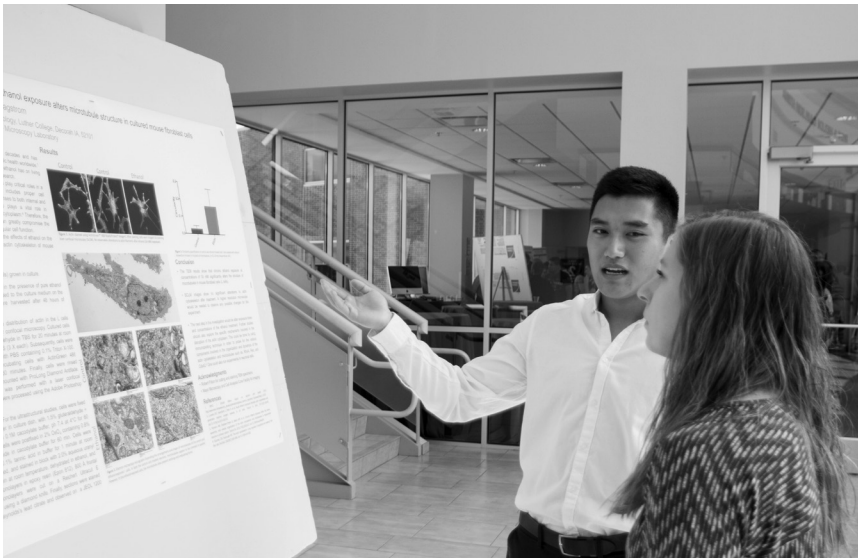


Student Research Symposium and Senior Recognition Convocation

Friday, May 11, 2018



LUTHER COLLEGE

To the Luther Community:

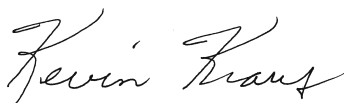
Welcome to the annual Student Research Symposium at Luther College. Here you will find—in scholarly presentations, posters, and artistic performance—the life of discovery, reflection, and creation that Luther students pursue under the inspired and skillful guidance of our faculty.

At the day's opening session we will hear from two outstanding seniors who were chosen to reflect on their research experiences. The projects undertaken by these two students, Erik Floden and Nicole Weber, represent the kind of complex learning—rooted in both disciplinary and interdisciplinary approaches—that Luther fosters to help our students and our society identify, understand, and address significant issues in our world.

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. What you will see and hear is the culmination of long hours of thought, experimentation, practice, vision, and revision, offered now to our students' peers, mentors, families, and friends. As part of the day's activities, we will celebrate the Class of 2018 with the Senior Recognition Convocation, with remarks given by Professor Ramona Nelson. 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 feature the top research papers from our common first-year spring course, Paideia 112: Enduring Questions.

The day will conclude with two evening performances performed by students in our music program's opera workshop and in our theatre program in the visual and performing arts. We are delighted that you have joined us today to see the fruits of our students' 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

- **Introit:** Badinerie (BWV 1067), by J. S. Bach, arr. Kerry Turner. Performed by the QTC Horn Quartet (Dr. Rebecca Boehm Shaffer, faculty coach): Luke Berkley '20, Kyli Kurtenbach '20, Emily Stifter '20, Leah Wittenberg '20.
- **Invocation:** Anne Edison-Albright, campus pastor
- **Welcome:** Rachel Brummel, assistant professor of environmental studies; member, Honors Advisory Committee
- **Research Reflections:** Nicole Weber '18 and Erik Floden '18
- **Recognition of Symposium Participants:** Laurie Zaring, associate professor of linguistics and French; member, Honors Advisory Committee
- **Postlude:** Wapango, by Paquito D'Rivera, arr. David Harris and W. Marshall Sealy. Performed by the QTC Horn Quartet.
- **Benediction:** Anne Edison-Albright

SESSION II: 10:00 A.M.–11:00 A.M.

<i>Olin 112</i>	<i>Olin 101</i>	<i>Valders 367</i>	<i>Preus Library, Hovde</i>	<i>Valders 262</i>		<i>Valders 206, 362, and CFL Recital Hall</i>
Selves and Others: Unity and Diversity	Apps for Luther: Software for the Liberal Arts	Comparative International Politics	European Institutions and Movements	Wrinkles in Time and Language		Paideia 112 Research (see separate brochure)

SENIOR RECOGNITION CONVOCATION: 11:15–11:45 A.M.

Center for Faith and Life Main Hall

SENIOR CLASS PHOTO: 11:45 A.M.–12:00 P.M.

Bentdahl Commons

LUNCH BREAK: 12:00–1:00 P.M.

Community Dessert Gathering

Complimentary ice cream novelties, Bentdahl Commons, central campus

SESSION III: 1:00–2:00 P.M.

<i>Olin 112</i>	<i>Olin 101</i>	<i>Valders 367</i>	<i>Preus Library, Hovde</i>	<i>Valders 262</i>	<i>Center for the Arts Gallery</i>	<i>Valders 206, 362, and CFL Recital Hall</i>
Gender in Health, Performance, and Theology	Interrogating the Past	Creative Processes and Products I	Small Things, Big Questions	Public Policies, Movements, and Perceptions	Finding the Hjemland	Paideia 112 Research (see separate brochure)

SESSION IV: 2:15–3:45 P.M.

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

SESSION V: 3:45–4:45 P.M.

<i>Olin 112</i>	<i>Olin 101</i>	<i>Valders 367</i>	<i>Preus Library, Hovde</i>	<i>Valders 262</i>		<i>Valders 206, 362, and CFL Recital Hall</i>
The Black Death	Apps for Life: Software for Your Day-to Day	Creative Processes and Products II	Identities and World Views	Searching the Heavens: Gods and Stars		Paideia 112 Research (see separate brochure)

EVENING EVENTS: 7:30 P.M.

Opera Performance: *Così fan tutte*, W. A. Mozart (Center for Faith and Life)
Theatre Performance: *Marie Antoinette*, David Adjmi (Center for the Arts Jewel Theatre)

SENIOR RECOGNITION CONVOCATION

11:15–11:45 A.M.

PRELUDE

Second Suite in F major, by Gustav Holst, arr. by David Sabourir

The Noble Brass Quintet (John Cord, faculty coach)

Michael Winkler and Madison Ihde, trumpet

Elyse Grothaus, horn

Elliot Douma, trombone

Gavin Shaeferle, tuba

INVOCATION

Anne Edison-Albright, campus pastor

RECOGNITION OF HONOR SOCIETY MEMBERSHIP

ADDRESS

Ramona Nelson, professor of accounting and management

“Will this be on the exam?”

ANTHEM

The Music of Living, by Dan Forrest

Aurora and Norsemen

Jennaya Robison and Mark Potwin, conductors

BENEDICTION

Anne Edison-Albright

POSTLUDE

Fugue in G minor (The Little Fugue), by J. S. Bach, arr. by Ronald Romm

The Noble Brass Quintet

A class of 2018 photo will be taken on Bentdahl Commons immediately following convocation.

SYMPOSIUM SCHEDULE

SESSION I: 9:00–9:45 A.M.

Center for Faith and Life Main Hall

- **Introit:** Badinerie (BWV 1067), by J. S. Bach, arr. Kerry Turner. Performed by the QTC Horn Quartet (Dr. Rebecca Boehm Shaffer, faculty coach): Luke Berkley '20, Kyli Kurtenbach '20, Emily Stifter '20, Leah Wittenberg '20.
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 - **Benediction:** Anne Edison-Albright
-

SESSION II: 10:00–11:00 AM

Olin 112

Selves and Others: Unity and Diversity

Moderator: Stephanie Travers

Natalie Shimp '19

Luther College as a Discourse Community:
First-Year Student Encounters with Linguistic
Discrimination

Nicole Weber '18

The Social Experience of Anxiety

Samantha Rabang '18

Misinterpreting Facial Emotions of African
Americans: Are Caucasians Prejudiced or
Just Emotionally Inept?

Olin 101

**Apps for Luther: Software for the Liberal
Arts**

Moderator: Kent Lee

Ashenafi Beyene '18

Charles Mugwagwa '18, Tenzin Tsephel '18
SASC Tutoring App

Joshua Jackson '18

Ashleigh Bunkofske '18, Eric Coughlin '18
Luther Course Proposal System

Linh Nguyen '18

Ian Christopherson '18, Taylor Gades '18
NordicShift

Valders 367

Comparative International Politics

Moderator: Pedro dos Santos

Faye Lee '20

Ghana and Malaysia: A Comparative
Assessment of Economic Development after
Independence

Nazario Jap Dos Santos '19

Regime Change: A Path for Independence of
the Non-Self-Governing Territory

Ismail Hamid '19

Democratic Breakdown in the Maldives

Preus Library, Hovde

European Institutions and Movements

Moderator: Michael Engelhardt

Sean McKenzie '20

Labour Movements in France and Sweden:
The Longevity of Unions

Jamie Herman '18

The Knowledge Economy and the Future of
European Universities

Nathan Campbell '18

Military Equipment Manufacturing in
Norway

Valders 262

Wrinkles in Time and Language

Moderator: Wanda Deifelt

Bryce Hefty '18

Former First

Kaitlyn Buls '19

What Happened to Day Five?: Problems with
the Past in Kazuo Ishiguro's *The Remains of
the Day*

Sam Scheidt '18

Ecumenism and the Catholic Church

SESSION III: 1:00–2:00 PM

Olin 112

Gender in Health, Performance, and Theology

Moderator: Wanda Deifelt

Elizabeth Bonin '18

Access Denied: The Rapid Decline of Rural Reproductive Health Clinics

Laila Sahir '18

Gender and the Performance of Power in *Marie Antoinette*

Wylie Cook '18

#SayHerName: Understanding the History of Womanist Theology and Its Relevance in Understanding Police Violence against Black Women and Girls

Olin 101

Interrogating the Past

Moderator: Laurie Bouska

Katie Patyk '18

Archival Research and the English Major: Stories from the Papers of Theodore Sturgeon

Jeffrey Lackmann '18

Bilocation: Thomas Pynchon's Anti-Historical Novel *Against the Day*

Sarah Lodge '19

Love in the Time of Cholera

Valders 367

Creative Processes and Products I

Moderator: Lea Lovelace

Emma Withers '18

Ryan Koning '19

Use Your Voice!: Exploring Youth Activism and Social Justice Through an Artistic Lens

Aaron Shouse '18

The Creative Process of *This, That, and the Other Thing*: A Podcast

Preus Library, Hovde

Small Things, Big Questions

Moderator: Molly Wilker

Grant Benthin '18

Sulfonamide Alcohol Ligands as Metal-Free Catalysts for Ring-Opening Polymerization Reactions

Nathan Campbell '18

Effects of Ligand Substitution on CdSe Nanocrystal Optical Properties

Joshua Jackson '18

Charm Meson Production from Bottomonium Decays

Valders 262

Public Policies, Movements, and Perceptions

Moderator: Victoria Christman

Owen Schleif '18

Tracing the Roots of Nationalism: The Case of Spain

Halina Pyzdrowski '18

Forrest Stewart '18

On the Path to Community Flood Resilience: Exploring Flood Experiences in the Upper Iowa Watershed

Shelja Thakur '18

Ganga River Pollution: A Policy Analysis

Center for the Arts Gallery

Finding the Hjemland

Moderator: Kate Elliott

Annika Vande Krol '19

Finding the Hjemland: Herbjørn Gausta and the Immigrant American Experience

SESSION IV: 2:15–3:45 PM

SHL/Valders

Poster Session

Moderator: Kirk Larsen

Ananda Easley '18

Alcohol Consumption and Generative Development in Middle Adulthood

Emily Fuller '19

Using UV-vis Spectrophotometry and Fluorescence Spectroscopy to Analyze the Binding Relationship of Curcuminoids and HAS

Anna Li Holey '18

Elizabeth Glennon '19, Shannon Meehan '18
Recent Adult Monarch Butterfly (*Danaus plexippus*) Abundance Trends in Tallgrass Prairies of Northeast Iowa

Jacqueline Krawczyk '18

Kaitlin Bohn '18, Adeline Smith '18
Exploring Effective Stress Reduction Techniques to Be Included in a College Campus Stress-Reduction Room

Shannon Meehan '18

Elizabeth Glennon '19, Anna Li Holey '18
Monarch Butterfly (*Danaus plexippus*) Oviposition and larval Feeding Preferences on Five Species of Milkweed (*Asclepias* sp.) in Northeast Iowa

Sydney Rehnelt '18

Mary Buchheit '18, Megan Meyer '18, Allison Swiggum '18
The Effects of Mindfulness-Based Exercise Interventions like Yoga and Tai Chi on Stress Levels in College Students

Senia Sikkink '18

Persistence and Looking at Humans during an Unsolvable Task in Pet, Foster, and Shelter Dogs

Morgan Streyle '19

Nikhil Thacker '18

Habitat Use by Native Bumblebees in Northeastern Iowa

Victoria Vytcharenko '19

Dopamine Quantification in *Caenorhabditis elegans* with High-Performance Liquid Chromatography

Nicole Weber '18

The Impact of Anxiety on Working Memory

Additional poster displays presented by students from the following classes:

Biology 112: Insects, Humans, and the Environment

Biology 239: Molecular and Cellular Biology

Biology 250: Restoration and Conservation

Biology 354: Evolutionary Biology

Computer Science 150: Intro to Computer Science

Physics 114: Physics of Sound

Psychology 353: Social Psychology

SESSION V: 3:45–4:45 P.M.

Olin 112

The Black Death

Moderator: Angela Kueny

Matthew Rossler '19

The Resurgence of the Black Death in 1720
France

Jamie Herman '18

Origins of Empiricism in Black Plague
Treatises

Karl Nycklemoe '18

The Three Dead: Perception of Death during
Times of Plague

Olin 101

Apps for Life: Software for Your Day-to-Day

Moderator: Kent Lee

Kieran Okerstrom '18,

Olivia Hawkins '18, Erik Nelson '18
Time-Management App

Kyle Miller '18,

Devin Hanggi '18, Aaron Herman '18
Pathwerks

Ryne Hanson '18,

Hillary Gardner '18, Jacob Schwartz '18,
Joschua Setiawan '18
SpeechApp

Valders 367

Creative Processes and Products II

Moderator: Amy Weldon

Linnea Peterson '18

The Oldest Child

Jeffrey Lackmann '18

“He says that he will never die”: Cormac
McCarthy’s *Blood Meridian* and the Stylistic
Rendering of the Eternal Judge

Preus Library, Hovde

Identities and Worldviews

Moderator: Holly White

Ana Lopez '19

Earth-Beings, Misfortune, and Causation in
Northern Chile

Marcella Meza '18

Anzaldúa’s Autohistoria-teoría: Subversion
and Revolution in Philosophical Expression

Eli Bowe '18

The Four-Dimensional Person

Valders 262

Searching the Heavens: Gods and Stars

Moderator: Tony Mutsune

Erik Floden '18

Determining Secular Brightness Trends of
Long-Period Variable Stars in Open Star
Cluster M23

Kevin Honz '18

Investigating Period Variations of Long
Period Variable Stars

Lily Kime '19

Gods Who Survive: Pagan Sources of John
Milton and Neil Gaiman

EVENING EVENTS: 7:30 P.M.

Opera Performance CFL Main Hall

Così fan tutte

Music by Wolfgang Amadeus Mozart

Libretto by Lorenzo da Ponte

“Who could be more faithful than our fiancées?” Nobody, according to soldiers Ferrando and Guglielmo, who are engaged to sisters Dorabella and Fiordiligi....until the skeptical Don Alfonso is willing to wager them against the claim. Don Alfonso has an elaborate scheme up his sleeve: stage a fake military procession that whisks the boys away to war (or so the sisters think), incite an emotional goodbye, get their chambermaid Despina involved in the wager, and disguise the boys as Albanians ready to woo the disheartened sisters. At its most serious, Mozart’s masterpiece *Così fan tutte* flirts with infidelity and betrayal and the inherent consequences, illuminated by some of his most divine music for voice and orchestra. At its lightest, it is a farcical comedy of errors, complete with mistaken identities, magnet therapy, and notaries in ridiculous wigs. In the end, it is a vehicle for Don Alfonso, the seasoned philosopher, to remind the young lovers, and indeed all of us, that true love will require forgiveness.

Professor of music Daniel Baldwin conducts the cast and the Luther College Chamber Orchestra in the performance; stage direction is by associate professor of music Andrew Whitfield; musical direction and preparation is by assistant professor of music Nicholas Shaneyfelt; and assistant stage direction is by instructor of music Carla Thelen Hanson. The production features original sets, designed and built by Brett Conrad, and original costumes, designed and built by Marann Faget. Lighting design is by theatre and dance technical director Tom Berger, and Luther student Cleo Garza is the stage manager.

The cast of *Così fan tutte* includes Luther students Kurt Anderson, Nathan Baldwin, Garret Baumler, Isaiah Cammon, Xavier Conzet, Colin Cosgrove, Mayalyn Cott, Emily Dirks, Mitchell Gage, Eddy Galstad, Jarrod Gross, Grace Huber, Abby Korenchan, Kiley Korey, Gabrielle Laske, Noah Lauer, Kelvin Li, Sean McKenzie, Mason Montuoro, Natalie Nelson, Riley Peters, Jenna Reimann, Natalie Rumer, Marie Sauze, Jacob Schmidt, Brenna Sherman, Sarah Smallfield, Jacob Southerland, Aidan Spencer, Katie Stuelke, and Josh Vidervol.

Theatre Performance Center for the Arts Jewel Theatre

Marie Antoinette

by David Adjmi

Director: Laila Sahir '18

Faculty advisor: Bobby Vrtis, assistant professor of theatre

Stage manager: Meghan Gaffney '18

Composer: John Kuntz '19

Assistant costume designer: Emma Brashear '18

Cast: Emma Brashear '18, Morgan Fanning '20, Christen Foster '18, Parker Fretheim '19, Mikaela Hanrahan '21, Andrew Kane '19, Jonathan Kuehner '20, Adrienne Lee '19, Nathan Sunde '21, Emma Withers '18, Ezra Wood (community member)

Adjmi’s contemporary take on the life of the young queen of France highlights the ideals and pressures of society in 1776 that shaped Marie Antoinette’s historical image as a frivolous woman. The lighthearted and witty tone of the play takes a dark turn as revolution threatens Marie Antoinette’s sheltered life. With social commentary that challenges modern viewers, Marie Antoinette forces the audience to question what is necessary for a fulfilling life.

PARTICIPANTS AND ABSTRACTS

Arranged alphabetically by lead student's last name (additional participants are listed alphabetically within each presentation).

GRANT BENTHIN '18

Sulfonamide Alcohol Ligands as Metal-Free Catalysts for Ring-Opening Polymerization Reactions

Biodegradable polymers made from renewable resources are a fundamental part of sustainable commercial technologies. One of the most successful advancements in biodegradable polymer development is polylactide (PLA), a polyester with substantial potential to replace some traditional petroleum-based plastics; it is synthesized by a ring-opening polymerization (ROP) of D,L-lactide. In recent years, considerable effort has been made to develop catalysts for PLA synthesis that control the rates of polymerization and the three-dimensional orientation of substituents along the polymer chain. Most catalysts currently used in PLA synthesis are metal-based and are often associated with levels of electrical conductivity and/or toxicity that are undesirable in electrical or biological systems. Hoping to avoid these undesirable properties, a library of metal-free sulfonamide catalysts was prepared. Herein, we report the synthesis of characterization of this library containing a broader range of electronic and steric properties.

Faculty advisor: Brad Chamberlain

ASHENAFI BEYENE '18

CHARLES MUGWAGWA'18, TENZIN TSEPHEL '18

SASC Tutoring App

SASC tutoring application is a web-based application that intends to address the difficulties associated with tutoring request submissions, tutor-tutee data processing, tutor-tutee matching, and reporting. Tutor-tutee data processing is handled through data tables in which insertion, update, deletion, filtering, and sorting features are enabled for a number of tables for efficient and timely data processing. Based on provided tutor and tutee data, we have also implemented a tutor-recommendation feature that makes the tutor-tutee assignment process very efficient. For flexible accessibility of processed tutor-tutee data, we have implemented data download features through which tutor-tutee data can be accessed

by the SASC admin locally. We also explore different data visualizations through graphs and tables.

Faculty advisor: Kent Lee

ELIZABETH BONIN '18

Access Denied: The Rapid Decline of Rural Reproductive Health Clinics

In June of 2017, Decorah closed the Northeast Iowa Community Action Corporation's family planning clinic due to financial struggles. Family Planning provided health services such as STD screenings, sexual health education, general well women exams, birth control administration, and services for men. In February 2017 Iowa senators in SF2, working to eliminate abortion, chose to reject federal funding in favor of their own state funding. Several clinics in Iowa besides NEICAC's have since closed because the state funds will not provide any reimbursement to entities that provide abortion services. What happens when the only confidential reproductive health care clinic in the county that accepts patients regardless of ability to pay is closed? For this journalism senior project, I interviewed providers, clients, women's health advocates, and a state representative and researched news and academic articles on women's health care. As a result of the widespread closings, patients now have to drive an hour and a half each direction to receive care. Since transportation is not always feasible, many are forced to go without reproductive health care, and women's health care is suffering. These are the Northeast Iowa symptoms of what some have called a national "war on women's health."

Faculty advisor: David Faldet

ELI BOWE '18

The Four-Dimensional Person

The problem of identity, and of personal identity in particular, has long been a question of interest. In this paper, I focus upon questions of temporal identity, that is to say, questions of continuous identity across time. In doing so, I make reference to the work of Donald Baxter, whose theories of many-one identity, self-differing objects, and aspects I apply to the stage-theoretic conception

of identity across time. In so doing, I defend the position that a person is best considered as a four-dimensional entity, one with extension in three spatial dimensions and also in the temporal dimension. I conclude by arguing that the person is a sufficient identity relation between its parts. Because of this, I argue that the concept of an identity relation, which crops up frequently in stage theory, is an attempt to answer a misplaced question. Instead, in the future it will be more productive to determine when an aspect can be a part of one person but not of another.

Faculty advisor: Peter Nekola

KAITLYN BULS '19

What Happened to Day Five?: Problems with the Past in Kazuo Ishiguro's *The Remains of the Day*

In Kazuo Ishiguro's 1989 Booker Prize-winning novel *The Remains of the Day*, Stevens, an aging butler, tells the story of his journey across post-World War II England, reflecting on his past as he travels to visit his old housekeeper, Miss Kenton. By looking at the work of scholars such as Lilian Furst and Graham McPhee, we can see how this is a story of an unreliable narrator shaping his life almost entirely through his past. Despite their careful examinations, neither these critics nor other scholars have spoken to one of the most interesting phenomena in the novel. In the narrative, Stevens reflects on each of the six days of his journey, carefully noting what happened during each day. That is, he reflects on all days except Day Five, the day on which he finally meets Miss Kenton. I argue that his choice not to narrate Day Five speaks to his inability to comprehend or fully occupy his present, instead choosing to situate his circumstances in terms of a carefully negotiated past. Stevens's ultimate inability to make sense of his present is an integral part of who he is—a man who proves himself incapable of moving forward.

Faculty advisor: David Faldet

NATHAN CAMPBELL '18

Military Equipment Manufacturing in Norway

Norway has a well-established reputation for its generous humanitarian aid contributions as well as its robust social welfare structure. What may not be as well-known is the extent to which Norwegian weapons and military equipment have become a source of the capital that affords Norway the ability to develop such a reputation.

This presentation will focus on research exploring the history of weapons manufacturing in Norway and its relationship with the Norwegian government and people. Additionally, it will shed light on Norway's complex relationship to the Israeli-Palestinian conflict with regard to its export of weapons and military equipment. This research was conducted as a facet of the Peace Scholars Program, which may be briefly introduced in the presentation.

Faculty advisor: Victoria Christman

NATHAN CAMPBELL '18

Effects of Ligand Substitution on CdSe Nanocrystal Optical Properties

The unique optical properties of semiconductor nanocrystals have prompted their use in a wide range of technological devices. With their growing popularity, it has become increasingly important to understand how the surface chemistry of nanocrystals can be altered to control the ways in which nanocrystals interact with their environment. In this study, the native ligands from as-synthesized CdSe nanocrystals were substituted for a series of shorter, thiol-based ligands with different functional groups. The optical properties of the nanocrystals were measured as new ligands were introduced onto the nanocrystal surfaces. The extent of ligand exchange was monitored by time-resolved and steady-state photoluminescence spectroscopy, and the stability of the nanocrystals was assessed using absorption spectroscopy. These data were used to gain insight into the ligand binding mechanisms and to understand how the nature of the binding mechanism is influenced by ligand functionality.

Faculty advisor: Molly Wilker

WYLIE COOK '18

#SayHerName: Understanding the History of Womanist Theology and Its Relevance in Understanding Police Violence against Black Women and Girls

Womanist theology has been used to understand the experiences of women of color within the church and the Bible as well as providing a unique lens in theorizing ethical living. In my research, I wondered where Womanist Theology has been and where it is going. Particularly I raise questions and advocate for praxis in overcoming the grip of empire and its violence against black women and girls. I also focus on unpacking the dominant media narrative that pigeonholes

women as secondary victims while denying their existence as primary victims and reproducing monolithic, hetero-patriarchal understandings of whose lives really matter. In order to develop such womanist understandings of empire and resistance to such projects, I trace the history of the genesis of womanist theology while also raising critiques of its own limitations. I then critically examine the dominant media narratives surrounding police violence toward black lives. Lastly, I offer a critique of womanist theology and its need to respond to the praxis of black feminist activists in the movement for Black Lives in order to inspire new cyclical means of knowledge production between the academy and the streets.

Faculty advisor: Wanda Deifelt

ANANDA EASLEY '18

Alcohol Consumption and Generative Development in Middle Adulthood

Erikson's developmental model encompasses the entire lifespan and is characterized by eight distinct stages. Each stage builds off of previous growth and revolves around a central conflict or focus. In middle adulthood (approximately age 40–60), this developmental issue is known as generativity versus stagnation. Generative individuals seek to invest their resources in the next generation and share their resources, taking on meaning beyond themselves, while stagnant individuals become self-absorbed and self-serving. This study seeks to explore a potential relationship between levels of generativity and alcohol consumption. It was hypothesized that higher levels of generativity would correlate with lower levels of alcohol consumption. The study found a curvilinear relationship between alcohol consumption and generativity. Individuals in the lowest and highest quintiles of alcohol consumption reported the lowest generativity scores, while the middle quintile reported the highest generativity scores. In other words, our data suggests that in middle adulthood, nondrinkers and heavy drinkers are the least generative, while moderate drinkers are the most generative. This somewhat supports our hypothesis. However, we did not expect to find nondrinkers and light drinkers to demonstrate low generativity. It has been suggested that there may be moderating variables at play, such as social support, openness, religiosity, etc.

These have not been explored. However, other factors, such as marital status, education level, and job status were also examined and found to be highly correlated with generativity. This study has important implications for the health of the middle-aged population. Alcohol habits and other predictors of generativity (marital status, education level, job status) develop during young adulthood, so this study also pertains to individuals in their undergraduate years of college and above.

Faculty advisor: David Bishop

ERIK FLODEN '18

Determining Secular Brightness Trends of Long-Period Variable Stars in Open Star Cluster M23

Images of a half-degree square field containing the open star cluster M23 have been acquired from February to October each year since 2005. Our access to such a long data set has allowed for the identification and analysis of long-period variable stars (LPVs) whose luminosities vary over intervals of tens to hundreds of days. Previous research has suggested that the LPVs identified at Luther appear to be getting dimmer over the long term—behavior not currently part of standard models of these stars. However, we will show that a change in instrumentation midway through the data set may have had a significant impact on apparent long-term LPV brightness trends. We discuss alternative photometric methods for star-brightness extraction. While no photometric method has so far proved to adequately reduce the effects of instrumental changes, we have improved photometric resolution, allowing for the identification of more LPVs and alternative approaches to determining their long-term brightness trends.

Faculty advisor: Jeff Wilkerson

EMILY FULLER '19

Using UV-vis Spectrophotometry and Fluorescence Spectroscopy to Analyze the Binding Relationship of Curcuminoids and HAS

Curcuminoids are a family of photosensitive organic molecules that have potential application in photodynamic drug therapy (PDT). To determine each curcuminoid derivative's efficacy as a drug in PDT, binding affinity for the carrier protein human serum albumin (HSA) was explored through UV-vis spectrophotometry

and steady-state fluorescence spectroscopy. This study suggests that there is an inverse relationship between the presence of hydroxyl groups in the curcuminoid derivative and binding affinity for HSA.

Faculty advisor: Olga Michels

ISMAIL HAMID '19

Democratic Breakdown in the Maldives

Theories of democratization look at different institutional and societal variables to argue that the absence of some variables might make democracies prone to breakdowns, while the presence of institutional and societal variables make the democracy stronger. Modernization theorists claim that countries naturally democratize as they develop economically, while the honeymoon theory supports this claim by arguing that young democracies have a buffer period during which the country is safe from a democratic breakdown. Meanwhile, other theorists argue that culture plays a bigger role in whether a country is ready for a democracy or not. This paper looks at the short-lived democracy in the Maldives, borrowing from existing literature on modernization and honeymoon-effect theory to examine the factors that played the most prominent role in the democratic breakdown of the country. The paper examines whether the Maldives was developed enough to be able to sustain the democratization process undergone between 2004 and 2008 by looking at economic indicators compared to other developing countries that have successfully democratized. In addition, it looks at the role of culture, more specifically Islam, which is deeply ingrained in Maldivian culture, to see the role of Islam in democratic breakdown in the country by placing existing scholarship on the relationship between democracies and Islam in a Maldivian context. The paper argues that Maldives was adequately developed to sustain democracy, and that Islam's inherent cultural values were not an important factor in the democratic breakdown of the Maldives.

Faculty advisor: Pedro dos Santos

RYNE HANSON '18

HILLARY GARDNER '18, JACOB

SCHWARTZ '18, JOSCHUA SETIAWAN '18

SpeechApp

Our group chose to design a web application, named SpeechApp, that streamlines the grading

process for a real-time speech/presentation. The current model of the application is designed based on one of the Luther College speech classes instructed by professor Kim Powell, who suggested the idea and provided us with feedback throughout the application development. The features of SpeechApp include a main interface to support real-time grading in presentation using a timer and rubric checker; a database that stores classes, sections, students, grades, and rubric for individual users/graders; and a function that allows the users to send the grade to each student.

Faculty advisor: Kent Lee

BRYCE HEFTY '18

Former First

While fantastical, works of fiction still deal with facets of reality. Often, the strangeness of the fiction makes it easier to connect with the ordinary elements. My work of fiction, *Former First*, is the story of Delta, a shapeshifter cast out of her own society who must learn that there is more to strength than just the physical aspect. Along the way, she confronts her own views about the world and the people who inhabit it. Shaped by my readings of Brandon Sanderson's *The Emperor's Soul*, George Eliot's *Middlemarch*, and a variety of authors from my anthropology classes, the story reflects cultural differences in our society as well as our ideas of race. While the work is one of fantasy, its themes of learning from failure and relating to others despite differences in culture and beliefs are ones that readers should recognize.

Faculty advisor: Amy Weldon

JAMIE HERMAN '18

The Knowledge Economy and the Future of European Universities

The knowledge economy represents a global push toward adopting innovation and knowledge as an economic good. This commodification of knowledge has created a demand for knowledge producers. European universities, historically looked to as research-based knowledge producers and public benefactors, are responding to this heightened demand for innovative technologies. Though public benefit from university-produced knowledge is by no means a new phenomenon, the commodification of that knowledge as an economic product listed as a public good has distorted how we understand the public-service mission of the university. In this paper I analyze

the way demand from universities for innovation and knowledge, understood as economic commodities, changes the way we understand the service goal of the university. I argue that fully accepting knowledge production as a public good produced by universities risks alienating the role of teaching in universities, which could be detrimental to the future of higher education.

Faculty advisor: Pedro dos Santos

JAMIE HERMAN '18

Origins of Empiricism in Black Plague Treatises

The Black Death presented a conundrum for medical practitioners and scholars. Perplexed by observations and experiences of the plague in contrast with ancient understandings of disease, chroniclers and academics were pushed to align their plague commentaries with either the ancient, scholastic, often religiously backed view of plague or a new, heretical understanding of the disease, grounded in observation and experience. Though chroniclers who emphasized the empirical source of their theories of plague have historically been understood as contagion theorists fighting predominantly against a miasmatic understanding of the plague, a closer look at plague treatises from the Black Death period illuminates the status of these countercultural chroniclers as rudimentary empiricists fighting a scholastic epistemological worldview. By looking at plague treatises that emphasize the importance of observation and experience in understanding the pestilence, this article establishes a narrative of the origin of empirical study during the Black Death: a crack in the ancient, scholastic model of understanding. Though empiricism is believed to have originated in the 17th century, this reading of plague treatises shows people were pushing toward understanding the world through observation and experience as early as the late Middle Ages.

Faculty advisor: Robert Christman

ANNA LI HOLEY '18

ELIZABETH GLENNON '19, SHANNON MEEHAN '18

Recent Adult Monarch Butterfly (*Danaus plexippus*) Abundance Trends in Tallgrass Prairies of Northeast Iowa

The abundance of monarch butterflies (*Danaus plexippus*) of the eastern migratory population has been declining at overwintering sites in Mexico over the past 20 years. Previous studies have revealed many of these overwintering

monarchs originate from summer breeding grounds concentrated in the corn belt in the Upper Midwest. To understand the status of breeding adult monarch populations in Northeast Iowa, modified Pollard walk butterfly surveys were undertaken at two- to three-week intervals from late May/early June to August or September in 2015–17. Butterfly surveys occurred in at least eight tallgrass prairies each year, including both remnant and planted natural areas that provide significant nectar and milkweed (*Asclepias* sp.) resources for monarch adults. In 2015, 544 monarchs were observed, while in 2016, only 134 monarchs were sighted. However, no surveys were conducted at the peak of the migration in September in 2015 or 2016, when monarch numbers were much higher at these sites. Planted prairies hosted a higher rate of monarchs/km than remnant prairies, likely due to the greater abundance of floral resources. The implications of prairie status, surrounding landscape use, floral resources, milkweed density, and overwintering monarch population size the previous winter on summer adult monarch populations is addressed.

Faculty advisor: Kirk Larsen

KEVIN HONZ '18

Investigating Period Variations of Long-Period Variable Stars

Stars are not static but can change in brightness, temperature, and size over processes that span days to billions of years. Long-period variable stars (LPVs) are a type of red giant star that pulsates, brightening and dimming with periods on the order of months. We sought to observe variations in these periods across a 12-year data set of over 80 LPVs in a single stellar field. Using the observatory atop Valdres, we have taken CCD images of the field of open star cluster M23 since 2006. We identified LPVs using a statistical test for long-term variation and then analyzed LPV brightness over time to find periods for subsets of the 12 years. Period variations of monoprotic and semiregular LPVs will be discussed. For example, one star has shown three oscillation modes with periods near 240 days, 120 days, and 80 days, but each mode appears to show variation in both period and amplitude, leading to a luminosity as a function of time that is complex and highly variable. This study may illuminate proposed mechanisms for nonevolutionary period changes in LPVs, including thermal pulses, chaotic behavior, and structural changes.

Faculty advisor: Jeff Wilkerson

JOSHUA JACKSON '18
ASHLEIGH BUNKOFSKE '18, ERIC
COUGHLIN '18

Luther Course Proposal System

Continued development of existing software is a crucial aspect of modern software development. Programmers are expected to be able to learn, document, and update products they had no hand in originating. During the 2016–17 academic year at Luther College, a group of students developed a website to replace Luther's old course proposal system using modern web technologies like AngularJS, MongoDB, and Java. A major improvement over the previous system, Luther Course Proposal was given a commitment for another year of continued support. This year, we fixed a number of bugs and made some important enhancements to the Luther Course Proposal website. In doing so, we improved the documentation for future developers and identified some important ways in which further work on this project can be expedited. Our efforts make a case for continued support for Luther Course Proposal while introducing us to an environment of continuing development that is common in the workplace outside of Luther.

Faculty advisor: Kent Lee

JOSHUA JACKSON '18

Charm Meson Production from Bottomonium Decays

The Standard Model of Particle Physics is a well-tested framework describing the fundamental particles of nature and the forces by which those particles interact. These fundamental particles are produced at high energies inside the Belle detector, a particle detector located in Tsukuba, Japan. By studying the decay of bottomonium mesons, bound states consisting of a bottom and an anti-bottom quark, in the Belle detector, it is possible to probe the strong force, a force significantly stronger than the electromagnetic force that is responsible for binding electrons to the atomic nucleus. In this analysis, the strong force is probed by studying both simulated and true data collected in the Belle detector for the decay chain $\Upsilon(2S) \rightarrow \gamma \chi_{bj}(1P) \rightarrow DX$, in which a bottomonium meson decays to a photon and a lower-energy bottomonium particle, which in turn decays to a charm meson D and some other particle. The results of this study contribute to the scientific community's understanding of the strong force and may also assist in the calibration of Belle simulations, which will

enhance the accuracy of simulated events for other Belle collaborators and improve the quality of the science conducted by the collaboration at large.

Faculty advisor: Todd Pedlar

NAZARIO JAP DOS SANTOS '19

Regime Change: A Path for Independence of the Non-Self-Governing Territory

This paper focuses on the 1975 events during which both Morocco and Indonesia invaded Western Sahara and East Timor respectively. This paper argues that regime change, especially democratization, in one country can lead to independence of an occupied territory. Examining the different outcome of these two cases with the theory of regime change and democratization would help to understand the reason why East Timor gained independence and Western Sahara remained occupied. In this case, regime change and democratization in Indonesia led to the independence of East Timor. This paper uses the most-similar-system methodology in comparing the regimes in Morocco and Indonesia. This comparison led to a hypothesis in which a regime change and democratization can lead to independence of a non-self-governing territory. The paper explains why self-determination is compatible with regime change and democratization by drawing some examples from Kosovo, Tibet, New Caledonia, and some post-Soviet countries. The paper also introduces two important concepts: non-self-governing territory and self-determination. Most of the definitions of these two concepts are based on the United Nations General Assembly, Chapter XI, and Declaration on the Granting of Independence to Colonial Countries and Peoples. The paper concludes that the regime change in Indonesia that allowed freedom for democratic institutions and civil society was the driving force for East Timor independence. Whereas in Morocco, the regime remains intact and ensues a tight control over civil society and democratic institution, which makes it hard for Western Sahara to get its independence. With a focus on self-determination and the theory of regime change and democratization, this paper offers a unique insight.

Faculty advisor: Pedro dos Santos

LILY KIME '19

Gods Who Survive: Pagan Sources of John Milton and Neil Gaiman

In this study, I examine the survival of pagan gods in the imaginations of two authors who wrote centuries apart: John Milton and Neil Gaiman. Milton's *Paradise Lost* and Gaiman's *American Gods* are full of pagan gods, from Mesopotamian gods listed as demons in *Paradise Lost* to a pantheon of gods drawn from Native American, Scandinavian, and Slavic mythological traditions in *American Gods*. By researching their sources, I study how the texts Milton and Gaiman read inform the way they write their pagan figures. I examine what the Bible says about the pagan gods that Milton demonizes in *Paradise Lost*, and I read translations by linguist John Selden, who had knowledge of many languages, including Arabic and Aramaic. I analyze how these resources are incorporated by Milton as he creates his own Genesis narrative, and I then compare how Gaiman uses his sources in *American Gods*. I examine *Bloodstoppers* and *Bearwalkers* by Richard M. Dorson, *Who's Who in Non-Classical Mythology* by Egerton Sykes, and several other major texts Gaiman used to inform his writing. By researching and comparing the texts read by both authors, I explore how what we read changes the way we understand the world.

Faculty advisor: Lise Kildegaard

JACQUELINE KRAWCZYK '18

KAITLIN BOHN '18, ADELINE SMITH '18

Exploring Effective Stress Reduction Techniques to Be Included in a College Campus Stress-Reduction Room

College students experience large amounts of stress yet often do not have or effectively utilize stress-reduction techniques. Luther College is interested in expanding the number of stress-reduction rooms (Zen Dens) available to students. A Zen Den is a space where students can relax and utilize stress-reduction tools such as a massage chair, music, aromatherapy, or meditation. The purpose of this research is to consider current stress-management practices among students and to present current data regarding the efficacy of stress-reduction rooms in reducing stress among college students. A literature review of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and PsychInfo databases revealed research evidence supportive of meditation as one stress-reduction therapy and element of stress-reduction spaces. Statistically,

results show that meditation significantly reduces stress. Furthermore, stress-reduction spaces reduce stress on college campuses but are underutilized and under-researched. Stress-reduction research is essential to Luther College's future plans to expand Zen Den spaces. This research provides support for the most effective techniques to be included in future stress-reduction rooms.

Faculty advisor: Angela Kueny

JEFFREY LACKMANN '18

Bilocation: Thomas Pynchon's Anti-Historical Novel *Against the Day*

Understanding the traditional function of the historical novel is essential in understanding Pynchon's *Against the Day*, because one of the novel's most original inversions is framing historical fiction in which the world is not built around the reader but beneath them. Narratively, the semifictional band of aeronauts, the Chums of Chance, fly high above the historical reality of the world below them and thus symbolically make the reader's perspective of time and place transcendent. This is made explicit in a scene where, at a time travelers' convention, the Chums meet with a pilgrim from the future. This pilgrim functions as the reader made manifest, and in this way, the novel acknowledges the presence of the reader. Not only that, it acknowledges the reader as an invasive force in the world that the novel portrays, a force of colonization that harvests from the past those aspects that the present feels that it had and lost. It is halcyon made literal, the wanting time-pilgrim, the historical reader, invading the past through the prism of historicity and genre.

Faculty advisor: Amy Weldon

JEFFREY LACKMANN '18

"He says that he will never die": Cormac McCarthy's *Blood Meridian* and the Stylistic Rendering of the Eternal Judge

Much critical analysis of *Blood Meridian* rightfully pays close attention to the notorious antagonist at the center of the novel: Judge Holden, more commonly referred to as the judge. Based on the many studies I have read, there is essentially literary consensus regarding this character. Critics almost always deem him as something more than human: a god, God's prophet, a Gnostic archon, a symbol of metaphysical meaninglessness, an unknowable cosmic demon, or "human history incarnate" (Sansom 2009; Pughe 1994; Mundik

2009; Parish 2008; Phillipa 1996). However, in all the criticism I have read, the stylistic choices McCarthy makes in the prose itself are largely neglected. As a result, the following analysis will work to illustrate that this literary consensus can be strengthened by stylistically examining the ramifications of the dialectic hierarchy in the novel alongside additive conjunctions, definite articles, and verb construction in the judge's final scene.

Faculty advisor: Amy Weldon

FAYE LEE '20

Ghana and Malaysia: A Comparative Assessment of Economic Development after Independence

This research aims to apply a comparative analysis to study the experiences that affected the divergence of the economic development of Ghana and Malaysia. These former British colonies share not only similar colonial and historical backgrounds but also ecological, geographical, and sociocultural similarities. Economically, Ghana and Malaysia were similar at independence but are different today. In explaining this divergence, the internal and external political environments of both countries and the effect of state initiatives on their political economies are compared to underline the critical junctures of their economic-development experiences. Since both countries started out having similar GDP values at independence, the most-similar-systems method is employed to identify variations in the countries' developmental experiences to explain the dissimilar economic outcomes today. The theories developmental state, state interventionism, market-led development, and state-led development are used to assess the role of the state in the process of economic change. Comparative case studies on Ghana and Malaysia's palm oil sectors, the regional economic influence of East Asia and West Africa, and national economic policies are analyzed to test the hypotheses of the effects of political stability and state interventionism on both countries' developmental experiences.

Faculty advisor: Pedro dos Santos

SARAH LODGE '19

Love in the Time of Cholera

Traditionally, research on the death of Pyotr Ilyich Tchaikovsky has shown that the great

composer died from cholera. Multiple sources tell stories of him drinking a glass of water that had not been sterilized, one of the most common means of contracting the disease. These accounts state that Tchaikovsky fell ill soon after and eventually succumbed to the illness. However, current research suggests that Tchaikovsky died from another cause: suicide. There are many speculations as to why and how, each with varying degrees of plausibility. Musicologist Alexandra Orlova makes the provocative claim that in a secret council of his peers, Tchaikovsky was given the option of exile or death. While this is the most popular explanation as to why Tchaikovsky took his life, it does not explain how. I assert that Tchaikovsky took his own life by ingesting arsenic. This hypothesis is supported by the numerous accounts of Tchaikovsky's last days, in which he was ridden with symptoms that more closely match arsenic poisoning than cholera, and by the funeral that was held for him, which was severely lacking many strict legal guidelines for all cholera victims. In this paper, I will analyze the validity of these theories, including Orlova's narrative, and speculate how this may alter the course of future Tchaikovsky scholarship.

Faculty advisor: Amy Engelsdorfer

ANA LOPEZ '19

Earth-Beings, Misfortune, and Causation in Northern Chile

What is the cause of misfortune? What is rational to believe? Anthropologists and philosophers alike have been faced with these questions when encountering non-Western epistemologies. This paper uses ethnographic research and philosophical analysis to explore the understanding of misfortune in the mining city of Calama in northern Chile. In this ethnographically inspired essay, I argue that Atacameños understand misfortune through a causal relation in their interactions with the "Earth-beings" (De la Cadena 2010). The Atacameños understand these Earth-beings as natural entities with agency that interact with the community. In this sense, misfortune is caused by a failure in the dynamic of reciprocity with the Earth-beings that is expressed through ritual. Research ties this example of causation in the Andean cosmivision with a wider philosophical discussion about rationality in non-Western epistemologies exemplified by the work of Taylor (1974). The general trend in this debate seems

to lead to an understanding of rationality as a kind of logical consistency that is derived from empirical evidence. To respond to the latter, I will be using David Hume's discussion of causation and ethnographic examples to propose an interpretation that finds Andean accounts of causation as rational and valid even on empiricist grounds.

Faculty advisor: Anita Carrasco

SEAN MCKENZIE '20

Labour Movements in France and Sweden: The Longevity of Unions

Since the onset of the Industrial Revolution, workers in Europe have been organizing with the goal of protecting labour rights. Throughout the rest of industrialization, labour rights and institutions evolved differently between European countries, but always with the same goal. With help from the EU, the result is that in present-day post-industrial Europe, labour rights are well protected. This study will examine the functionality of different workplace-representation strategies. Focusing on France and Sweden, it will ask specifically: Why does France have a significantly lower union membership, at 8%, compared to the union membership of Sweden, at 70%, when both countries have a high percentage of collective bargaining coverage, ~85% of workers covered? Using a most-similar-systems design, this study will use a mix of empirical and historical analysis of labour laws and institutions and an assessment of collective bargaining coverage and union membership to compare the evolution of the labour movements in France and Sweden. This study will show that France's high collective-bargaining coverage can be attributed to its laws regarding works council requirements. These findings indicate that Swedish collective bargaining, which relies solely on union membership, is less stable during financial crises when compared to France's hybrid union works councils representation. These results have major implications on the longevity of labour systems, whose collective bargaining is based upon independent union membership and the viability of labour laws that allow for labour organization rather than enforce it.

Faculty advisor: Pedro dos Santos

SHANNON MEEHAN '18

ELIZABETH GLENNON '19, ANNA LI

HOLEY '18

Monarch Butterfly (*Danaus plexippus*) Oviposition and Larval Feeding Preferences on Five Species of Milkweed (*Asclepias* sp.) in Northeast Iowa

The eastern migratory population of the North American monarch butterfly (*Danaus plexippus*) has been declining and is threatened with quasi-extinction. One factor in this decline is believed to be the drastic reduction in milkweed availability in the summer monarch breeding range. Because Decorah, Iowa, is located within this summer breeding range, we conducted a study to determine if monarchs in northeastern Iowa express any oviposition or larval feeding preference toward different species of milkweed (*Asclepias* sp.). Five species of *Asclepias* common in northeast Iowa (*A. incarnata*, *A. speciosa*, *A. syriaca*, *A. tuberosa*, and *A. verticillata*) were examined weekly from June to September in 2016 and 2017. Monarch eggs and larvae were counted on milkweeds arranged in seven replicate blocks composed of five plots of each milkweed species with each plot containing five plants. Significantly more eggs were found on *A. incarnata* and *A. speciosa* and significantly more larvae were found on *A. syriaca*. However, all five species of milkweed were used by *D. plexippus* for oviposition and larval feeding.

Faculty advisors: Kirk Larsen

MARCELLA MEZA '18

Anzaldúa's Autohistoria-teoría: Subversion and Revolution in Philosophical Expression

Gloria E. Anzaldúa is a self-proclaimed Chicana, tejana, working-class, dyke-feminist poet and writer-theorist who has influenced Latina/Chicana philosophical work since her debut in the 1980s. Her notions of borderland identity and ambiguity of self are central in lieu of a situated subjectivity, seen most vividly in her mode of expression. Autohistoria-teoría, or personal essay that theorizes, is a hybrid of poetry, prose, personal narrative, and fictional elements that portrays and symbolizes the complexity of identity from and about which she writes. I explore autohistoria-teoría robustly to highlight the expression Anzaldúa utilizes that has shifted the expression of theory within the academy and further, I assert, revolutionized and subverted the reputability of personal renderings with self and identity that has become essential to

reckoning with complex notions of identity. Expounding upon Anzaldúa's style is not only useful as an illustrative conception of subjectivity but also allows for questioning and critiquing the reputability of conventional modes of expression within the academic discipline of philosophy.

Faculty advisor: Holly Moore

KYLE MILLER '18
DEVIN HANGGI '18, AARON HERMAN '18

Pathwerks

Pathwerks is an online tool that allows users to keep track of information about their car, including a history of gasoline fill-ups, miles-per-gallon (mpg) comparisons to other car models, as well as overall mpg trending, when to get an oil change, and attraction locations for road trips. The application itself allows users to create accounts and add their car based on its vehicle identification number, and input statistics both on an Android app as well as a browser interface. The browser also allows for more detailed monitoring of a given car's statistics.

Faculty advisor: Kent Lee

LINH NGUYEN '18
IAN CHRISTOPHERSON '18, TAYLOR
GADES '18

NordicShift

Most students at Luther College include work study among many other activities in their busy schedules. Thus, it is often difficult for managers to schedule their students. NordicShift is a web application designed to remove the headache of students' busy schedules. Managers are able to automatically create a schedule for students by entering their desired shifts. The auto-scheduler then uses information from students' Google calendars to create work schedules. The application has user-friendly manager and student views, allowing managers to create, change, or delete shifts as well as add in students for departments and modify information like working hours. It also integrates emails to the website so that students will receive notification when their schedules are posted and when they modify their information. Through these and additional features, work-study scheduling can be efficiently streamlined and optimized.

Faculty advisor: Kent Lee

KARL NYCKLEMOE '18

The Three Dead: Perception of Death during Times of Plague

Today, the Black Death is viewed as something akin to a horror movie, killing horribly and indiscriminately in darkened medieval towns while ghastly masked doctors wander from corpse to corpse. Unfortunately, this image was not the universal perception of death, and by extension the Black Death, that existed within late medieval and early modern England. In my research, I examined if and how the Black Death and recurring plague outbreaks shifted or warped how the English interacted with death, the dead, and dying. From this, I argue that while the Black Death didn't radically alter how the living interacted with death, it did accentuate trends of death acting as a mediatory power between the divine and the human and place greater emphasis upon the body after dying. My research focused on English grave epitaphs; artistic and literary depictions of death; funerary practices before, concurrent, and after the Black Death; and up-to-date historical scholarship on the Black Death. While this research doesn't provide any groundbreaking innovation into the effects of the Black Death, it demonstrates the supernatural power structures that existed in late medieval and early modern England that would, in turn, be upset by the upcoming Reformation.

Faculty advisor: Robert Christman

KIERAN OKERSTROM '18
OLIVIA HAWKINS '18, ERIK NELSON '18

Time-Management App

We created a time-management application named Boop that can be used on your phone to evaluate and understand how much time you spend doing various activities. This application takes data entered by a user and then visualizes that data so that the user can understand how much time they actually spend doing certain activities. It is a helpful app for any student looking to be more productive at studying or to simply live a healthier, efficient lifestyle.

Faculty advisor: Kent Lee

KATIE PATYK '18

Archival Research and the English Major: Stories from the Papers of Theodore Sturgeon

Many undergraduate English majors are familiar with reading primary texts in their field, since an author's published novels typically constitute

these materials. However, few undergraduate English majors have the opportunity to visit an archive that contains an author's personal letters to and from fellow collaborators and/or editors. This past summer, I had the opportunity on a student/faculty collaborative research grant to visit the archives at Kansas University to study the Theodore Sturgeon Papers that are housed there. This presentation will discuss the overall experience of doing an archival research project: how I prepared to go to the archives, my experience in the archives, and how I used the archival material after returning from Kansas. Using both the papers produced from this research as well as some of the letters found in the archive, this presentation will argue that archival research can be important to understanding both an author's literary choices as well as how the genre in which an author wrote was shaped as a whole. My experience in the archives shows different ways in which English majors can conduct research through methods other than simply reading novels as well as how the supplementary materials that can be found in an archive can enrich a research project.

Faculty advisor: Andy Hageman

LINNEA PETERSON '18

The Oldest Child

"The Oldest Child" is a short story about a 14-year-old girl named Solveig whose mother has just been transferred to hospice care. For the first half of the story, Solveig watches what happens around her with detached interest, unable to process her emotions regarding her mother's impending death, but this changes when her mother announces that she has been writing letters to her daughters for them to read at important life events. The announcement about the letters becomes a catalyst for Solveig to begin to process her emotions and realize exactly why she is afraid of losing her mother. The entire story takes place over the course of fewer than 24 hours and is a tale of incomplete and partial transformation; Solveig progresses from feeling emotionless and useless to allowing herself to feel sad and afraid, though she still does not let herself cry in the end. I will be presenting this story at the international Sigma Tau Delta (English honor society) convention this spring.

Faculty advisor: Amy Weldon

HALINA PYZDROWSKI '18

FORREST STEWART '18

On the Path to Community Flood Resilience: Exploring Flood Experiences in the Upper Iowa Watershed

Many communities—including those in the Upper Iowa River Watershed—are facing increased flood frequencies linked to climate change. Community flood resilience is the ability of people living in a watershed to plan and act collectively to mitigate, prepare for, respond to, and recover from a flood. In order to understand possibilities for building flood resilience in the Upper Iowa Watershed, we will present findings from a small sample of initial interviews conducted the summer of 2017 exploring the flooding experiences of residents of the unincorporated community of Freeport during the 2016 floods. In particular, we ask: What were common themes and experiences of Freeport flood-impacted residents, and what support networks did they draw upon at different stages of the flood-resilience cycle? Our initial analyses suggest residents tend to rely on their informal networks over the course of the response and recovery stages. In contrast, they depend on formal networks to provide mitigation and increase preparedness in communities. Drawing upon community resources, we hope this research may inform ways to increase flood resilience by reducing local vulnerability to floods and improving the adaptive capacity of those living in the Upper Iowa Watershed.

Faculty advisor: Rachel Brummel

SAMANTHA RABANG '18

Misinterpreting Facial Emotions of African Americans: Are Caucasians Prejudiced or Just Emotionally Inept?

Humans' innate ability to recognize faces and identify facial emotions has limitations. We examined the Other Race Effect (ORE), a common finding that people are generally less able to distinguish between individuals of different races relative to members of one's own race. Critically, the ORE is also found to bias the identification of facial emotions, particularly the misidentification of neutral emotions as angry emotions. Research suggests the ORE reflects individuals' prejudicial views of and lack of contact with other races. We suggest that differences in emotional intelligence (EI), the ability to identify and regulate emotions in oneself and in others, may also be a factor.

Therefore, we examined the relationship between EI, implicit and explicit prejudicial views, and the ORE typically shown by Caucasians for Black faces. Participants completed an EI measure, facial- and emotion-identification tasks, and implicit and explicit assessments of prejudice. Because the ORE may substantially contribute to racial profiling and police brutality, we hope to use our findings to promote awareness of how, at a basic level, we (mis)interpret the intentions of individuals whom we see as different from ourselves. We then hope to use this awareness to teach that all lives matter.

Faculty advisor: Stephanie Travers

SYDNEY REHNELT '18
MARY BUCHHEIT '18, MEGAN MEYER '18,
ALLISON SWIGGUM '18

The Effects of Mindfulness-Based Exercise Interventions like Yoga and Tai Chi on Stress Levels in College Students

This presentation analyzes the effects of mindfulness-based yoga and tai chi programs on the stress and mood of college students. A literature search was performed using nursing databases CINAHL and PubMed; ten primary studies provided evidence to make recommendations on Luther College. Based on the findings of these articles, mindfulness-based yoga and tai chi programs show reduction in stress and improved mood status of college students. This presentation will highlight different aspects of the programs that benefit students in addition to the beneficial health outcomes in students. This will aid in how nurses can implement these yoga and tai chi programs in their communities to promote decreased stress and improved overall mood in their college-student population. These impacts are important to the overall well-being of college students due to the negative long-term physical and psychological impacts that having a high-stress and low-mood lifestyle can have on young adults.

Faculty advisor: Angela Kueny

MATTHEW ROSSLER '19
The Resurgence of the Black Death in 1720 France

In the year 1720, there was a great outbreak of the bubonic plague in the French city of Marseille that killed an estimated 100,000 people. In order to contain the disease, the French royal government took active steps to quarantine the

city and prevent further spread of the plague. The question that I will attempt to answer is: What exactly was the French government's response to the outbreak of the Black Death in Marseille, and did it have any international repercussions? The outbreak of the Black Death in Marseille caused the French government to take a greater role in local affairs in and around the city of Marseille, and the government actively took steps to warn other nations about the possibility of another great plague. This paper will be broken up into three separate moments of French history during this time: pre-plague rulings of the French government in both internal and external affairs, government rulings during the actual outbreak of plague in 1720 in both internal and external affairs, and post-plague rulings after the outbreak in Marseille ceased. Evidence will largely be drawn from a collection of governmental decrees, rulings, ordinances, letters, journals, and laws that will elaborate on what the government's positions were in response to the outbreak in Marseille. Additional information will come from other academic historians and secondhand sources. The research will show to what extent the French royal government was acting in order to protect its citizens and interests during the Marseille outbreak and how the outbreak affected relations with other governing bodies.

Faculty advisor: Robert Christman

LAILA SAHIR '18
Gender and the Performance of Power in *Marie Antoinette*

In David Adjmi's play *Marie Antoinette*, characters constantly struggle to gain and maintain power. As they attempt to gain power in their interactions, each character employs distinct tactics. Prominently, this is communicated through physical expression in the body. Because the body is gendered, the expression of power through the body is also necessarily gendered. I have been exploring this relationship between gender and the performance of power through Luther College's production of *Marie Antoinette*. As the director of the play, I have been working closely with the actors to examine this relationship and the role that the actors play in communicating this relationship to the audience. Discussion and physical exploration in the rehearsal space have been focused on when and how bodies are used to achieve and maintain power and how the gender identity of an individual influences the physical tactics they use

to achieve power. These discoveries have been used to develop staging and physical character choices for the performances in May that will reflect, bring awareness to, and challenge conceptions about the relationship between gender and the performance of power that are held by the audience.

Faculty advisor: Robert Vrtis

SAM SCHEIDT '18

Ecumenism and the Catholic Church

Starting in the 1960s with the documents of the Second Vatican Council, which called the Catholic Church to an age of *ressourcement* and *aggiornamento*, ecumenical advancements (e.g., the Joint Declaration on the Doctrine of Justification and the Lutheran-Catholic Dialogues) have flourished between Catholic and Protestant churches. These joint documents and dialogues have changed the way that Christians interact, and they have encouraged an atmosphere of unity. In this new age of ecumenical dialogue, it is important that the Catholic Church continue to evaluate its own position on some contentious issues that exist within its own congregation. Summoning the same spirit of *ressourcement* and *aggiornamento* that was incited at the Second Vatican Council, Catholics can address these issues as they continue engaging with their Protestant brothers and sisters.

Faculty advisor: Wanda Deifelt

OWEN SCHLEIF '18

Tracing the Roots of Nationalism: The Case of Spain

Nationalism, the fervor and passion that drives an individual's pride toward his or her country, only exists through the nation-state, the modern political unit. However, the cultural, societal, and religious roots upon which this sense of national pride originated can be traced to a time before the nation-state existed. This presentation is a case study of how fragments of nationalistic thought were visible in Spain before it was a nation-state. In my research of Spanish proto-nationalism, I looked at how the 15th-century monarchs Ferdinand and Isabella promulgated a certain interpretation of Spanish identity. In the case of Spain's Jewish population, the Inquisition, at the behest of Ferdinand and Isabella, took a preexisting form of anti-Jewish hatred and adapted it to Spain by racializing Judaism

and developing a uniquely Spanish way of discriminating against those who were perceived to have "tainted blood." This produced a clear and visible example of nationalistic rhetoric long before Spain was a nation-state. This study has broader implications for how we think about nationalism. The roots of many nationalisms that manifest themselves in hatred of the "other" must be studied so as to better understand how a certain community defines itself. With so many ultranationalist narratives that exist around the world today, it is necessary to delve into the roots of this mindset in order to understand it and, hopefully, eradicate it.

Faculty advisor: Victoria Christman

NATALIE SHIMP '19

Luther College as a Discourse Community: First-Year Student Encounters with Linguistic Discrimination

Language is a reliable indicator of social membership, reflecting regional background, socioeconomic status, ethnicity, and gender. When groups of unequal power speak different dialects, dialects of subordinate social groups are dismissed to subordinate linguistic status (Wolfram 2015). Language in academia therefore calls into question educational leadership for social justice on college campuses due to the intricate tie language has with identity and social structure. At Luther College, our discourse community creates a linguistic hegemony that disadvantages those who do not speak the "standard" way. This research explores the ways in which expectations of speech on campus impacts the experiences international students have, pertaining specifically to those who speak non-American English as a native language. Using interpersonal interviews, eight first-year international students answered questions designed to determine whether and to what degree they have encountered discrimination in reference to dialectical difference. Findings indicate that Luther College's discourse community is constructed upon a linguistic ideology that favors a majority domestic student population and further impacts the degree of comfortability in academic and social settings for international students. Findings call for change in how we approach linguistic diversity and inclusivity to include conversations pertaining to the divide dialectical difference creates at Luther College.

Faculty advisor: Laurie Zaring

AARON SHOUSE '18

The Creative Process of *This, That, and the Other Thing*: A Podcast

In the past ten years, the interest in podcasts has steadily risen with easier access to the internet, with programs such as *Science Friday*, *This American Life*, and *Serial* being among the top of popular podcast lists. Creating a polished podcast, while simple in theory, takes time, effort, and specific skills. The podcast *This, That, and the Other Thing* is a model that others can use to start their own podcasts. Through the creation process of the podcast, ideas and styles used by nationally syndicated podcasts are implemented, with multiple genres being used throughout. Through analyzing interview styles, editing styles, genres, and storyline creation, *This, That, and the Other Thing* takes on the style of podcast that can be found among the top online programs, as well as shows that can be heard on radio stations like National Public Radio. The creation of *This, That, and the Other Thing* provides a step-by-step process for those who are eager to create a polished podcast series on their own, along with entertainment for those who are interested in the content of the podcast itself.

Faculty advisor: David Grouws

SENIA SIKKINK '18

Persistence and Looking at Humans during an Unsolvable Task in Pet, Foster, and Shelter Dogs

Previous research has investigated how dogs respond to an unsolvable task, both in terms of their task persistence and the amount of time that they look to humans for help or information. We tested 18 pet, 5 foster, and 15 shelter dogs on an unsolvable version (lid screwed shut) of a previously learned task that consisted of opening a wooden box's lid to retrieve food after demonstrations by a stranger in the presence of their handler. One-way ANOVAs were used to analyze the data with a $p < 0.05$ significance level. Pet dogs spent more time looking at their handler than shelter dogs, while shelter dogs spent more time looking at the box than either pet or foster dogs. Dogs that could sit on command spent more time looking at people, while dogs that could not spent more time in contact with the box. Dogs that were shelter surrenders spent more time looking at people than shelter strays. Strays spent more time biting the box, trying to open it. Contact with people

appears to play a significant role in the amount of time spent looking at people during an unsolvable task.

Faculty advisor: Kristy Gould

MORGAN STREYLE '19

NIKHIL THACKER '18

Habitat Use by Native Bumblebees in Northeastern Iowa

Many insect species are undergoing widespread decline. In North America, populations of several species of bumblebee (*Apidae: Bombus* spp.), including two native to eastern Iowa, have declined precipitously. Loss of habitat, along with pathogens and insecticides, appears to be a factor. The goal of this study was to better understand patterns of habitat use by bumblebee species in northeastern Iowa. We documented the abundance of bumblebees in three habitat types (forest, prairie remnant, and planted prairie) at several locations in Winneshiek and Allamakee counties during June and July 2017. We measured the abundance of pollen and nectar resources (measured as percent cover) at each of the study sites. During the earlier part of the summer, bee abundance was similar in all three habitat types, but later in the summer, there were more bees in the remnant prairie sites than in the other two habitats. During the early summer, floral abundance was higher in the forest than prairie habitats. We observed bees exhibiting nest-searching behavior at higher frequency in the forest compared to in prairie habitats. Our results confirm that forest habitats provide important resources for native pollinators, particularly early in the summer, and that remnant prairies provide key resources in the late summer, when floral resources are more available in those habitats.

Faculty advisor: Beth Lynch

SHELJA THAKUR '18

Ganga River Pollution: A Policy Analysis

The Ganges River is one of the most important river systems in India to the millions of people living close to the river. Over the past few decades, the river has been facing very serious pollution problems that have been eroding the water quality and health of the river. Different campaigns, projects, and government actions have been taken or are being taken by the current government (BJP-Bhartiya Janta Party) in power, but it's unclear if they have been successful. In my

research I asked: What are the policies challenges to addressing the Ganges pollution? Further, how is the current political party (BJP) dealing with the problem, and what possible policies/projects could work better to tackle the issue? To answer these questions, I explored Indian governmental websites on Ganga and the projects/programs in place, newspaper articles, and books on the policies to address the pollution issue. Through the research I found that there is institutional complexity that makes it hard to determine who is responsible if Ganga pollution policies don't work. Also, there is no clear timeline to achieve the goals, and corruption in the government system makes it hard to achieve goals. These findings are helpful in looking at what policies are working and what improvements could be done to make the river restoration process a success.

Faculty advisor: Rachel Brummel

ANNIKA VANDE KROL '19

Finding the Hjemland: Herbjørn Gausta and the Immigrant American Experience

Finding the Hjemland: Herbjørn Gausta and the Immigrant American Experience is a collaborative research project that entails documenting and locating all the known paintings of artist Herbjørn Gausta. Gausta was a Norwegian immigrant who has close connections to Luther College and surrounding communities. Luther College and the Vesterheim have a large collection of Gausta paintings. However, there are many paintings in public and private collections, both domestic and international. Over the last year, we have done extensive archival work to locate paintings we do not have in our database. We have also reached out to other institutions to assist in our search. Our goal is to create a catalogue raisonné of Gausta's work, which is a systematic, organized collection of every painting, detailing size, subject, and provenance. We essentially wish to have knowledge of every painting to better understand the story that Gausta and his work tells, especially the concept of home to immigrants, and the experiences of Herbjørn Gausta in particular. This presentation will be a short gallery talk in the Center for the Arts. I will share my work and findings and select a few of my favorite paintings that represent Gausta's story.

Faculty advisor: Kate Elliott

VICTORIA VIVTCHARENKO '19

Dopamine Quantification in *Caenorhabditis elegans* with High-Performance Liquid Chromatography

The loss of dopamine, a significant neurotransmitter, is a hallmark of neurodegenerative diseases such as Parkinson's disease, however its etiology is unclear. Evidence has shown that the insulin signaling pathway, a central regulator of metabolism and oxidative stress response, may be dysregulated in the disease state. In order to determine the influence of this pathway on dopamine, we quantified dopamine in wild type and insulin signaling mutant strains of the nematode model system *Caenorhabditis elegans* (*C. elegans*). Due to the molecular complexity of the cellular mixture, it is difficult to quantify dopamine in multicellular organisms. Standard absorption spectroscopy is not effective because many compounds in the cellular mixture absorb in the same wavelength range as dopamine. We have developed a protocol to quantify dopamine in *C. elegans* using high-performance liquid chromatography (HPLC) with UV-vis detection. HPLC is an effective method because of its high sensitivity and selectivity, as well the possibility to detect several analytes at once. In this study, we correlated dopamine levels in *C. elegans* with activity of the insulin signaling pathway. Both the development of our HPLC protocol for dopamine detection and our results from analysis of *C. elegans* mutant strains will be presented.

Faculty advisor: Molly Wilker

NICOLE WEBER '18

The Social Experience of Anxiety

Anxiety can infiltrate many areas of an individual's life, including their social relationships, behavior, college experience, and identity. With the increase in prevalence of mental illness, and anxiety in particular, it is important to understand holistically how an individual's life is impacted. This senior honors project aims to understand how Luther College students experience anxiety and the impacts it has on them. I answered this question through in-depth, biographically oriented interviews with students. Key themes identified include the use of language surrounding mental health and anxiety, particularly the word "crazy," the process of disclosure and how anxiety changes people's perception and treatment of the individual, and experiences of stigmatization and the ramifications therein. In addition, I also

interviewed faculty and staff involved in dealing with student mental health to gain a broader understanding of how mental health is viewed and treated, and the structures supporting it at Luther College. Through this research I hope to be able to suggest recommendations to improve structures in place and the environment at Luther College.

Faculty advisor: Anita Carrasco

NICOLE WEBER '18

The Impact of Anxiety on Working Memory

It is generally agreed that both psychological and physical components of anxiety negatively affect working memory (WM), a component of memory that deals with current information in order to complete cognitive tasks. However, few studies have examined the relationship between anxiety and the components of Baddeley's model of WM; further, these studies have conflicting results. The goal of this study is to investigate the impact of both state (i.e., environment dependent) and trait (i.e., individual tendency to respond anxiously across situations) anxiety on the phonological loop, visuospatial sketchpad, and central executive functions of cognitive inhibition, switching, and updating information. To manipulate state anxiety, participants were randomly assigned to anxiety-inducing or supportive task instructions. Trait anxiety and negative self-talk, which are frequently present in anxious individuals, were assessed with the Positive and Negative Affect Scale and the Cognitive Interference Questionnaire. Multiple components and functions of WM were assessed with widely used cognitive tasks: Digit Span, Corsi Block, Stroop task, Navon task, and a 3-Back N-Back. This study extends the current literature by investigating the psychological aspect of anxiety, specifically the negative self-talk therein, and the selective deficits found in aspects of WM, and addresses limitations found in the extant literature.

Faculty advisor: Stephanie Travers

EMMA WITHERS '18

RYAN KONING '19

Use Your Voice!: Exploring Youth Activism and Social Justice through an Artistic Lens

How can art serve as a vehicle for exploring themes of empathy and social justice with pre-service teachers in the classroom and in the community? This presentation will feature two

current art education students who explored topics such as privilege, power, and social activism with seventh-grade students through the creation of a student collaborative zine. In the context of a middle school art room during a secondary methods course for art educators, Emma Withers and Ryan Koning led discussions and student exploration of graphic novels focused on social justice themes. Middle school students researched young social activists and illustrated their unique stories of empowerment, knowing their collaborative work would impact their community through proceeds raised for a charitable cause.

Faculty advisor: Lea Lovelace

ADDITIONAL POSTER DISPLAYS
PRESENTED BY STUDENTS FROM THE
FOLLOWING CLASSES:

Biology 112: Insects, Humans, and the Environment

Biology 239: Molecular and Cellular Biology

Biology 250: Restoration and Conservation

Biology 354: Evolutionary Biology

Computer Science 150: Intro to Computer Science

Physics 114: Physics of Sound

Psychology 353: Social Psychology

CLASS OF 2018 HONOR SOCIETY MEMBERSHIP

Luther College currently has chapters in many national and international honor societies. Membership criteria are established by the national offices and local chapters. The honor societies and respective academic disciplines are Phi Beta Kappa (liberal arts), Lambda Alpha (anthropology), Chi Alpha Sigma (athletics), Beta Beta Beta (biology), Eta Sigma Phi (classics), Lambda Pi Eta (communication), Omicron Delta Epsilon (economics), Sigma Tau Delta (English), Pi Delta Phi (French), Delta Phi Alpha (German), Phi Alpha Theta (history), Alpha Mu Alpha (marketing), Pi Mu Epsilon (mathematics), Pi Kappa Lambda (music), Sigma Pi Sigma (physics), Pi Sigma Alpha (political science), Psi Chi (psychology), Phi Alpha (social work), and Sigma Delta Pi (Spanish). Students listed are graduating senior members.

PHI BETA KAPPA

Derek Barnhouse
Johanna Beaupre
Victoria Bleckeberg
Eli Bowe
Michelle Brown
Tiffany Cassmann
Claire Christian
Megan DeMouth
Fiona Edberg
Taylor Gades
Thaddeus Guy
Elisabeth Hartmark
Jillian Hazlett
Devin Hedlund
Bryce Hefty
Nicholas Hentges
Kevin Honz
Abigail Hughes
Joshua Jackson
Brady Letney
Shannon Meehan
Isobel Michaud
Linh Nguyen
Emily Osborne
Linnea Peterson
Megan Petzold
Halina Pyzdrowski
Lauren Resner
Kacy Rodamaker
Froeydis Roenneberg
Emilyn Ryski
Samuel Scheidt
Ryan Schnaith
Aidan Spencer
Emily Starman
Ethan Thonn
Maxwell Uetz
Zachary Withers

LAMBDA ALPHA (ANTHROPOLOGY)

Alison Gau
Bryce Hefty
Jay Puffer
Nicole Weber

CHI ALPHA SIGMA (ATHLETICS)

Matt Amann
Meredith Arpey
Jordan Boge
Elizabeth Bonin
Ashley Burrows
McKenzie Carney
Ian Christopherson
Jackie Cychosz
Christian Deranek
Pilar Dritz
Nicole Ellingson
Tanner Gibbons
Bryce Hefty
Sam Houlihan
William Jeide
Trevor Kao
Lucas Kane
Samantha Kraft
Jacqueline Krawczyk
Brady Letney
Shannon Meehan
Koltin Pfaffle
Grant Preheim
Hunter Prueger
Halina Pyzdrowski
Sydney Rehnelt
Lauren Resner
Sam Scheidt
Ryan Schnaith
Emily Starman
Natalie Stockman
Anna Strien

Luke Von Eschen
Katie Waller
Sofie Wallock
Jacob Warehime
Sean Westendorf
Cory Wirth
Hannah Wright

BETA BETA BETA (BIOLOGY)

Leah Barkema
Tiffany Cassmann
Jae Creger
Megan DeMouth
Ella Fackel
Devin Hedlund
Abigail Hughes
Brady Letney
Shannon Meehan
Isobel Michaud
Emily Osborne
Emily Starman
Ethan Thonn
Cory Wirth

LAMBDA PI ETA (COMMUNICATION)

Elizabeth Bonin
Kristen Carlson
Tyler Johnson
Nam Nguyen
Christina Van Nevel
Cassidy Woods

OMICRON DELTA EPSILON (ECONOMICS)

Victoria Bleckeberg
Claire Christian
Ella Fackel
Josefina Bakhita Goncalves Soares
Lucas Kane
Mwayi Pankuku
Linnea Peterson
Jose Velastegui Cobo

SIGMA TAU DELTA (ENGLISH)

Emma Deihl
Devin Hedlund
Bryce Hefty
Emily Osborne
Katie Patyk
Linnea Peterson
Victoria Revier
Natalie Sandstrom
Grant Thomas
Sierra Twesten

PI DELTA PHI (FRENCH)

Jordan Boge
Desiree Bradshaw
Hannah Dailey
Kalie Kampa

DELTA PHI ALPHA (GERMAN)

Paul Fritzell
Taylor Gaide
Hillary Gardner
Alison Gau

PHI ALPHA THETA (HISTORY)

Johanna Beaupre
Nathan Burwell
Eric Coughlin
Meghan Gaffney
Kailee Keyser
Madelyn Kieler
Colin Landsteiner
Charles Mugwagwa
Karl Nycklemoe
Katie Patyk
Kathryn Roets
Owen Schleif
Anna Strien
Carley Sullivan

PI MU EPSILON (MATHEMATICS)

Claire Christian
Eric Floden
Amanda Gielau
Kevin Honz
Joshua Jackson
Onward Mahachi
Nathan McPhetres
Linh Nguyen
Linnea Peterson
Megan Petzold
Emilyn Ryski
Ryan Schnaith

PI KAPPA LAMBDA (MUSIC)

Catherine Koenning
Gabrielle Laske
Heather Lindell
Daniel Melaas-Swanson
Christopher O'Connell
Marie Sauze
Aidan Spencer

SIGMA PI SIGMA (PHYSICS)

Erik Floden
Nicholas Hentges
Kevin Honz
Joshua Jackson
Megan Petzold

PI SIGMA ALPHA (POLITICAL SCIENCE)

Geoffrey Dyck
Josefina Bakhita Goncalves Soares
Karl Nycklemoe
Halina Pyzdrowski
Shelja Thakur

PSI CHI (PSYCHOLOGY)

Michelle Brown
Emma Deihl
Mengyu Duan
Nicole Ellingson
Jillian Hazlett
Kelly Kennedy
Iloria Phoenix
Samantha Rabang
Kacy Rodamaker
Laila Sahir
Nicole Weber

PHI ALPHA (SOCIAL WORK)

Kristin Davis
Hannah Harms
Savannah Hartman
Claire Lutter
Adam Morgan
Lydia Nelson
Hannah O'Polka
Hannah Potter
Ashley Veaser
Seth Warner

SIGMA DELTA PI (SPANISH)

Derek Barnhouse
Michelle Brown
Tiffany Cassman
Emma Deihl
Devin Hedlund
Evie Hoff
Heather Lindell
Halina Pyzdrowski
Kacy Rodamaker
Zachary Withers

LUTHER
COLLEGE