive ideas for a particular situation. My research seeks to determine the features of how and under what conditions runners and dancers enter a mind-frame of decreased bodily awareness ( sometimes referred to as being in the “zone”), determine how or if creativity arises during the movement, and

highlight the differences between the two groups. Through interviews with runners and dancers, personal reflection, and neuroscience research, I compiled data regarding how and why individuals get into a zone and the neurobiological mechanisms at play. This research integrates both personal narrative and neurological functioning to begin exploring how the brain responds to strenuous exercise and what kinds of thought processes facilitate moving in a subconscious or detached state of awareness. These findings will give a broader understanding of how the nervous system communicates with the rest of the body to produce what is known as the runner's or dancer's high.

*Faculty sponsor: Marian Kaehler*

SARA MARONDE '15  
MATTHEW BORCHART '16,  
MEG MCCLURE '15

#### **The Impact of Methyladenosine on mRNA Regulation by miRNA-RISC**

The use of micro RNA (miRNA) is one method by which organisms regulate gene expression. When bound to protein to form the RNA-induced silencing complex (RISC), miRNA associates with complementary sequences in messenger RNA (mRNA), so that it no longer can be used in translation. We are testing the hypothesis that methylated adenine (m<sup>6</sup>A, a chemical modification observed in mRNAs *in vivo*, with no known function assigned) within this complementary region of mRNA might affect its regulation by miRNA. We first transform *E. coli* with plasmids that contain an artificial minigene, to serve as a source of template for *in vitro* synthesis. Alternatively polymerase chain reaction (PCR) is used to generate template for making target RNA (the manufactured equivalent of mRNA). The experimental conditions for *in vitro* synthesis of target RNA are optimized for incorporating m<sup>6</sup>ATP directly into the target RNA. The target RNA size and concentration are assessed by urea polyacrylamide gel electrophoresis. Once generated, target RNAs containing various levels of m<sup>6</sup>A can be utilized in an RISC assay to monitor the impact of methylation on the interaction of the miRNA-RISC with the target RNAs.

*Faculty sponsor: Marian Kaehler*

COLIN MARTIN '15

#### **“Hansel and Gretel”: Humperdinck’s Opera and Grimm’s Fairy Tale**

Nearly everyone is familiar with fairy tales, many of which stem from the tales collected and arranged by the Brothers Grimm. The story of Hansel and Gretel is well known in modern society, but it continues to evolve today. An evaluation of Humperdinck’s 1893 play, filmed at the Metropolitan Opera in 1982, will establish the effectiveness of the play as a modern reworking of the tale with respect to the original work by the Brothers Grimm. The evaluation will be made by comparing events that are shared or altered between the works, differentiation of character roles and depth, and common themes found in both works. Analysis suggests that the modern play is indeed effective as an adaptation, because the main characters have more complex roles and the goal of the children is broader than survival. The findings suggest that the concerns of the public can be identified and tracked through literary records, as can the development of fictional storytelling through history.

*Faculty sponsor: Ruth Kath*

CASSANDRA MISSELDINE '15

#### **Milton’s Female Eden: The Implications of Gendered Personification in Paradise Lost**

In *Paradise Lost*, Milton uses female pronouns and gender-specific words such as “womb” and “mother” to describe Eden’s landscape, personifying the earth as a female entity. The language that illustrates the environment parallels that employed to characterize Eve, connecting Milton’s vision of nature to the idealized female body. Contemporary eco-critics have read *Paradise Lost* as an environmentalist guide to living in harmony with the earth. But what are the consequences of buying into Milton’s brand of environmentalism when it uses the same paternalistic vocabulary to advocate for the care and protection of the earth as it does to objectify women? While careful cultivation and protection of the environment is generally viewed as positive, I argue that we must analyze this assumption in light of Milton’s personification of the earth as an idealized, obedient female body. This paper examines the ways in which Milton’s extensive use of gendered personification perpetuates unrealistic and misogynistic perceptions of women in the real world and questions the validity of eco-critical arguments that label Milton as a proto-environmentalist.

*Faculty sponsor: Lindsey Row-Heyveld*

AMALIA MONGIAT '16

**Adoption, Orphanages, and the Exploitation of Children in Cambodia**

In recent times, it has become increasingly popular for Westerners to visit developing countries and dedicate some or most of their time to volunteering. In Cambodia, many Western volunteers embrace opportunities to spend time in orphanages, where they get to interact one-on-one with young Cambodian children. Seeing this as a lucrative business, illegitimate orphanages have appeared around Cambodia for the purpose of luring tourists to them to get their money. Despite the Western volunteers' best intentions, they are contributing to a corrupt system that pays into orphanage owners' salaries and leaves children developmentally disengaged. My research of orphanage tourism includes three methods of inquiry: experiencing Cambodian culture firsthand, analyzing campaigns to end orphanage tourism, and researching the topic. The combination of these approaches reveals a corrupt system that is fueled by Western tourists and results in young children being taken away from their families to live in orphanages to draw in volunteers and their money.

*Faculty sponsor: Scott Hurley*

BJORN MYHRE '16

EVAN SOWDER '15

**The Architecture of Sand and Stone**

Traditionally, adventure filmmaking is reserved for professionals with big budgets, long shooting schedules, and high profile sponsors. In *The Architecture of Sand and Stone*, a short subject documentary film emphasizing visual associations and rhythmic qualities, we challenge such norms. Bound by a strict budget and a minimal timeline, but liberated by our own agenda, we set out on a mission to document the beauty and unique qualities of the terrain in southwest Utah. The Mars-like terrain, carved by millions of years of corrosion, consists of slick rocks, towering arches, steep canyons, and vast desert. Although exceedingly awe-inspiring, the Southwest presents many challenges, including extreme temperature fluctuations and limited access to electricity. Because there is a need to emphasize the importance and value of personal well-being and environmental stewardship in our natural world, this film fills a needed gap. Ultimately, to reach our goals for this film we had to play by the rules of nature, embrace the challenges, and push ourselves to our full creative potential. In this presentation, we will discuss our production

process, as well as screen select scenes from the film.

*Faculty sponsor: Thomas Johnson*

ALAYNA NELSON '16

**Black Death in England**

The Black Death was a time of massive upheaval throughout Europe leading to lawlessness. But little research has been done on laws created because of the Black Death. This study will investigate laws issued by the government during and in the wake of the plague. Focusing on England throughout the various Black Death outbreaks (starting in 1348 and appearing for the last time 1665) the study will ask specifically: what laws did government officials pass in order to handle the chaos brought about by the plague, and what effect did the laws have? Using primary documents, such as edicts and official statements, as well as secondary sources on governmental action, this study will demonstrate that governments in England passed many laws to control the country during and after the many outbreaks of the plague. These findings will reveal the ways society was controlled during times of disaster and how governments reacted to the aftermath of these disasters.

*Faculty sponsor: Robert Christman*

SHELBY NELSON '15

**Analyzing Main-Channel and Back-Channel Tweets During the October Church of Latter Day Saints General Conference**

Many religious groups have seen the Internet as a medium for evangelism, spreading their message and/or establishing their legitimacy among external audiences. However, very little research had been conducted on the phenomenon of persons leaving religious groups. The Church of Jesus Christ of Latter Day Saints, although priding itself on increased membership, has seen an extremely high number of disaffiliations, resulting in a fairly stable membership, if not a net loss. The purpose of this study is to investigate ways in which Twitter may be being utilized among members and/or former members of the LDS church as a channel for outreach, as a means of internal communication, and as a tool for the expression of dissatisfaction. Specifically, we examined the use of Twitter as a tool for back-channel communication during the annual LDS church General Conferences in the fall of 2013 and 2014. Examining qualitatively those tweets that were quoted or retweeted most frequently

(buzz tweets), we applied Lundby's measure of the aspects of belonging (2011) to determine how the official Twitter communication of the LCS church energized and invigorated the back-channel participation.

*Faculty sponsor: Mark Johns*

**BENJAMIN NORDQUIST '15**  
**Intolerance and Islamophobia: Practices of Exclusion, Discrimination, Prejudice, and Violence in the West**

In an increasingly globalized world, many Western states are facing an influx of immigrants, particularly Muslim minorities. In Europe, attitudes towards the Muslim minority have grown increasingly hostile, largely in response to extremist violence in the name of Islam. Not all Muslims are extremists, but Western nations continue to struggle with the challenge of distinguishing the unacceptable violent actions of a few from the motives of the peaceful majority. This paper examines the controversies surrounding the ban of the *hijab* and *burqa* in France, the story of Malala Yousafzai, and the debates surrounding the Ground Zero Mosque in New York. The study of these controversies provides a backdrop against which to understand the historical trajectory of anti-Muslim policies in the West. This paper concludes that many Western nations have responded to growing Muslim minority communities with Islamophobic political and social policies through acts of exclusion, discrimination, prejudice, and violence.

*Faculty sponsor: John Moeller*

**WALKER NYENHUIS '15**  
**Writing the Woods: Wilderness Encounters in Contemporary American Nonfiction**

For over four centuries, writers have attempted to pen the beauty, mystery, and terror of the so-called "American Wilderness." In doing so, they have altered the cultural landscape and what the literate citizenry thinks about its relationship to the natural environment. My study will explore three contemporary examples of this nonfiction tradition—Bill Bryson's *A Walk in the Woods* (1998), Cheryl Strayed's *Wild* (2012), and Jon Krakauer's *Into the Wild* (1996), along with scholarly and critical essays—to address how this dynamic relationship between writers and the wilderness has evolved over time and to examine how capturing these experiences through writing may limit or enhance a reader's perception of the natural environment. As industrial powers

continue to see environmental degradation as a necessary means to an end, discourse surrounding the cultural value and public presentation of wilderness is especially relevant.

*Faculty sponsor: Andy Hageman*

**NANA AMA ODAME '15**  
**What Are the Effects of Hershey's Business on the West African Countries that Produce Cocoa?**

Chocolate is a 60 billion dollar global industry. The Hershey Company has been producing chocolate and sugar confectionary for years. Few people have actually thought about where the cocoa used in their chocolates comes from. For more than 50 years, most of the cocoa beans used in Hershey products have been grown and farmed in Ivory Coast and Ghana. The effects of this industry on these two nations have been both positive and negative. Interviews, observational studies, and video documentaries reveal that although the Hershey Company has been involved in the development of social capital such as education, the company has been linked to the use of child labor, modern slavery, and child trafficking on cocoa plantations. My presentation will address the significant ethical issues raised by industry practices.

*Faculty sponsor: Don Jones*

**ROBERT PATINO '15**  
**"You are Out of Your Element!": Defining Masculinity in *The Big Lebowski***

The hegemonic idea of masculinity can be perceived in film and television through the stereotypical characteristics associated with men: wealth, power, knowledge, and aggression. These characteristics, which can be displayed through action films, sports, or reality television shows depict the qualities that a masculine, "macho" man should display. Through the Coen brothers' film, *The Big Lebowski*, the presentation of reinforcements as well as challenges to this hegemonic portrayal of masculinity are contrasted and given a broader understanding. Through the male characters' actions, dialogue, presentation, and lives in the film, a qualitative understanding of the ideologies behind masculinity are examined in order to answer the question, "What makes a man?" that *The Big Lebowski* ponders. Through an ideological analysis of the artifact, the hegemonic idea of masculinity can be amended.

*Faculty sponsor: Derek Sweet*

KARA PEDERSEN '15

**Black Plague: Impacting More than Just Bodies**

The Black Plague killed a third of the population of Europe in the 14th century. The purpose of this presentation is to outline the Black Plague's disease process, discuss the factors that contributed to the rapid spread of the illness, and point to its long-term socio-cultural, political, and historical impact. As an infectious disease, the plague obviously had devastating effects on families and communities, but there were many widespread cultural and economic ramifications of the large death toll in Europe as well, including increased work opportunities for women, an increase in job pay, and a shifting view of God from a gentle deity to a vengeful figure. The overpopulation that contributed to the rapid spread of the disease was thinned, and the world worked to rebuild what a plague had disrupted in only four years.

*Faculty sponsor: Jayme Nelson*

LINNEA PETERSON '18

**To Baghdad: The Economic Impacts of a Capital Shift**

After the initial Islamic conquests following the death of the Prophet Mohammed, a new kind of empire emerged: the caliphate. This study explores the economic history of the first two caliphates: the Umayyad, which ruled from 661 to 750 CE, and the Abbasid, which was in power from 750 to 945 CE. With an emphasis on trade, this study seeks to answer the following question: What were the economic impacts of moving the capital of the caliphate from Damascus under the Umayyads to Baghdad under the Abbasids? While relying on the research of scholars of Islam and of the Middle East, this study makes use of the transactions costs model of trade, which investigates the impact of the costs of trading on the volume and frequency of trade. The study concludes that moving the capital to Baghdad had positive economic impacts because of Baghdad's superior access to the Indian Ocean, which linked it more effectively with the caliphate's trading partners to the east. In this way, the study adds a dimension to the comparison of the Umayyad and Abbasid caliphates, which has previously tended to focus on the two dynasties' religious differences.

*Faculty sponsor: Wade Shilts*

DAVID PFOTENHAUER '15

**Searching for Secular Evolution in Semi-regular Variable Stars**

Prior research has identified and classified 66 variable stars within the field of open star cluster M23. With our data set of stellar flux values now extending over 10 years, we begin to search for long-term trends within the confirmed variable stars that lie within the cluster's field. Simple initial analysis suggests that approximately two-thirds of the variable stars have, on average, grown fainter in the past decade. Further analysis shows a correlation between trends in magnitude and amplitude of variation. Very long secondary or tertiary periods are evident in several stars we have investigated. Over the entire population of semi-regular variables in our study, the fraction of mean magnitude variation attributable to such secondary and tertiary periods and the fraction attributable to secular variation due to evolution is uncertain. Better knowledge of the long-term variability in these stars can yield an improved understanding of the pulsation states excited in semi-regular variables as well as a better understanding of the presently unclear relationship between Mira type and semi-regular type variable stars.

*Faculty sponsor: Jeffrey Wilkerson*

LAURA POST '16

ROBERT MANGES '15

**The Effect of a calR Mutation on *Vibrio parahaemolyticus* Gene Expression under Varying Calcium and Iron Conditions**

In this study we investigated the organism *Vibrio parahaemolyticus*, a ubiquitous marine bacterium and major cause of foodborne illness in humans. We are interested in understanding how this bacterium senses and responds to environmental changes, including those that occur in ocean, estuary, and gastrointestinal habitats. Two elements whose levels vary in these environments are calcium and iron, and prior work in our lab has identified 45 *V. parahaemolyticus* genes whose activity is influenced by these elements. A protein, CalR (calcium regulation), has been identified that is involved in regulating a subset of these genes. We hypothesized that CalR suppressed gene activity under particular calcium and iron conditions. To test this hypothesis, we introduced a calR mutation into *V. parahaemolyticus* strains and examined the effect of the mutation on gene activity under different environmental conditions. Eliminating CalR resulted in elevated expression of multiple genes,

particularly under low calcium conditions. These data expand the CalR regulon and provide further support that CalR is a repressor that responds to calcium levels. This study is increasing our understanding of how *V. parahaemolyticus* responds to environmental signals, including those that might be contributing to its pathogenesis.

*Faculty sponsor: Jodi Enos-Berlage*

MAJA PROESCHOLDT '15

**The Fate of Joy: The Solitary Survivor of the Romanov Massacre**

Much has been written about the mystery of the Romanovs, the last Russian royal family, following their assassination during the Russian revolution and the rumored survival of the Grand Duchess Anastasia. While the historical outcome of the Romanovs has already been told, there is a lesser known, yet humanizing, element to the story: the fate of the dog belonging to Alexei Romanov, the tsarevitch (heir) to the Russian throne and Anastasia's brother. Joy the spaniel was well-known throughout Russia, as he was frequently featured in photographs of Alexei for the public. Joy lived, but following the assassinations, references to him crop up only sporadically. I wanted to investigate Joy's story further. Based on research using primary and secondary sources, including two contemporary and relatively little-known autobiographies, I suggest that Joy's survival is a positive symbol of hope in an otherwise tragic tale, and gives some measure of closure to the mystery of the Romanov family. Previous to my research, there was no complete source that connected all of the events of Joy's life into one fluid story. My blog post of this research was credited earlier this year by both *The Siberian Times* and a Slovakian newspaper, showing the great interest surrounding Joy's story as a personalizing component within this tragedy.

*Faculty sponsor: Laurie Iudin-Nelson*

HUNTER PRUEGER '18

**The Phantom Carriage: A Film Score**

Over J-Term I took MUS-185: Hollywood's Soundtrack: Great Symphonic Film Music, taught by Luther's composer-in-residence, Brooke Joyce. In this class we learned about all of the different elements and considerations that go into a film score. We were then given the option to score a silent film for the final project. I chose a 1921 Norwegian silent horror film titled *The Phantom Carriage* and scored the first 11 minutes. I recorded it by multitracking, which means that

I recorded myself playing every instrument and making every sound that is heard in the score, then layered them together. I tried to compose music that matched the overall aesthetic of the film while incorporating techniques that we learned in class. My presentation will provide the context for this project, exploring the process I used in created the track. In addition, we will have the film playing in a continuous loop in a classroom in Valders Hall during the afternoon poster session, where everyone is invited to drop in to experience the completed project.

*Faculty sponsor: Brooke Joyce*

MAIA PUGH '15

LENNY ULLOA SILVA '16

**“Without Others, We Don’t Exist”:**

**Applying Symbolic Interactionism Theory to Evaluate the Cyclical System of Racism and Discrimination in the Spanish Film, *Princesas***

Symbolic Interactionism Theory, founded by George Herbert Mead, assumes that meaning develops out of the discourse that is transmitted through interactions between people. Through these interactions, people construct their perceptions of self-identity and behave according to them. This investigation uses Symbolic Interactionism Theory to evaluate the Spanish film, *Princesas*. The main character in the film, Zulema, is an immigrant in Spain working as a prostitute to earn money for her family back home. By applying the theory, it becomes evident that Zulema's identity in Spain is constructed by those with whom she interacts. Because the interactions are wrought with racism, the perception of self-identity she forms is one that influences her behavior in ways that perpetuate the racism. In this way, a cycle of racism is established, from which it is very difficult to liberate oneself. Ultimately, the results of the analysis call us to recognize and work to defeat our own racist views and subsequent behaviors.

*Faculty sponsor: David Thompson*

MAIA PUGH '15

**Building a Competitive Brand: How Food Cooperatives are Meeting the Challenges of the Growing Natural Food Industry while Simultaneously Adhering to Principles that Discourage “Big Business”**

Local food cooperatives have been at the helm of the natural foods movement, directly challenging the principles that have guided the growth of the conventional retail food industry controlled by

large corporations. Adhering to a common set of seven principles, which involve voluntary and open membership, democratic member control, members' economic participation, autonomy and independence, education and information, cooperation among cooperatives, and concern for local community, the cooperatives have been successful in promoting and growing the natural food market and with it the ideologies embedded in the principles. However, in the last decade, the demand for natural food has grown immensely, and big chain food retailers have responded by increasing their supply of natural food products. Wal-Mart is now the leading supplier of natural food. This phenomenon has demanded that food cooperatives develop strategies in order to be competitive in the market. This research seeks to address which specific strategies food cooperatives are using to strengthen the brand in order to remain competitive in the market while simultaneously adhering to its cooperative principles, and ultimately evaluates whether or not they are and can continue to be successful at this endeavor.

*Faculty sponsor: Derek Sweet*

NICK RAUCH '15

**Identifying Gender Differences in Coaching Communication: How Players and Coaches Evaluate Their Communication Patterns with Each Gender**

Research indicates there may be differences in the way athletes communicate, receive criticism, and handle aggressive communication from their coaches. There is also research supporting the theory that differences in coach and athlete communication may be influenced by gender. This study seeks to unravel gendered communication within sport while examining reasons why these coaches think the differences occur. In this study, I interview 10 athletes and 10 coaches to achieve in-depth analysis on coaching and gendered differences. Findings suggest that both the coaches and the athletes think there are differences in aggression and soliciting blame based on the gender of the athlete. Differences are also seen in the motivations of the coach to handle situations based on gender. These findings are discussed with regard to the implications of gendered communication in sport.

*Faculty sponsor: Sarah Wilder*

SARAH RICKERTSEN '16

**Hogwarts, a Home**

The story of Harry Potter is beloved to millions around the globe, and many people know some part of J.K. Rowling's publishing struggle. Rowling was a single mother on welfare before and during publication of the first book, *Harry Potter and the Sorcerer's Stone*. Success was not immediate. How and why did she keep writing, and why is the story so engaging? It has a lot to do with Hogwarts, the magical school central to the story. This creative nonfiction piece engages Harry himself, J.K. Rowling, and my own childhood to explore why and how Hogwarts has become home for so many. By researching Rowling, delving back into *Sorcerer's Stone*, and exploring my own childhood, I found that the details of Hogwarts, both its halls and its people, create a comforting and encouraging place for its writer, its readers, and even its characters.

*Faculty sponsor: Amy Weldon*

CADENCE SAWYER '15

HENRY JUNGBAUER '15, ISABELLE KROGH '15, LAURA MESADIEU '15

**Yodel: Location-Based Agenda and Budgeting Tool**

Yodel is an app created solely for Android devices, and it is first and foremost an organizational tool. The user can keep track of tasks that they need to complete using the to-do list, and things they need to buy using their to-buy list. It is a location-based agenda in that it pings reminder notifications to the user upon arrival to locations that have been set for a specific to-do. The optional budgeting tool allows the user to set monthly or weekly budgets, and subtracts from this amount upon checking off items from their to-buy list. In addition, the Yodel website allows users to view the same information about their past purchases as well as to-do and to-buy lists from any device. There is an analytic option for companies that allows them to view information such as what items their customers are buying at what times, which items their consumers are most often reminding themselves to purchase, etc. Our presentation will showcase this app and website and describe the process we used to create it. Welcome to Yodel!

*Faculty sponsor: Kent Lee*

ALEXANDRA SCHARMER '16

### **Psychological Well-Being Differences Between Atheists, Agnostics, and Fundamentalists**

In a comparison of 458 participants, classified as atheists, agnostics, low religious fundamentalists, or high religious fundamentalists, we analyzed differences on measures of self-esteem, depression, and locus of control. Generally, we found that high-fundamentalists had the lowest levels of depression and the highest levels of self-esteem and responsibility for success. Atheists had the lowest self-esteem and responsibility for success, and the highest levels of depression. Agnostics and low-fundamentalists were in the middle, and were not significantly different from each other. These differences point to the potential psychological benefits of religious fundamentalist belief patterns.

*Faculty sponsor: David Njus*

JENNIFER SCHMIDT '15

### **Smallpox and the Effect It Had on Our World**

The purpose of this project is to explore the effects of smallpox in our world in relation to vaccinations, causes of the disease, and treatment. This study of smallpox also investigates the socio-cultural effects of the disease as well as its historical impact. The last reported case of smallpox was recorded in 1977, and the disease was officially declared eradicated in 1980, because of the smallpox vaccination. Routine smallpox vaccination among the American public, in fact, stopped in 1972, after the disease was eradicated. This study documents the potential of vaccinations as a key tool to help society fight diseases that are otherwise dangerous. The goal of this research was to identify ways in which infectious diseases could be prevented in the future and explore the impact that medicine has had on infectious disease since the eradication of smallpox.

*Faculty sponsor: Jayme Nelson*

MARY SCHMIDT '15

### **A Multidisciplinary Approach to Explore the Benefits and Barriers of Family Presence During Resuscitation**

This project explores the issues surrounding family presence during resuscitation situations. Resuscitation can be described as the attempt to restore a patient's health status by mechanical, pharmacological, or physiological means during an emergency situation such as cardiac or respiratory arrest. There are no data that define

a right or wrong answer when it comes to having family members present during such events. Here we seek to explore the issue from an objective standpoint and try to weigh the strengths and weaknesses from both sides of the argument. This poster presentation will also explore the education necessary for family members to make an informed decision on whether or not to be present. Benefits of family presence during resuscitation include allowing the family a chance to say goodbye and sharing spiritual moments, and ultimately facilitate the grieving process if resuscitation fails. Possible disadvantages of family presence could involve psychological trauma to the family, distraction of the resuscitation team members, and inadequate space availability. Families and individual family members will react to the resuscitation of a loved one in very different ways; ultimately it is their choice to be in attendance at the resuscitation or not.

*Faculty sponsor: Janna Edrington*

MARY SCHMIDT '15

### **Ebola in Our World: Identifying Factors and Situations that Promote This Emerging Disease**

The purpose of this poster presentation is to summarize the relevant and best evidence related to Ebola in the areas of surveillance, transmission of the virus, isolation, clinical presentation, diagnosis, and therapy. From a nursing standpoint, it is imperative to understand how to combat transmission of this deadly disease in terms of protecting personnel, proper protective equipment, and recognizing means by which this disease is spread (directly, through caregivers, and during burial). This study of Ebola also seeks to discover social-culture, environmental, and historical impacts of the emerging disease. The goal is to identify factors and situations that promote this emerging disease and discover how this evidence can be applied to nursing practice.

*Faculty sponsor: Jayme Nelson*

CLAIRE SEITZINGER '16

LAURA BORAN '16, REED JOHNSON '16  
**Lactones Derived From Fatty Acids: New Monomers for the Production of Bioplastics**  
Biodegradable plastics derived from renewable, agricultural resources (e.g., corn and soybeans) have the potential to provide a foundation for sustainable commercial products that alleviate the environmental problems associated with their petroleum-based analogs. Recently, rapid

advances have been made in the development of biodegradable polymers. For example, polylactides (PLA) are polyesters with the potential for commercialization in the fiber, film, and packaging industries. Despite its promise, PLA currently only displaces a limited range of petroleum-based plastics. One reason is that commercially available PLA deforms at relatively low temperatures, thus making it unsuitable for applications such as microwave-safe containers. Herein we report the synthesis of different analogs of D,L-lactide (1-4) prepared from palmitic and stearic acids. These monomers contain a 14-16 carbon chain, and upon polymerization are expected to yield comb polymers with different physical properties than PLA. Consequently, the potential commercial viability of these polyesters will hopefully promote further development of other related bio-plastics.

*Faculty sponsor: Brad Chamberlain*

EMILY SENA '15

**Diamonds are a Terrorist's Best Friend:  
Breaking Down the Relationship Between  
Commodities and Terrorist Financing**

"A diamond is a girl's best friend." Or is it? The brilliant stone has been portrayed in movies and advertisements as the ultimate object of fantasy, and the message seems to have worked. In 2014, global diamond sales reached more than \$80 billion. But this stone has been tainted by bloody conflicts in Africa—themselves fueled by the diamond trade—and more recently by terrorist organizations such as al Qaeda. In 2002, the Kimberley Process Certification Scheme was established to eliminate the sale of conflict diamonds, yet its effectiveness has been questioned. Charmian Gooch of the NGO Global Witness stated: "The fact is that most consumers still cannot be sure where their diamonds come from, or whether they are financing armed violence or abusive regimes." Still, diamond sales have continued to rise; the purchase of diamonds has become an expression of ostentatious consumerism, which has resulted in dissolution of human rights. The underlying cause of diamond-related conflict is not corrupt governance or poor economic management in producing countries. Rather, it is the demand from consuming nations. If diamond-related conflict is to end, then the corporate strategies that create that demand, namely the portrayal of diamonds as the epitome of romance and luxury, must stop.

*Faculty sponsor: Victoria Christman*

STEPHEN SHATZER '16

***La Cenerentola: The Italian Operatic  
Interpretation of Charles Perrault's  
Cinderella Story***

The story of Cinderella has been told in many different languages, each of which has imparted its own influence on the story. We decided to focus on the Italian cinematic version of Charles Perrault's "*Cendrillon, ou la petite pantoufle de verre*." By examining the two versions side-by-side, we hoped to discover causes for the inconsistencies between the two versions of the story. In Perrault's text, Cinderella's family is rich; in the film, the family's house is falling apart. Perrault's version contains a magical godmother. A philosopher plays a similar role in the film; however, the film does not contain any morphing pumpkins. While Perrault's text focuses on a wicked stepmother and subservient husband, the film places the focus on the father. The film version deals with the father's desire for wealth and power, but the text focuses more on Cinderella. The complete absence of an "evil stepmother," along with the diminished emphasis on Cinderella and her love, shows a possible feminist side to the film. The film also appears to teach a different moral: greed will not lead to anything good—which is quite different from Perrault's stated moral about beauty, love, and graciousness not always leading to success without the help of others.

*Faculty sponsor: Ruth Kath*

JOSH SIRIOS '15

**Privacy Boundary Turbulence among  
Collegiate Athletes and the Media**

America is a land absolutely fascinated with its athletes and sports. Nowadays every public and private move done by athletes is exposed on the Internet or in some other social media practice. Professional athletes are the leading players in our public drama, but collegiate athletes are slowly moving their way to the top. Previous studies have shown that the media does in fact affect collegiate athletes; however, most of the research conducted has looked at racial stereotyping, gender discrimination, and social media scandals. The goal of this research project is to interview collegiate athletes to determine their interactions and privacy management with the media, helping to understand how they reveal and conceal their private information. By discussing this issue with male and female athletes from various sizes of colleges from around the United States, I hope to uncover the happenings of privacy management

and turbulence between collegiate athletes and the media.

*Faculty sponsor: Sarah Wilder*

RACHEL SKINNER '15

**Changing the Definition of Beauty:  
An Ideological Criticism of Dove's Real  
Beauty Sketches**

For decades, advertisements, and later television, formed the definition of beauty. Models became thinner and makeup targeted women to reduce wrinkles, lighten skin tone, and cover blemishes. Television shows continue to perpetuate the idea that beautiful women are young, thin, and have flawless skin. To combat the immense pressure set on women to be "beautiful," Dove set on a mission to widen the definition of beauty through its Dove Real Beauty Campaign. Using ideological criticism, this study looks at Dove's most recent video advertisement, *Dove Real Beauty Sketches*, and how this video sets up ideologies to counter the dominant, more traditional ideological representation of women and beauty in the media. Supported via additional research, this study explains how Dove's *Real Beauty Sketches* video is changing how women are represented in advertisements to help show women their true beauty.

*Faculty sponsor: Mark Johns*

CLARE SLAGEL '16

ANNE TURCO '15

**The Effect of Celiac and Renal Denervation in  
Angiotensin-Induced Hypertension**

The sympathetic nervous system contributes to hypertension in several experimental models, although the mechanisms by which sympathetic activity elevates arterial pressure are unclear. Much of the focus is sympathetic control of renal function, which is supported by observations that renal denervation ameliorates uncontrolled hypertension. However, in angiotensin II-high NaCl hypertensive rats renal denervation fails to lower blood pressure, suggesting that in some forms of hypertension the sympathetic nervous system may target other vasculatures. Studies demonstrate that denervation of the splanchnic vasculature via celiac ganglionectomy reduces blood pressure in both angiotensin II-NaCl and Dahl-S rats. The present study investigated the contribution of renal denervation or celiac ganglionectomy in angiotensin II-induced hypertension. Male Sprague Dawley rats

underwent celiac ganglionectomy (n=3), renal denervation (n=5) or sham surgery (n=5) and were implanted with telemetry probes for monitoring mean arterial pressure and heart rate. Osmotic minipumps were implanted for delivery of angiotensin (4.2 ug/hour) for 10 days. In sham-treated rats, angiotensin raised mean arterial pressure, while RDx and CGx significantly decreased the hypertensive response to angiotensin. These results indicate that elevated angiotensin levels increase sympathetic nervous system activity in rats, and raise arterial pressure through targeting both the splanchnic and renal vasculatures.

*Faculty sponsor: Scott H. Carlson*

CALLIE SONNEK '15

**The Frescos of Room Five in the Villa  
of the Mysteries**

The houses of Pompeii have provided an important resource to scholars as sites with a wealth of material culture that can be used to study the common people of the Ancient Roman Empire. In particular, Room Five within the Villa of the Mysteries has been written about by a host of scholars, but their writings have produced a variety of explanations as to its purpose. This paper asserts that this room within the villa depicts the initiation ritual of the mystery cult of Dionysus and was in fact also used for said purpose. It explores the nature of private homes through the lens of Roman thought to better understand their ideas on domestic space and its uses. It also looks at the practice of Dionysian worship in the state religion but more importantly within the context of the mystery cult practices. By looking at various factors such as the location of the villa, the location of the room itself within the house, the wall-paintings, and what little we know about the mystery cult worship practices from literary sources, I conclude that this explanation is the most probable solution to the question that has plagued scholars since its discovery.

*Faculty sponsor: Dan Davis*

CALLIE SONNEK '15

**Martin Luther and Art**

Although Martin Luther was not the only Protestant reformer to begin a movement against the Roman Catholic Church during the 1500s, he was certainly one of the most famous and influential. Throughout his life, his words and ideas were able to reach across Europe through

various channels such as spoken word, printed text, and artwork. A distinctive aspect of his work as leader of a reform movement was his use of images. Art was used widely by Luther during his Reformation to spread his ideas, specifically to the common people in Europe. Using one image, Albrecht Dürer's *Four Apostles*, as a case study, I examine why Luther felt this art-focused teaching was a necessary method to legitimize and broadcast his ideas. Dürer's *Four Apostles* in particular serves as an incarnation of the new ideas that emerged from Luther's movement. I argue that the success of Luther's use of art is a large contributing factor in the subsequent success of his movement as a reformer, not only against the Catholic church but especially in contrast to others who chose iconoclasm.

*Faculty sponsor: Kate Elliott*

STEVE SORENSON '15

### **Modification of Aluminum Oxide Surfaces through Friction and Wear**

Over the last decades, researchers have demonstrated that phenomena such as friction and wear at the nanoscale differ markedly from their macroscale counterparts. These differences present significant engineering challenges, such as development of microelectromechanical systems (MEMS) being limited by challenges of high friction and high wear. The push for improvement in micro and nanoscale designs depends on continued work to understand these small-scale phenomena. In our work, we use the atomic force microscope to investigate how the frictional behavior of aluminum oxide surfaces change during sliding. We find that the frictional properties of aluminum oxide vary with sliding time, specifically, friction increases during sliding. These results indicate a chemical change to the surface where the aluminum oxide reacts with ambient water vapor to form aluminum hydroxide. If frictional modification is due to this reaction, we would expect greater friction increases in environments with higher water content. In addition to increases in friction during rubbing, we also see drastic changes to the geometry of our microscope's tips. Although our results reveal that aluminum oxide is not an ideal material for small-scale mechanical devices, we have come to better understand the complicated nature of friction of aluminum oxide, and small-scale friction in general.

*Faculty sponsor: Erin Flater*

MARGARET STEINBERG '15

### **The Politics of Saving Muslim Women: Rethinking Native Informant Narratives on Islam and Misogyny**

Increased attention to the plight of Muslim women in the West has manifested itself in Western media and politics, with particular attention paid to the abuses of honor-related violence and female genital cutting. The hyped media coverage, and the resulting political actions, has spurred a debate surrounding "Muslim issues." Native informant literature in particular has focused heavily on the idea of saving Muslim women from an inherently oppressive and violent religion. These "Muslim-insider" narratives exacerbate misconceptions of honor violence and genital cutting in the media and in politics by painting Islam as monolithic and unchanging, and the women as helpless and silent. Using postcolonial feminist critique, I will challenge the narrative of the "oppressed Muslim woman" in two ways. First, I will employ statistical analysis and highlight the voices and work of Muslim and non-Muslim scholars and organizations to argue that native informant perspective on honor violence and genital cutting exaggerate and distort the role played by Islam in these phenomena. Second, I will demonstrate that the native informant obsessions with oppressed Muslim women serves to downplay the history and ongoing prevalence of violence against women in Western contexts.

*Faculty sponsor: Todd Green*

MITCHELL STENOIEN '17

### **Hans Christian Andersen's "The Snow Queen" and *Frozen***

In 2013, Disney Studios introduced a very popular film called *Frozen*. Just a week after its opening, *Frozen* had already become a "classic" and has now earned more than a billion dollars worldwide. The story of *Frozen* is based on the 1844 original fairy tale by Danish writer Hans Christian Andersen. My project compares the 2013 Disney film with Andersen's story to see how closely Disney followed the earlier plot, characters, and ending. My close study of both works revealed that although Andersen's characters and story line were changed significantly for the movie, the values and concluding lesson in both versions were remarkably similar: The emphasis on the struggle between good and evil fades in favor of an emphasis on the value of family and friends. My poster shows several major differences and

similarities between the original Andersen story and the popular modern Disney film.

*Faculty sponsor: Ruth Kath*

KATELYN STOREY '15

**Reconstructing Early-Holocene Fire Regimes, Vegetation, and Extinct Megafauna Populations in Northwest Wisconsin**

The northwest Wisconsin sand plain has extremely sandy soils that originated from glacial outwash. This region currently supports jack pine barrens that are dependent upon wildfire and have dominated the sand plain since before European settlement. I was interested in documenting the changes in vegetation and fire regimes in this region during the early Holocene (~13,000-8,000 years ago), as well as documenting the presence or absence of *Sporormiella* spores to determine if extinct megafauna (mammoths and mastodons) were present in this area and if their extinction was correlated with changes in vegetation and/or fire regimes. To accomplish this I reconstructed fire history by identifying and counting charcoal fragments in contiguous samples from a sediment core. This data was combined with pollen analysis to reconstruct the vegetation history and examination of pollen slides for fungal spores indicative of megafauna. Results give a good picture of what the vegetation and fire regime was like during the early Holocene: the mid-Holocene was still a jack pine dominated ecosystem, but during the very early Holocene there was less jack pine and more spruce. These changes in ecosystem coincide with fire frequency changes. Results also show that megafauna were most likely not present in this region. Understanding how fire regime interacted with the changing vegetation and herbivory during the early Holocene may help land managers better manage and create policies for fire-dependent ecosystems.

*Faculty sponsor: Beth Lynch*

ZACHARY STOTTLER '15

**Charm Meson Production in Decays of Bottomonium**

Matter, at the fundamental level, is composed of quarks bound together in systems by the strong interaction. The simplest of these systems is the meson, a bound state of quark-antiquark. In the case of a meson with uniform flavor, these systems are known as quarkonia, or bottomonia in the case of bottom quarks. However, quarkonia are not stable, and shortly after formation they decay to systems that are energetically preferable.

Identification of these decays, which occur via transition or annihilation, as well as measurement of the frequency with which they occur, known as the branching fraction, offers valuable insight into the mediating interaction, that is the strong nuclear force. In this presentation, I will present the analysis I conducted as part of my senior project to study charm production in decays of the  $\chi_b(1P)$  at the Belle experiment, located at KEK in Japan. Using Monte Carlo simulations in conjunction with data consisting of 158 million decays of the  $\Upsilon(2s)$  gathered at KEK from 2009 to 2010,  $D_0$  mesons are fully reconstructed via two decay channels ( $K\pi$  and  $K3\pi$ ) in coincidence with a low energy photon. Preliminary measurements of branching fractions will be presented.

*Faculty sponsor: Todd Pedlar*

DANIEL STOVER '16

CLARE SLAGEL '16, KOLIN WALKER '15  
**Investigating the Selective Autophagy of Ubiquitinated Proteins in *Saccharomyces cerevisiae*: Implications for Neurodegenerative Diseases**

Alzheimer's and Huntington's disease are a result of improper deposits of proteins in the neurological tissues. These protein deposits are found to be covered with a coat of ubiquitin, a protein used to signal for protein degradation. Ubiquitin-dependent pathways function normally within these cells, and it is the ubiquitin-independent pathway, autophagy, that is malfunctioning. The purpose of this study was to confirm preliminary work on Ald6p, a protein found in yeast thought to be ubiquitinated and sent through the autophagy pathway. The model used to examine the Ald6p degradation pathway was *Saccharomyces cerevisiae* (baker's yeast). We hypothesized that Ald6p would be sent through the autophagy pathway and degraded in response to starvation-inducing conditions. We tagged Ald6p with green fluorescent protein (GFP) to explore its movement. We hypothesized that fluorescent microscopy would show Ald6p moving from the cytosol to the vacuole in starved cells, indicating the active degradation of Ald6p. However, we were unable to find conclusive evidence to prove this hypothesis. We also explored other proteins involved in autophagy, specifically, Ald4, Ubp11 and Ape1.

*Faculty sponsor: Brooke Shields*

EMILY STUMPF '15

### **“Greenwashing” and Environmental Rhetoric in Advertising**

Since the 1970s, the environmental movement has grown exponentially. Environmental values are shaping the rhetoric of advertising. Research indicates that under little to no regulation, advertisers and big business have released products labeled with positive environmental appeals, while the products actually have a negative impact on the environment. This phenomenon is called “greenwashing.” There are “seven sins” that categorize the types of greenwashing that are present in the advertising world. Research has shown that the majority of “green” product claims are false. This paper conducts a rhetorical analysis of cleaning products that have been “greenwashed” to examine the extent to which the “seven sins” and other rhetorical appeals are exploited by advertising of household cleaning products.

*Faculty sponsor: Kim Powell*

MATTHEW SULLIVAN '15

### **Chinese Nationalism and Its Political Ramifications**

This paper explores the effects Chinese nationalism has on the People's Republic of China's (PRC) foreign policy decision-making. The study is divided into three different sections. The first section sets parameters that define nationalism. More specifically, it investigates the role of historical identity in shaping China's perception of international order, which results in nationalism. The second part discusses how Chinese historical identity and nationalism play a role in Chinese politics. Most importantly, it discusses how nationalism supports the PRC government's nation-building policies, and how nationalistic perceptions of world order shape its foreign relations and international behavior. The second section also makes the argument that because Chinese nationalism produces a completely different and irreconcilable worldview to the dominant Western perception of world order, it has a “negative” effect on China's foreign policy. The third section of the paper discusses the potential application of smart power. First, smart power is defined according to parameters proposed by Joseph Nye. Then, using these parameters, the essay analyzes how Chinese leaders might consider a smart-power strategy to balance the negative influences of nationalism in foreign policy.

*Faculty sponsor: Victoria Christman*

IMSOUCHIVY SUOS '15

### **The Impact of Innovation on K–12 Education in Cambodia**

Over 35 years ago, Cambodia emerged from a brutal regime that resulted in complete destruction of schools. It remains one of the poorest countries in Asia. Endemic corruption, limitations on educational opportunity, high income inequality, and poor job prospects contribute to a long-term economic development issue, which still remains a daunting challenge. Connecting these issues is the poor education system in Cambodia and lack of skills training. This paper presents specific innovation models that can be used to improve the K–12 educational system. Specifically, reverse innovation, clean slate, lean startup, and TRIZ illustrate ways to improve the K–12 educational system, resulting in an improved standard of living for the Cambodian population. The paper suggests that no single innovation model can solve the problem alone, yet a combination of innovation models, accompanied by appropriate economic development policies, have the potential to create a path leading to the desired level in standard of living.

*Faculty sponsor: Don Jones*

JOSHUA SWANSON '15

### **The Virile Sword, Bow, and Axe**

In Peter Jackson's *The Lord of the Rings* cinematic epic, three male characters travel across Middle-Earth to combat various evils. While typical gender analyses of *The Lord of the Rings* trilogy focus primarily on the female characters, these three male characters represent important facets of the male identity worthy of note. Aragorn, the human, is a ranger who rejected his throne. Legolas, the ranger elf, represents the supremely efficient and pragmatic male. Gimli, the dwarf, offers the male identity of a comedic, charismatic gruffian. An analysis of the three movies shows the ways in which these characters comprise the different archetypes to which males are expected to appeal within American culture. A literature review looks at the expectations American society places upon males, continues with the ways in which the fantasy genre contributes to these expectations, and finishes with an analysis of the ways in which *The Lord of the Rings* contributes to the fantasy genre. After establishing these connections between the genre, culture, and *The Lord of the Rings*, a novel analysis examines the specific moments in which these characters reflect the aforementioned male stereotypes.

*Faculty sponsor: Mark Johns*

ABBEY SYME '16

***Fundamental Movements with Jenn Schmidt***

*Fundamental Movements with Jenn Schmidt* is a short documentary film produced by Abbey Syme that explores one Luther student's experience within the Luther dance department. More explicitly, it discusses the styles of movement fundamentals and contact improvisation, which are both taught at the college. The project itself came out of an investigation into creating a short single-subject documentary, and the subject matter was inspired by the desire to share the unique and holistic approach to dance implemented by the Luther College dance faculty. In this presentation, I will touch on key reasons for making this film, screen the film, and close with final thoughts aimed at helping people understand the place of dance at Luther, as well as in the broader world.

*Faculty sponsor: Thomas Johnson*

JOIE TANAKA '16

**Religious Reactions to the Black Plague in Late Medieval Europe and 19th-Century China**

During the late medieval era, the Black Plague devastated the European continent, and just as devastatingly, it attacked southern China in the 19th century. Despite these two attacks in two different continents and entirely different time periods, the swift and brutal nature of the disease prompted people to turn toward whatever form of religion they had available to them. This study will attempt to discover if despite the religious, time, and cultural differences, religion and folk belief in late medieval Europe during the Black Plague served the same purpose as religion and folk belief in China. This study will compare various popular religious images, beliefs, and customs of Europeans during the mid-14th century and of the southern Chinese during the late-19th century, when the Black Plague was most prevalent in both areas. This research shows that the folk beliefs of these two different cultures served the same purpose of comforting and reconciling people with their devastating surroundings. This conclusion suggests that people and societies have similar reactions in dealing with unknown diseases and disasters, which can help us understand reactions of people to disasters today.

*Faculty sponsor: Robert Christman*

JOIE TANAKA '16

***Kamidana in the Household during Meiji Japan***

The Luther College Anthropology Collection houses a variety of artifacts, many of which have not been previously researched. One of these objects is a little Japanese household shrine, which has a small deity sitting in it, commonly known as a *kamidana*. Analyzing the inscription on *kamidana* and making comparisons to other similar objects, this paper gains insight on Japanese culture and politics. This *kamidana* not only left a record of Japanese customs such as the Coming of Age Ceremony and inheritance, but the time period in which it was made tells us that *kamidana* were becoming prevalent during the time of political and social upheaval of the Meiji Restoration of 1868. This research implies that *kamidanas* are one of the many results of the institution of State Shintoism and the Meiji government's attempt to make effective use of its citizens by unifying them in a time of rapid industrialization and Westernization in Japan.

*Faculty sponsor: Xiaolin Duan*

MELISSA THOLEN '15

**The Plague and the Restoration Government: How the Plague of 1665 Affected the Public Opinion of Charles II and the Cavalier Parliament**

In 1347 the Black Death took its toll on Western Europe; people from every station of life were terrified of this disease, its quick march across the continent, and the massive number of casualties. But this outbreak was only the beginning of a long chain of epidemics that would cripple European cities like clockwork every seven or 11 years. This paper focuses on the final outbreak of plague in England, during the reign of King Charles II in the year 1665, and the plague's effect on the public's opinion of their king and national government. In what ways did the official responses to this epidemic affect the public's opinion of the king and Parliament? To shed light on this question, primary sources ranging from disdainful poems that were anonymously published in newspapers, the memoirs of diarists, and letters written during the time of the plague were used. Research suggests that during the Plague of 1665, the public's opinion of their national government, especially the king, deteriorated significantly. Given the sheer number of deaths that resulted from this outbreak of plague, people were outraged by the king's response of fleeing the city of London to get away

from the “bad air” caused by plague. The subjects of Charles II believed that, as their king, he should bear the same burdens as everyone else.

*Faculty sponsor: Robert Christman*

EMILY TOPE '15

***Our Eagles: A Documentarian's Path to Discovery***

In the fall of 2014, I began work on a documentary film, *Our Eagles*, which explores the phenomenal popularity of a bald eagle family in Decorah, Iowa. The more people I interviewed, the more I was struck by their enthusiasm and affection for the eagles, and the more interested I became in answering the question: why do people get so attached to these eagles? As I soon learned, since its inception in 2009, the Decorah Eagle Cam has become the most-viewed live stream in Internet history, reaching more than 300 million viewers. Fans of the cam contribute to online discussions, donate to wildlife conservation organizations, and educate friends and co-workers about the eagles' lives. But what stuck with me most was their tendency to anthropomorphize the birds and consider them to be like family. Through my filmmaking process, I strove to analyze the eagles' effect on their devoted followers—to understand the eagle-loving community. My presentation will include discussion of the project and excerpts from the film.

*Faculty sponsor: Andy Hageman*

EMILY TOPE '15

***American Storytellers: Exploring the Power of Writing in American Society***

We live in an increasingly divided society, our country continually splitting into regional and ideological factions. So says Robert Wolf, the director of Free River Press, a non-profit publishing house based in Decorah. Wolf travels the country, holding writing workshops in which he coaches ordinary Americans on how to craft their life stories. In turn, I craft Wolf's story by making him the subject of *American Storytellers*, a documentary film that explores the mission of Free River Press. Through my efforts to interpret Wolf's history, I seek to discover the value of autobiographical writing as well as the press's aspiration to, as Wolf says, share stories that “will underline our common humanity.”

*Faculty sponsor: Thomas Johnson*

LENNY ULLOA SILVA '16

***Multiculturalism and Immigration: Integration in Barcelona, Spain***

As of 2014, the immigrant population in Barcelona, Spain, has increased 0.8 percent in comparison to the previous year, representing 17.4 percent of the entire population in the city. In 2000, 5 percent of the Barcelonan population was immigrant; nowadays that number has risen to 20 percent. The integration of those individuals to the home city has always been difficult due to the controversy over this issue. Some Spaniards believe that immigrants have come to “steal” jobs; others believe that it is the citizens' duty to integrate them into the city. Since the number of immigrants in Barcelona keeps rising, I decided to study and analyze what factors have benefited the situation of immigrants in Barcelona. Through this research, I have been able to conclude that there are three factors that have helped immigrants' integration: the Spanish government; the perception of the citizens of Barcelona toward the immigrants, and the immigrants themselves who have formed different groups to assist foreigners and support each other.

*Faculty sponsor: David Thompson*

ALES VARABYOU '17, STEPHEN BECKLIN '15, KIRBY OLSON '17, ROBBIE NESMITH '16, ZECHARIAH SMITH '17, ELLEN WIDERSKI '16

***Pink Autonomous Low-Cost Multirotor (PALMR)***

This research project examines the physical, mathematical, and programming aspects of constructing an autonomous quadcopter at a minimal budget. Open-source software was used in creation of flight and stabilization algorithms. The Arduino microcontroller was implemented as primary means for bidirectional communication with the periphery devices. C++ language compatibility allowed for the fast execution necessary to process the mathematical functions involved in the two-axis stabilization of a multirotor. The precision of the stabilization algorithm was achieved by studying the mathematical principles of control feedback loops and implementing the Proportionality Integral Derivative (PID) controller. Part of the automation algorithm was achieved using a RaspberryPi microcomputer as a platform to perform the image-processing, allowing the system to rely on the video input to navigate itself in space. The image-processing functionality was implemented using the OpenCV module for

Python. The designed system was configured to be responsive to changes in both hardware and software components, which allows for additional research of specific algorithms to be done with minimal effect on the work flow of other elements. We believe that the multirotor constructed in this research will serve as an effective tool in studying the direct hardware communication in advanced robotic systems.

*Faculty sponsor: David Ranum*

KATHERINE VORDERBRUGGEN '16  
**A Warning to Everyone: An Examination of Russian Foreign Policy and International Implications of the Russo-Georgian War of 2008 and the Current Crisis in Ukraine**

Since the fall of the Soviet Union in 1991, certain former Soviet states in Eastern Europe and the Caucasus have been working to achieve independent state institutions. For some of these states, such as Georgia and Ukraine, the post-Cold War era has been an opportunity to separate from Russian influence and seek alignment with the West. However, Russian foreign policy hinders these attempts at self-determination as a means to ensure Russia's importance in Eastern Europe and international affairs. This study will address these political dynamics of influence as well as foreign roles within the post-Soviet bloc. It will specifically consider the similarities and differences in Russia's actions in Georgia in 2008 and its current actions in Ukraine, as well as the further implications for international relations within the former Soviet states. Using recent scholarly publications and current reports from different news sources on the Georgian and Ukrainian conflicts, this study demonstrates how Russian foreign policy continues to attempt to maintain influence in the post-Soviet bloc. These findings call into question the willingness of European institutions and Western states to intervene in the former Soviet states on the basis of self-determination and democracy as well as the future implications for such intervention.

*Faculty sponsor: Laurie Iudin-Nelson*

CALVIN WALLER '15  
**The Regional Implications of Hindu Nationalism in India**

Hindu nationalism is a political ideology that dates back to the early to mid-20th century and includes the belief that the nationhood of India should be strictly tied to its Hindu identity. My senior thesis research explores the modern history

of Hindu nationalism, focusing on events and leaders that have made major contributions to the concept and mindset. I also discuss its influence on India's foreign policy and the extent to which Hindu nationalism benefits or undermines India's regional interests. Hindu nationalism is not a new phenomenon, but it has intensified in recent years with the success of the BJP, a party with ties to Hindu nationalist organizations, and the election of Narendra Modi. I argue that although the Hindu nationalist agenda is secondary to the development agenda, in both the eyes of the voter and the focus of Prime Minister Modi, if a development agenda is implemented and completed successfully, the potential exists for a legitimization of Hindu nationalist sentiments and a fueling of communal tensions. Although Modi's administration currently does not seem to be pushing a nationalist agenda, if they were to do so in the future, it could have dire consequences for peace in the region.

*Faculty sponsor: Victoria Christman*

RACHEL WILLIAMS '15  
**Lobbying in Christ's Name: The Effect of Public Policy Advocacy on Christian Congregations and Churches**

Within the past the 30 years the number of national religious advocacy groups has tripled. The interaction between politics and religion to create a better society has created an effect on both institutions and the systems of governance at the national level in the United States of America. This study has focused on religious organizations that have gained power to affect policy and how that has affected Christian faith and American politics. The study focused on how these faith-based organizations have navigated compromises needed to pass policy, the effect lobbying has on religious organizations and religious convictions, and the effect that these political faith-based organizations have had on how politics and the political sphere operate. From analyzing different advocacy movements and religious organizations, it was concluded that religious congregations had a shift in identity, political ideology usurping belief. This created ineffective lobbying and a split church. The organizations that did not choose a political side were able to do effective lobbying and uphold their religious commitments. Religious lobbying organizations that had more commitment to religious convictions than allegiance to either political party remained groups, whereas

Christians of different of political parties could work together.

*Faculty sponsor: Guy Nave*

DYLAN WINSTON '15

### **Spin Torque through pi and 2pi Domain Walls**

The spin of an electron, a form of angular momentum, generates a magnetic moment. This magnetic moment, like a compass needle, will rotate to align with a magnetic field. As an electron travels through an area of rotating magnetic field in a material (known as a domain wall), the magnetic moment will align with the field. Conservation laws dictate that a change in the electron's spin will cause an equal but opposite change in the domain walls that is known as "spin torque." This spin torque can cause domain walls to move through a material that can possibly be implemented in future electronic memory devices. Using a simple model of the quantum mechanical system, we can simulate electrons being transported through these domain walls. From this model we calculate the spin torques that are created in these domain walls and try to understand how they move because of it. We have discovered that the spin torque is heavily dependent on the domain wall geometry as well as the material.

*Faculty sponsor: Elizabeth Golovatski*

MARGARET YAPP '15

### **Strings: What Does It Mean to Grow Up?**

In this presentation, I will be reading from *Strings*, a collection of my essays that explore the uneasy, exhilarating limbo that is young adulthood. In various forms and lengths, these essays explore a wide breadth of subjects and experiences ranging from Pabst Blue Ribbon beer and R. Kelly to roller skating and dementia. Despite their differences, the works all exist in the coming-of-age sphere, and are centered around the same big question: what does it mean to grow up? I wrote these essays in an attempt to answer this question for myself, as an exercise in reflection and self-understanding through creative writing. Although these essays focus on my own experiences, the growing up experience is universal. Everyone has to grow up sometime; the process is awkward, confusing, painfully beautiful, and worth reflecting on. Following the reading, I hope to involve the audience in a Q&A about my writing process, the collection in general, and their own writing experiences.

*Faculty sponsor: Keith Lesmeister*

DAVID ZALK '15

### **The Effective Strategies of Behavioral Taxation: An Analysis of Modern Efforts to Incentivize Rational Decision Making**

Throughout history, governments have used taxation as a method to transform behaviors of society. Whether it is encouraging specific behaviors, such as saving for retirement, the implementation of new technology, or discouraging harmful behaviors, the tax code is inherently more than a tool to generate revenue, but additionally an effective method of persuading a population. Employing the understanding of tax credits such as the Saver's credit and the Residential Energy Efficient Property Credit, this research addresses the effectiveness of the U.S. government's use of tax credits to stimulate encouraged behavior compared with the efforts of other countries to develop more efficient ways of addressing similar behavior. Through examining current academic research, initial findings suggest that other countries have found more efficient and creative ways to incentivize behavior and that their methods have translated to more favorable results. If true, research suggests that adaptation of U.S. tax regulations could lead to a greater efficiency in affecting societal behavior.

*Faculty sponsor: Mona Nelson*

CHRISANN ZUERNER '15

### **Grimms's "Aschenputtel" and Rogers and Hammerstein's 1957 TV film Cinderella**

The Brothers Grimm's fairy tale "Aschenputtel" (Cinderella) portrays the classic tale of good prevailing over evil forces. When comparing the classic fairy tale to the modernized movie of Rogers and Hammerstein's *Cinderella*, the theme of good triumphing over evil can be extended to interpret the interactions between the characters and their attempts at self-determination to pursue their lives. This study focuses on comparing how Cinderella is portrayed in terms of female power—in attempting to define her life or passively allowing for people around her to determine her actions. This analysis yields a deeper look into the seemingly innocent story of Cinderella and the role a male hero continues to play even in current renditions of the classic fairy tale. My presentation will combine a synopsis of both versions of the story with a comparison and critique of the two Cinderellas.

*Faculty sponsor: Ruth Kath*





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