

University of Minnesota Morris Digital Well

## University of Minnesota Morris Digital Well

---

Undergraduate Research Symposium Abstract  
Books

Public Lectures, Events, and Conferences

---

4-18-2015

### 2015 Undergraduate Research Symposium Abstract Book

Academic Center for Enrichment

Follow this and additional works at: [https://digitalcommons.morris.umn.edu/urs\\_abstracts](https://digitalcommons.morris.umn.edu/urs_abstracts)

---



---

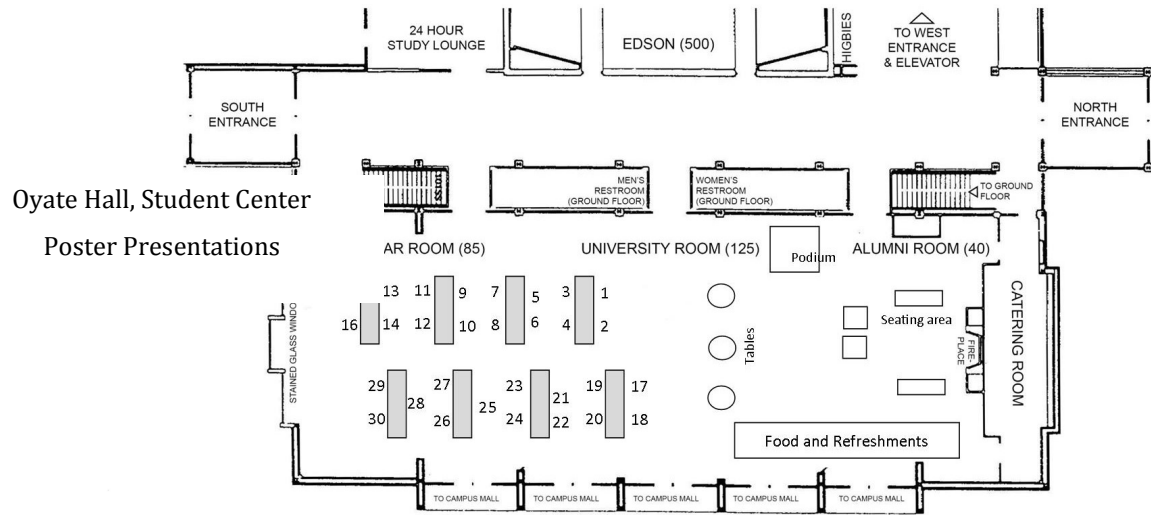
 Program Index
 

---

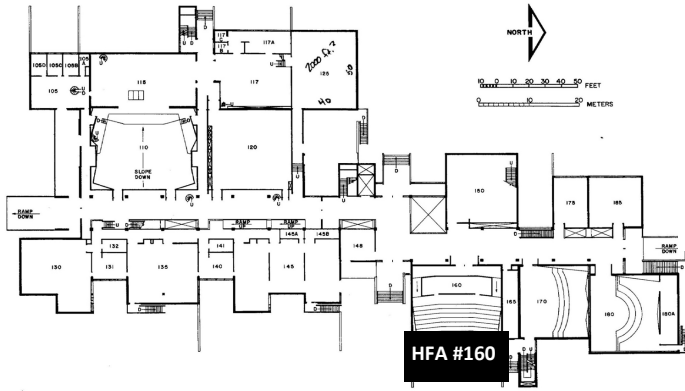
The 2015 Fifteenth Annual UMM Undergraduate Research Symposium (URS) celebrates student scholarly achievement and creative activities. Students from all disciplines participate in the URS. Types of presentations include posters, oral presentations, and short or abbreviated theatrical, dance, or musical performances. Presentations are accompanied by discussions and multimedia.

Adler, Kezia - Poster, pg. 12  
 Ali, Abdul - Poster, pg. 12  
 Asche, Alexandra - Oral, pg. 27  
 Bailey, Nicole - Oral, pg. 27  
 Bello, Oluwatomisin - Oral, pg. 28  
 Blais, Rachael - Poster, pg. 13  
 Bohling, Rachel - Poster, pg. 15  
 Borkenhagen, Laura - Poster, pg. 16  
 Brand, Wesley - Poster, pg. 16  
 Broberg, Eden - Oral, pg. 28  
 Brockman, Teresa - Poster, pg. 13  
 Buchanan, Britta - Oral, pg. 29  
 Butler, Ravi - Oral, pg. 29  
 Christiansen, Allison - Poster, pg. 16  
 Cicha, Calvin - Poster, pg. 14  
 Crain, Gabrielle - Oral, pg. 30  
 Dial, Ashley - Oral, pg. 30  
 Evansen, Taylor - Poster, pg. 14  
 Farley, Marlin - Oral, pg. 31  
 Fix, Marla - Poster, pg. 38  
 Forrest, Rachel - Poster, pg. 17  
 Gerold, Blake - Poster, pg. 15  
 Goemann, Hannah - Poster, pg. 15  
 Grady, Brittany - Oral, pg. 31  
 Greenslit, Morton - Poster, pg. 16  
 Guadarrama, Jennifer - Oral, pg. 32  
 Hagen, Tessa - Poster, pg. 13  
 Hanson, Kari - Oral, pg. 32  
 Hanson, Chloe - Poster, pg. 16  
 Hofer, Ellie - Poster, pg. 22  
 Horsch, Caitlyn - Poster, pg. 26  
 Johnson, Isaac - Poster, pg. 17  
 Jopp, Kelsey - Oral, pg. 33  
 Jordan, Torri - Poster, pg. 17  
 Kim, Saesun - Poster, pg. 18  
 King, Michelle - Poster, pg. 19  
 Klausling, Kyle - Oral, pg. 33  
 Kleckner, Joe - Oral, pg. 34  
 Klemek, Liv - Oral, pg. 34  
 Kokesh, Broc - Oral, pg. 35  
 Kokesh, Broc - Poster, pg. 19  
 Komaniecki, Garrison - Poster, pg. 20  
 Krogstad, Mathea - Oral, pg. 28  
 Kroska, Andrew - Poster, pg. 21  
 Kroska, Maryanna - Poster, pg. 20  
 Larson, Drew - Poster, pg. 26  
 Lemmon, Aaron - Poster, pg. 25  
 Liebhard, Casey - Poster, pg. 35  
 Lindblad, Grace - Oral, pg. 36  
 Macheledt, Kaitlyn - Oral, pg. 36  
 Mallek, Abby - Poster, pg. 26  
 Maudal, Michael - Poster, pg. 22  
 McDonough, Matthew - Poster, pg. 21  
 McFall-Boegeman, Hunter - Poster, pg. 26  
 Miller, Clare - Poster, pg. 22  
 Miller, Margaret - Oral, pg. 37  
 Mondloch, Brad - Poster, pg. 22  
 Nivison, Margareta - Poster, pg. 23  
 Nyquist, Corrie - Poster, pg. 23  
 O'Leary, Nina - Oral, pg. 37  
 Peterson, Rose - Poster, pg. 24  
 Riffel, Lucia - Oral, pg. 38  
 Roettgen, Timothy - Poster, pg. 12  
 Rollins, Meagan - Poster, pg. 22  
 Sax, Emma - Poster, pg. 25  
 Schliep, Paul - Poster, pg. 25  
 Schorr, Anna - Oral, pg. 38  
 Schroeder, Sarah - Oral, pg. 39  
 Schroeder, Cory - Oral, pg. 39  
 Smolund, Isaac - Poster, pg. 25  
 Strenge, Sarah - Poster, pg. 26  
 Thao, Pengxeu - Oral, pg. 40  
 Threadgill, Zachary - Oral, pg. 11  
 Titus, Ellen - Poster, pg. 26  
 Tuntland, Elise - Performance, pg. 40  
 Whitley, Bo - Oral, pg. 41  
 Wolf, Allison - Oral, pg. 41  
 Wolf, Allison - Poster, pg. 17

STUDENT CENTER: OYATE HALL (250 | 500)

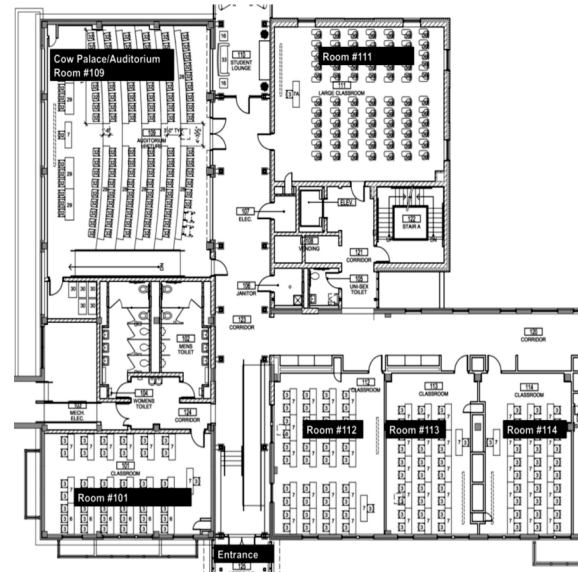


Oyate Hall, Student Center  
Poster Presentations



Humanities Fine Arts Building  
Performance Presentations

John Q. Imholte Hall, 1<sup>st</sup> Floor  
Oral Presentations



The University of Minnesota, Morris

—2015—

UMM Undergraduate Research Symposium

Featuring student research, creative, and scholarly work from across campus

Saturday, April 18, 2015

- 9:30 a.m.—12:00 p.m. Registration, Student Center
- 9:30 a.m.—12:00 p.m. Poster/Visual Display, Oyate Hall
- 10:00 a.m. Welcome, Jimmy Schryver, URS Co-chair and Jacqueline Johnson, Chancellor, Oyate Hall
- 11:00 a.m.—12:00p.m. Oral Presentations, John Q. Imholte Hall, Room #s: 111, 112, 113, 114
- 12:00 p.m.—1:00p.m. Lunch, Dining Hall (or on your own)
- 1:15 p.m.—1:30 p.m. Welcome, Bart Finzel, Vice Chancellor for Academic Affairs and Dean; Brian Herman, University of Minnesota Vice President for Research, HFA Recital Hall #160
- 1:30 p.m. Introduction of Feature Presentation, HFA Recital Hall #160  
Barbara Burke, Associate Professor of Communication, Media & Rhetoric
- 1:30 p.m.—2:15 p.m. Feature Presentation, HFA Recital Hall #160  
Zachary Threadgill  
“ThreadyBeats: Finding a Place in the Mix”
- 2:30 p.m.—2:50p.m. Performance Presentation, HFA Recital Hall #160
- 2:30p.m. —4:10 p.m. Oral Presentations, John Q. Imholte Hall, Room #'s: 111, 112, 113, 114

**POSTER PRESENTATIONS 9:30 a.m. - 12:00 p.m.**  
**Oyate Hall, Student Center**

- #1 Chloe Hanson, Laura Borkenhagen, and Allison Christiansen (Biochemistry): **A Potential Interaction between Csd1 and Csd2, Two Cell Shape Determining Proteins in *Helicobacter pylori*** (Advisers: Timna Wyckoff), abstract pg. 16
- #2 Calvin Cicha (Biology): **Dissolved Inorganic Carbon Optimization for Enhanced Microalgal Pigment Production** (Adviser: Robert Gardner and Michael Ceballos), abstract pg. 14
- #3 Hannah Goemann (Biology): **Carbon Partitioning during Bicarbonate-Induced Triacylglycerol Accumulation in Chlorophyta** (Adviser: Michael Ceballos), abstract pg. 15
- #4 Broc Kokesh (Biology): **The Effects of Water Quality on the Habitat Use of Tiger Salamanders in Prairie Wetlands** (Adviser: Heather Waye), abstract pg. 19
- #5 Brad Mondloch, Meagan Rollins, Michael Maudal, Ellie Hofer (Biology): **Investigating the Influence of CD80/B7-H1 Signaling on Anti-tumor Immune Responses Mediated by CD8+ T Cells** (Adviser: Rachel Johnson), abstract pg. 22
- #6 Corrie Nyquist (Biology): **Evaluating the Role of Crayfish as Vectors of Organic Matter in Prairie Pothole Lakes** (Adviser: Tracey Anderson), abstract pg. 23
- #7 Sarah Streng and Hunter McFall-Boegeman (Chemistry): **Synthesis of Organic Materials for Use in Printable Organic Photovoltaics** (Adviser: Ted Pappenfus), abstract pg. 26
- #8 Blake Gerold and Rachel Bohling (Chemistry): **Synthetic Methods of CTS and CZTS Nanocrystals** (Adviser: Ted Pappenfus), abstract pg. 15
- #9 Maryanna Kroska (Chemistry): **Adsorption of Peptides in Metal-Organic Frameworks: A Focus on Neurodegenerative Proteins** (Adviser: Zachary Mensinger), abstract pg. 20

**Presenter:** Bo Whitley  
**Project Adviser:** Nicholas Leonard (Psychology)  
**Title:** **Attitudes towards Authoritative Figures**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #113, 11:20 a.m.

There is considerable research documenting the important role that mass media has in shaping student perception. However, despite growing mass media exposure to law enforcement behavior, few studies have examined the influence of mass media on perceptions of authority figures. This study examined the influence of mass media usage on college students' perceptions of authoritative figures. Study participants included college students currently attending a small, public, liberal-arts university. The study utilized an experimental design in which the experimental group was exposed to videos showing non-procedural behavior by uniformed law enforcement officers. The control group was exposed to a neutral video. All participants then completed a survey about their media usage and perceptions of procedural justice. It was hypothesized that self-reported perceptions of procedural justice would be lower among the experimental group, with media usage moderating the effect. More specifically, it was hypothesized that the differences between groups would become smaller as self-reported media exposure increased. Data collection for this study is currently underway. However, the findings of this study have significant implications for research, practice, and policy. In particular, as law enforcement behavior is increasingly documented and disseminated, the public's perception of their legitimacy and overall compliance may be impacted.

---

**Presenter:** Allison Wolf  
**Project Adviser:** Jennifer Rothchild (Sociology)  
**Title:** **Constructing Health Together: Validating Knowledge in the Implementation of Community Health Initiatives**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #114, 11:40 a.m.

In the field of public health, peer-reviewed publications using randomized control trials are held in the highest regard. Unfortunately, for many members of the general public, peer-reviewed publications don't offer practical solutions to their community's public health concerns. Additionally, when the two communities come together, conflict can arise from unequal perceptions of their own values, goals, and resources. Through the implementation and promotion of community-based participatory research (CBPR), academics and community members can produce public health outcomes that simultaneously benefit scholarly goals and practical applications when their knowledge bases are validated. The conflicts between academics and communities center around perceived and actual power differences, so social conflict theory is used to analyze how their perspectives both conflict and coincide with each other while also emphasizing the importance of everyday versus specialized knowledge to validate all types of experience being contributed into a successful CBPR process. My research explains how using CBPR to construct and design community health initiatives can repair weak connections between researchers and communities while simultaneously creating new methods for combating public health issues.

**Presenter:** Pengxeu Thao  
**Project Adviser:** Michael Lackey (English)  
**Title: The Biographical Novel as a Literary Model for Understanding Multigenerational Trauma**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #113, 3:30 p.m.

The biographical novel is a relatively understudied literary form that combines the seemingly contradictory practices of biographers and novelists. These biographical novels alter historical facts in order to present what the author considers to be a representation of a political or psychological truth. One example is William Styron's *The Confessions of Nat Turner*, a 1967 biographical novel about a 19<sup>th</sup> century slave insurrectionist. Styron makes changes with Turner's life such as altering his sexuality, reimagining his childhood on a plantation, and inventing characters. These alterations not only offer a critical lens into the psychology of slaves and slavemasters of the past, but also show political and psychological mechanisms that also exist in the present time. To help support this, I will draw upon Dr. Joy DeGruy's research in her 2005 book, *Post Traumatic Slave Syndrome: America's Legacy of Enduring Injury and Healing*. Her research chronicles the lasting effects of slavery and oppression across generations of African American communities. Styron's literary investigation of Nat Turner and Degruy's psychological approach to understanding African American communities can contribute not only to the legitimacy of an emerging literary form, but also to understanding important cultural truths. Through the analysis of these texts, I propose that the biographical novel, which is by nature multigenerational, can serve as a literary form for representing and understanding cross-generational forms of oppression.

---

**Presenter:** Elise Tuntland  
**Project Adviser:** Wes Flinn (Music)  
**Title: Camille Saint-Saëns and Lord Alfred Tennyson: An Introspective Glance into Romantic Ideals on Love and Madness**  
**Type of Presentation:** Performance  
 Humanities Fine Arts Building, Recital Hall #160, 2:30 p.m.

"A Voice by the Cedar Tree," composed by Camille Saint-Saëns, derives its text from Lord Alfred Tennyson's larger collection, *Maud*. In the poem, the protagonist falls in love with Maud and clings to his idealization of himself and his love, despite his claims of the wretchedness of man and society. His initial distaste for Maud blooms into obsession and ultimately twists into insanity by the end of the second part. It is in the narration's absolutist views of the world that Tennyson is able to create uniquely dark and ironic comedy. Saint-Saëns derives the text of his song from where the protagonist observes Maud singing alone. Although the lines that the composer sets are only a portion of the first part, Saint-Saëns eloquently expresses the major themes used in the entirety of Tennyson's poem. Moreover, he exemplifies various glimpses into the underlying psychosis that plagues the narrator and foreshadows his ultimate downfall. By analyzing the poem (using, among others, the work of James R. Kincaid) and comparing that to a theoretical and historical analysis of the song aided by published analyses, this lecture-recital aims to explore how Tennyson's poem and its setting of Victorian society, as well as its intimate reflections of psychosis, are reflected in Saint-Saëns' song. With this interdisciplinary approach, both the protagonist's personal plight and its reflections on Victorian society can be examined while demonstrating the artistry with which both composer and poet are able to create an engaging and vibrant critique of the world around them.

**POSTER PRESENTATIONS 9:30 a.m. - 12:00 p.m.**  
**Oyate Hall, Student Center**

- #10 Margareta Nivison (Chemistry): **The Modification of Hydrostability in MOF-5 for Selective Amyloid-Beta Peptide Adsorption Studies** (Adviser: Zachary Mensinger), abstract pg. 23
  - #11 Andrew Kroska (Communication, Media, and Rhetoric): **Calvin and Hobbes: Public Education through a Child's Eyes** (Adviser: Mary Elizabeth Bezanson), abstract pg. 21
  - #12 Emma Sax, Paul Schliep, Aaron Lemmon (Computer Science): **Developing Beginner-Friendly Programming Error Messages** (Adviser: Elena Machkasova), abstract pg. 25
  - #13 Isaac Smolund (Computer Science): **Assisting the Development of Emergent Readers through Computational Manipulatives** (Adviser: Kristin Lamberty), abstract pg. 25
  - #14 Garrison Komaniecki (Chemistry): **Multiple Neuronal Changes Caused by Optogenetic Astrocyte Stimulation** (Adviser: Nancy Carpenter), abstract pg. 20
  - #15 Saesun Kim (Math): **Determining Parameters of Dynamical Systems Using B-Spline Least Square Minimization** (Adviser: Barry McQuarrie), abstract pg. 18
  - #16 Saesun Kim (Physics): **Three-Particle Distribution Functions in the Hard-Sphere Model** (Adviser: Michael Korth), abstract pg.
  - #17 Torri Jordan and Allison Wolf (Sport Studies and Athletics): **Traumatic Brain Injury and its Effect on Performance Measures of Major League Soccer Players** (Adviser: Rich Hardy), abstract pg. 17
  - #18 Taylor Evansen (Sport Studies and Athletics): **The Relationship between Energy Drink Consumption and Nutritional Knowledge among NCAA III Student-Athletes** (Adviser: Rich Hardy), abstract pg. 14
-

**POSTER PRESENTATIONS 9:30 a.m. - 12:00 p.m.**  
**Oyate Hall, Student Center**

- #19 Matthew McDonough (Theatre Arts): **Sound Design for *A Midnight Dreary*** (Advisers: Siobhan Bremer and Craig Moxon), abstract pg. 21
- #20 Rose Peterson (Theatre Arts): **Costume Design for *A Midnight Dreary*** (Adviser: Siobhan Bremer), abstract pg. 24
- #21 Rose Peterson (Studio Art): **Woven Test Screens** (Adviser: Jess Larson), abstract pg. 24
- #22 Isaac Johnson and Rachel Forrest (Studio Art): **X-ternal Anatomy: Examining the Impermanent** (Adviser: Jess Larson), abstract pg. 17
- #23 Teresa Brockman (Statistics): **Methods to Increase Matching Yield from Case-Control Draws** (Advisers: Stephen Burks, Jon Anderson, and Rebecca Haider), abstract pg. 13
- #24 Abdul Ali and Timothy Roettgen (Chemistry): **Analysis of Rice Varieties Using Fourier Transform Infrared Spectroscopy** (Adviser: Joseph Alia), abstract pg. 12
- #25 Ellen Titus, Caitlyn Horsch, Drew Larson, and Abby Mallek (Biology): **Pressures on the Prairie-Forest Ecotone in Minnesota** (Advisers: Peter Wyckoff and Jon Anderson), abstract pg. 26
- #26 Rachael Blais and Tessa Hagen (Psychology): **The Relationship between Cortisol, Perceived Stress, and Mindfulness Meditation among College Students** (Adviser: Kerry Michael), abstract pg. 13
- #27 Kezia Adler (Political Science): **A Presidential Candidate's Mental Health and the Public's Vote** (Adviser: Sheri Breen), abstract pg. 12
- #28 Clare Miller (Physics): **Long-Term Analysis of the Velocity Centroid Data from SiO Maser Emissions** (Adviser: Gordon McIntosh), abstract pg. 22
- #29 Michelle King (Physics): **A New Method of Image Analysis for Measurement of Cirroform Clouds** (Adviser: Sylke Boyd), abstract pg. 19
- #30 Morton Greenslit and Wesley Brand (Physics): **Computational Analysis of Wake Field Flow between Multiple Identical Spheres** (Adviser: Robert Matson), abstract pg. 16

**Presenter:** Sarah Schroeder

**Project Adviser:** Tammy Berberi (Honors)

**Title:** **Freedom to Fight: A Study on the Evolution of Women's Roles in Modern Warfare**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #111, 3:30 p.m.

Beginning with the Mollies of the Revolutionary War, women have participated in American warfare since the nation's inception. More recently, a key development in women's roles took place two years ago when the United States lifted the ban on female combat. This has resulted in modifications to the military's approach to war fighting and this process is ongoing. Two particularly pivotal moments in the participation of women in warfare and evolution of their role took place during WWII and the Iraq War. Using sources from American military history and current military policy this study begins with a brief examination of women's roles in warfare beginning in the Revolutionary War and then focusses on the participation of women in combat zones during WWII and the Iraq War. Specifically, I examine the impact that new technology had on women's roles, the growing necessity of female acceptance in the military, and how as a result, women's roles in warfare have evolved greatly. The official changes in the military roles of women has changed the dynamic between women and men further and has brought women in the United States closer to equal status with their male counterparts. This research complements and expands our understanding of women's participation in the American labor force as well as their stake in geopolitical and economic issues.

**Presenter:** Cory Schroeder

**Project Adviser:** Benjamin Narvaez (Latin American Area Studies)

**Title:** **Latinos in Blackball America: Using Sport to Discuss Race Relations, 1911-1947**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #114, 3:50 p.m.

Sport offers an excellent arena for analyzing and critiquing race relations because it is a microcosm of race relations in the United States. My research fills the gap in which Latinos are overlooked in baseball history. Moreover, the focus of my study analyzes the way in which Latino players were discriminated against by popular media, a topic not researched by many historians. My investigation also focuses on baseball because of the cultural importance it held in both the United States and Latin America. In examining Latino ballplayers during the Blackball Era (1900-1950), one can better understand the role these players played in "un-whitening" American baseball. My research shows how lighter-skinned Latino ballplayers, either mixed or pureblood European, were able to play in major league baseball, while Afro-Latin American players could only play in the Negro leagues. While light-skinned players in the majors faced discrimination and did not explicitly challenge baseball's racial barrier, the inclusion of an "other" in the major leagues paved the way for later acceptance of black ballplayers. My research helps to rewrite Latinos into baseball history. By analyzing newspapers and sports magazines, one can see how differences in language, race, and ethnicity upheld and challenged the color barrier in major league baseball during this period, a key element in the discussion of race relations between the U.S. and Latin America.

**Presenter:** Lucia Riffel

**Project Adviser:** Julia Dabbs (Art History)

**Title:** **Defining the Grid: Conflicting Interpretations Regarding the Paintings of Agnes Martin**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #112, 11:20 a.m.

Agnes Martin (1912-2004) was a modern painter who honed a very unique style comprised of minimalistic yet expressive compositions based on grids. Although Martin was very explicit about the aims of her paintings, they were commonly misinterpreted by critics. My research provokes further thought into the importance of art criticism versus the views of the creator herself, and how this dialogue impacts the experience of a viewer. Labeled by these scholars as a minimalist and abstract classicist, Martin herself believed she aligned with the motives of abstract expressionism, a movement focused on uninhibited emotion rather than a more controlled aesthetic. In my research, I analyzed four different theories about Martin's work coming from art critics as well as from Martin herself. I related these theories on her work to the artistic movements of minimalism, abstract expressionism, romanticism, and neoclassicism—analyzing each interpretation of Martin's gridded paintings within the art historical context to which it relates. I then formulated my own analysis and interpretation of Martin's visual language informed by my research and firsthand examination of selected paintings by Martin. By analyzing and synthesizing these interpretations of Agnes Martin's work, I have enlivened and extended this art historical conversation as well as raised questions about the nature of art criticism and interpretation.

---

**Presenter:** Anna Schorr

**Co-Presenter(s):** Marla Fix

**Project Adviser:** Nicholas Leonard (Psychology)

**Title:** **Predictors of Sexting Behavior in Rural College Students**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #112, 11:00 a.m.

Sexting is a relatively new phenomenon that refers to the act of sending sexually explicit messages, primarily between mobile phones. While sexting has garnered the attention of the media, limited research actually exists regarding sexting behavior. Our study examined self-reported sexting behavior among students attending a small, public, liberal-arts university. The study utilized a descriptive research design in which participants self-reported details about their demographics, sexting behavior, and other high-risk behaviors. Several studies examining risky behavior involvement classify sexting as a highly risky behavior. The intent of our research was twofold. First, descriptive data were used to report the nature of sexting behavior among college students. Second, controlling for other variables, the study examined whether relationship status and participation in other high-risk behaviors predicted sexting behavior among college students. In particular, it was hypothesized that being in a committed, intimate relationship would predict increased sexting behavior. In addition, it was hypothesized that self-reported involvement in "other high-risk behaviors" would predict increased sexting behavior. Given the limited research in this domain, the study's findings have significant implications for research, practice, and policy.

## ORAL PRESENTATIONS

John Q. Imholte Hall, Room #'s 111, 112, 113, 114

### Room #111

- 11:00 Marlin Farley (Communication, Media, and Rhetoric): **Native American Representations in Professional Sports** (Adviser: Barbara Burke), abstract pg. 31
- 11:20 Nina O'Leary (Studio Art/American Indian Studies): **Native Enough** (Adviser: Jess Larson), abstract pg. 37
- 11:40 Margaret Miller (Latin American Area Studies): **The Cross-Cultural Society of Panama: Examining the Chinese Population in the Hispanic Community** (Adviser: Benjamin Narvaez), abstract pg. 37

### Room #111

- 2:50 Alexandra Asche (English): **Putting Writing Back in the Writing Process** (Adviser: Tisha Turk), abstract pg. 27
- 3:10 Liv Klemek (English): **"This Is How it Started": A Discourse on Indigenous Authors and Artists as Trickster Figures** (Adviser: Becca Gercken), abstract pg. 34
- 3:30 Sarah Schroeder (Honors): **Freedom to Fight: A Study on the Evolution of Women's Role in Modern Warfare** (Adviser: Tammy Berberi), abstract pg. 39
- 3:50 Kyle Klausning (Latin American Area Studies): **Evaluating the Sustainability of Oil Based Development in Ecuador** (Adviser: Donna Chollett), abstract pg. 33



## ORAL PRESENTATIONS

John Q. Imholte Hall, Room #'s 111, 112, 113, 114

## Room #112

- 11:00 Anna Schorr and Marla Fix (Psychology): **Predictors of Sexting Behavior in Rural College Students** (Adviser: Nicholas Leonard), abstract pg. 38
- 11:20 Lucia Riffel (Art History): **Defining the Grid: Conflicting Interpretations Regarding the Paintings of Agnes Martin** (Adviser: Julia Dabbs), abstract pg. 38
- 11:40 Ashley Dial (English): **The Biographical Novel: What Is Considered Truth?** (Adviser: Michael Lackey), abstract pg. 30

## Room #112

- 2:30 Kaitlyn Macheledt (Studio Art): **Portraiture and the Phenomenological Paradigm** (Advisers: Michael Eble and Julia Dabbs), abstract pg. 36
- 2:50 Ravi Butler (Communication, Media, and Rhetoric): **"Do I Really Like My Job?": Workplace Relationships Viewed in Comedy Movies** (Adviser: Barbara Burke), abstract pg. 29
- 3:10 Gabrielle Crain (English): **Writing Is the Worst: How Multimedia Writing Can Bridge the Gap between Public and Academic Spheres** (Adviser: Tisha Turk), abstract pg. 30
- 3:30 Grace Lindblad (English): **Listening, Learning, Teaching: How Ishmael Reed and Thomas King Function as Community Healers** (Adviser: Becca Gercken), abstract pg. 36
- 3:50 Casey Liebhard (English): **"Whales, Whales, Whales, Lesbians, Whales, Whales": The Duplicity of Gender in Thomas King's *Green Grass, Running Water*** (Adviser: Becca Gercken), abstract pg. 35

**Presenter:** Margaret Miller**Project Adviser:** Benjamin Narvaez (Latin American Area Studies)**Title:** **The Cross-Cultural Society of Panama: Examining the Chinese Population in the Hispanic Community****Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #111, 11:40 a.m.

My study focuses on the present-day experience of Chinese-Panamanians to provide a deeper understanding of Panama's multiracial and multicultural society. Panama has an extremely diverse population, which includes people of indigenous, African, European, and Asian backgrounds. In the past, these have mostly been studied as historical entities or experiences. Chinese immigrants originally arrived in Panama in 1854 as railroad laborers and have since grown to six percent of the population. Despite this significant presence, scholars have largely ignored the Chinese experience and their contributions to Latin America's regional development. My focus on Panama's modern Chinese community and its relationship to the Panamanian concept of racial democracy leads to several new and interrelated questions. For example, I examined how Hispanic-Panamanians publicly perceive and interact with the Chinese community, and whether the Chinese are openly accepted as equals by the larger society's media. Additionally, I investigated whether the Chinese are represented as a monolithic group. To conduct this study, I traveled to Panama to implement three on-site research methods: the collection of media, public observations, and information from Chinese-Panamanian community leaders. My presentation will highlight the absence and acknowledgement of Chinese-Panamanians in the public sphere's popular culture and address how active public presence has affirmed the community as a locally recognized minority group. Although the Chinese are a noteworthy percentage of Panama, they are not acknowledged in Panamanian media, but are integrated into the country's social culture and economic status.

**Presenter:** Nina O'Leary**Project Adviser:** Jess Larson (Studio Art)**Title:** **Native Enough****Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #111, 11:20 a.m.

This project focuses on UMM's Native students, pairing digital photographic portraits and excerpts from interviews to create a diverse phenotypical and experiential spectrum of contemporary Native students' experiences and attitudes. All students interviewed attend UMM under the tuition waiver—however, this group represents a wide range of concepts of what it means to be Native, thus adding to an unspoken tension within the on-campus community that is seldom discussed. Many Native students, like me, are disconnected from their culture or feel that they should not identify with it because of their lack of understanding of life ways (in lieu of living in suburban areas) or because they do not fit phenotypic appearance (blonde hair, blue eyes, etc.). To develop this series, I looked extensively at historical and artistic representations of Native Americans to see what has been said and to shape what I wanted to add to the conversation. My perspective is unique because I am a member of the culture defining the culture, as opposed to outsiders' inaccurate observations in previous historical attempts. The current phase of research focuses on the photograph and the statements but will continue to evolve to incorporate multimedia and web components, as well as explore post-university life and students at other tuition-waiver institutions.

**Presenter:** Grace Lindblad  
**Project Adviser:** Becca Gercken (English)  
**Title:** **Listening, Learning, Teaching: How Ishmael Reed and Thomas King Function as Community Healers**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #112, 3:30 p.m.

Preserving cultural traditions and evading destructive colonial constructs results in a plethora of narrative habits, specifically those of repeating and resizing existing ideas with significant difference, a theoretical concept coined in 1988 by Henry Louis Gates Jr. as "signifyin(g)." Utilizing this theory, it is possible to more closely examine postmodernism as a signifyin(g) tool used to sustain prominent cultural figures. I argue that the Native American trickster figure in Thomas King's *Green Grass, Running Water* and the African American conjurer figure in Ishmael Reed's *Mumbo Jumbo* both demonstrate the pedagogical potential of a narrative in healing and unifying repressed cultural communities. Both intertextual novels work with characters, narrative forms, and a manifestation of the authorial voice to emphasize the importance of rewriting history as a catalyst to a healed future community. Encouraging a community of artists and leaders, these postmodern texts play an integral role in a movement towards cultural preservation.

---

**Presenter:** Kaitlyn Macheledt  
**Project Advisers:** Michael Eble (Studio Art) and Julia Dabbs (Art History)  
**Title:** **Portraiture and the Phenomenological Paradigm**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #112, 2:30 p.m.

Scholars often treat the fields of social science and studio art as mutually exclusive; however artistic endeavors show a potential for expanding social science research. In this study I focus on portraiture as a tool to expand social science methodology. Through comparing portraiture and the phenomenological paradigm between the social sciences and arts, I propose a new aesthetic structure for the artist wishing to contribute to social science knowledge. The structure I propose is based on rules of phenomenological research. This method of investigation aims to capture a phenomenon of life through the perspective of the person being studied. When applied to the artistic process of portraiture, the artist is able to capture a richness, complexity, and dimensionality of the human experience unlike any other analytical method. I display this through Fontana's *Portrait of Antoinetta Gonzalez* (1590) and the results of my Undergraduate Research Opportunity in Hawaii. During my time in Hawaii, I created collaborative artwork with a sample of 18 Hawaiian intentional community members. Directed by the rules of phenomenological research, I drew portraits of each community member and collected their insights, experiences, and perceptions of "truth," which I will present as evidence to my proposal of a new interdisciplinary aesthetic structure.

**ORAL PRESENTATIONS**  
**John Q. Imholte Hall, Room #'s 111, 112, 113, 114**

**Room #113**

- 11:00 Jennifer Guadarrama (Psychology): **Perceptions of Diversity in Rural College Students** (Adviser: Nicholas Leonard), abstract pg. 32
- 11:20 Bo Whitley (Psychology): **Attitudes towards Authoritative Figures** (Adviser: Nicholas Leonard), abstract pg. 41
- 11:40 Kari Hanson (Philosophy): **Defeating Knowledge of Perception** (Adviser: Lory Lemke), abstract pg. 32

**Room #113**

- 2:50 Broc Kokesh (Biology): **The Influence of Spines on Predation of Devonian Brachiopods** (Adviser: Tracey Anderson), abstract pg. 35
- 3:10 Eden Broberg and Mathea Krogstad (Psychology): **Academic Success and Christian Affiliation in College** (Adviser: Nick Leonard), abstract pg. 28
- 3:30 Pengxeu Thao (English): **The Biographical Novel as a Literary Model for Understanding Multigenerational Trauma** (Adviser: Michael Lackey), abstract pg. 40
- 3:50 Kelsey Jopp (English): **Positive Composition: Raising Happy Writers in High School and Beyond** (Adviser: Tisha Turk), abstract pg. 33

## ORAL PRESENTATIONS

John Q. Imholte Hall, Room #'s 111, 112, 113, 114

## Room #114

11:20 Oluwatomisin Bello (Sociology): **Exploring Reasons for the Persistence of Girl-Child Marriage in Nigeria** (Adviser: Farah Gilanshah), abstract pg. 28

11:40 Allison Wolf (Sociology/Public Health Studies): **Constructing Health Together: Validating Knowledge in the Implementation of Community Health Initiatives** (Adviser: Jennifer Rothchild), abstract pg. 21

## Room #114

2:30 Nicole Bailey (Communication, Media, and Rhetoric): **The Ultimate Midnight Snack: Chocolate** (Adviser: Barbara Burke), abstract pg. 27

2:50 Joe Kleckner (Communication, Media, and Rhetoric): **The Boondocks and Star Wars Episode I: A Rhetorical Analysis** (Adviser: Mary Elizabeth Bezanson), abstract pg. 34

3:10 Brittany Grady (English): **"Be Original": Remix Theory in the Classroom** (Adviser: Tisha Turk), abstract pg. 31

3:30 Britta Buchanan (English): **Designing a New, Writing-Based Pedagogy for Lower Level History Courses** (Adviser: Tisha Turk), abstract pg. 29

3:50 Cory Schroeder (Latin American Area Studies): **Latinos in Blackball America: Using Sport to Discuss Race Relations, 1911-1947** (Adviser: Benjamin Narvaez), abstract pg. 39

## PERFORMANCE PRESENTATION

Humanities Fine Arts Building, HFA Recital Hall #160

## HFA Recital Hall #160

2:30 Elise Tuntland (Music): **Camille Saint-Saëns and Lord Alfred Tennyson: An Introspective Glance into Romantic Ideals on Love and Madness** (Adviser: Wes Flinn), abstract pg. 40

**Presenter:** Broc Kokesh**Project Adviser:** Tracey Anderson (Biology)**Title:** **The Influence of Spines on Predation of Devonian Brachiopods****Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #113, 2:50 p.m.

Brachiopods are small animals that live on the seafloor and are prominent in the Devonian fossil record from 420 to 360 million years ago. An interesting feature of some species is that large spines develop on their exterior surfaces and are thought to have evolved for defense against predators. Fortunately, this hypothesis can be tested by observing wound marks indicative of attempted predation as described by Zhang et al. (2011). In this study, I examined wound marks on fossils of the spiny brachiopod *Atrypa rockfordensis* and the spineless *Atrypa devoniana*. Results show that *A. rockfordensis* only experienced attacks at lengths smaller than 16mm, whereas *A. devoniana* experienced attacks at all sizes. Furthermore, *A. rockfordensis* experienced significantly fewer attacks than *A. devoniana*, suggesting that certain predators may have preferentially avoided *A. rockfordensis*. These findings provide evidence of attempted predation as a means of discerning interactions among organisms and are useful in understanding predator-prey interactions in ancient marine ecosystems.

**Presenter:** Casey Liebhard**Project Adviser:** Becca Gercken (English)**Title:** **"Whales, Whales, Whales, Lesbians, Whales, Whales": The Duplicity of Gender in Thomas King's *Green Grass, Running Water*****Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #112, 3:50 p.m.

My research project examines the ways in which native author Thomas King in his book *Green Grass, Running Water* signifies both on the Bible's representation of gender and Hermann Melville's *Moby Dick*. Henry Louis Gates Jr. defines signifying as "the repetition and revision, or repetition with a signal difference" and argues that it cultivates humor by means of duality and slippage. Not only does signifying establish agency for African Americans, but it also calls into question the dominant culture's understandings of the oppressed group, and in doing so, undermines the dominant culture's authority. King, in subverting the narratives of the Bible and *Moby Dick*, comments on societal assumptions of gender and sexuality. Moreover, by signifying, King asserts that westernized ideals in regards to gender and sexuality are limited and only through the Native trickster can readers form a greater understanding of the transformative nature of gender. Native American tricksters challenge cultural assumptions like European-American notions of gender as existing through a binary system, using extreme and often bizarre measures. King uses this opposition to compel his readers to re-think their understanding of gender identity.

**Presenter:** Joe Kleckner  
**Project Adviser:** Mary Elizabeth Bezanson (Communication, Media, and Rhetoric)  
**Title:** *The Boondocks and Star Wars Episode I: A Rhetorical Analysis*  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #114, 2:50 p.m.

Since the *Star Wars* franchise continues to attract immense public and academic interest, I chose to examine Aaron McGruder's (African American comic strip artist) perspective on the media coverage surrounding the release of *Star Wars Episode I*. Comic artists use strips rhetorically when persuading their audience to think about an event in a new way. This project examines a story arc in the comic strip *The Boondocks* written by Aaron McGruder during May of 1999. In the arc, McGruder depicts Huey Freeman, an African-American child waiting in line for the release of *Star Wars Episode I*, responding to a loyal Caucasian fan of the franchise. To understand the rhetorical dimensions of this particular story arc, I used Bitzer's rhetorical situation, Bezanson's domination theory, and Bang's ten visual principles. Some rhetorical topics covered include the behavior of fans, the lack of diversity in both people and opinions, and the intense anticipation of the film's release. Ultimately, McGruder rhetorically exposes the privilege of typical fans, and the ignorance and lack of diversity within this social group. Analyzing comic strips in this manner allows us to see how artists like McGruder view media-related events and how their work methodically persuades their audience to view the world the way the artist does.

---

**Presenter:** Liv Klemek  
**Project Adviser:** Becca Gercken (English)  
**Title:** *"This Is How it Started": A Discourse on Indigenous Authors and Artists as Trickster Figures*  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #111, 3:10 p.m.

This research project focuses on how contemporary Native American authors and artists, as storytellers, function in the same way as traditional American Indian trickster figures. Trickster figures in American Indian stories have similar traits; they can be deceiving, shape shifting, gender bending, and ambiguous. By focusing on the trickster traits of ambiguity and deceit and by analyzing the parody and pastiche in the ledger art inspired paintings *My Elk Medicine is Strong* by George Flett and *Cad-do-Lacs* by Delores Purdy Corcoran, as well as Thomas King's novel *Green Grass, Running Water*, I conclude that despite their different mediums and genres, all of these artists can be interpreted in the same way—as traditional trickster figures. Ledger art, a traditional Native art form used to keep records of events, has been reimagined by contemporary Native artists to tell stories just as contemporary Native authors reimagine traditional trickster stories. Through my analysis of the satire and mimicry found in both King's novel and Flett and Purdy's artwork, I offer a new way to reconcile traditional indigenous storytelling with contemporary indigenous storytelling and conclude that audiences need to expand their definitions of literature and text in the fields of both English and American Indian Studies.

**FEATURE PRESENTATION**  
**Humanities Fine Arts Building, HFA Recital Hall, #160**  
**1:30 p.m.**

---

**Presenter:** Zachary Threadgill  
**Project Adviser:** Barbara Burke (Communication, Media, and Rhetoric)  
**Title:** *ThreadyBeats: Finding a Place in the Mix*  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #112, 11:00 a.m.

Music's power to influence our minds and shape our thoughts and perceptions of the world is fascinating to me, and my passion for music has provided me with an artistic outlet to connect with other people. I have seen that music production is a unique process for creative expression, merging knowledge about art and technologies to create a finished composition. As computer-processing power increases at an exponential rate, innovation has led to many analogue systems being replaced by digital technologies, and the music business has capitalized on this late-20th century technology boom. I have spent the past two years as a mix engineer investigating the ways new developments and processes have been incorporated into modern music recording practices. Utilizing advanced mixing techniques with specialized tools from Digital Audio Workstations (DAWs), in combination with my knowledge of musical theory and artistic expression, my goal is always to create musical pieces that captivate the audience's emotions and energy. With each upgrade to newer technologies, DAWs have become more advanced; new ways to enhance sound profiles (equalization), increase perceived loudness (compression and limiters), and simulate instrument placements (panning) are now being used to create what is known as a stereo field, realized as an invisible theoretical representation of a musical performance. In my presentation, I will be discussing why and how mix engineers achieve this result. I will explain how we combine music theory, artistic expression, and audio manipulation to enhance songs recorded digitally. Also, I will conduct a live, real-time demonstration of parallel processing, a common vocal enhancement technique developed in Motown, and I will play a sample of my completed compositions. My work creates music that fits into the modern pop and rap genres while maintaining a specialized sound unique to myself.

---

---

**POSTER PRESENTATIONS**  
**Oyate Hall, Student Center**

---

**Presenter:** Kezia Adler

**Project Adviser:** Sheri Breen (Political Science)

**Title:** A Presidential Candidate's Mental Health and the Public's Vote

**Type of Presentation:** Poster or Visual Display #27

This research discusses how the stigma of mental illness influences the public's intention to vote for a candidate. Public knowledge of the mental health status of a candidate may alter their voting behavior, and support for a candidate may vary by political party. Historically, Democrats with mental illness have been elected despite public knowledge of their mental illness. Other research related to biological and psychological findings lend support to the idea that Democrats are less likely to differ their vote due to mental illness. No previous studies have analyzed the impact of mental illness on the outcome of an election, and this absence reflects the political reality that the stigma of mental illness is so powerful that few candidates would admit having any such illness. Through an experimental study, two hypotheses were tested: 1) That the public is most likely to alter their candidate choice when faced with a candidate in their party who has admitted to having a mental illness, and 2) that Democratic identifiers are less likely than Republicans to alter their regular voting behavior. Participants of the study voted in two mock elections. The first election consisted of descriptions of both candidates and their platforms; the second was the same except for the fact that the candidate from the participant's political party had been hospitalized for depression three times. 130 responses were collected, and results show statistically significant support for both hypotheses, signifying that voting behavior has the potential to be changed due to the stigma of mental illness, and that Republicans are more likely to modify their voting behavior than Democrats.

---

**Presenter:** Abdul Ali

**Co-Presenter:** Timothy Roettgen

**Project Adviser:** Joseph Alia (Chemistry)

**Title:** Analysis of Rice Varieties Using Fourier Transform Infrared Spectroscopy

**Type of Presentation:** Poster or Visual Display #24

This experiment analyzed ten varieties of grain, eight of them being rice, using the fourier transform infrared spectroscopy instrument. The objective was to determine which grain sample has the highest nutritional value. Infrared peaks were absorbed at 1745 cm<sup>-1</sup>, 1650 cm<sup>-1</sup>, 1540 cm<sup>-1</sup>, and 1020 cm<sup>-1</sup> through 1150 cm<sup>-1</sup>. We used the spectrum data to assign peaks that represent certain functional groups. For example the peak at 1650 cm<sup>-1</sup> indicates a strong amide presence, representing a protein chain. By analyzing the various compounds in our samples we were able to determine the grain with most nutritional advantages. This allows us to relay this information to areas in the world that depend on this grain daily. It would benefit populations all over the world because of the increase of antioxidant activity in their daily nutrition. In the long term, this will exponentially decrease the chances of heart problems and cancer.

**Presenter:** Kelsey Jopp

**Project Adviser:** Tisha Turk (English)

**Title:** Positive Composition: Raising Happy Writers in High School and Beyond

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #113, 3:50 p.m.

Scholarship in composition studies has traditionally focused on teaching students to write well. In recent years, however, some educators, writers, and theorists have suggested that the greatest problem in the composition classroom is not bad writing but unhappy writers. Unfortunately, the few scholars committed to addressing the problem of unhappy writers have seldom been in direct conversation with one another and are instead tackling the issue individually in the composition classroom. To move forward, the field needs a framework for further research and discussion. In this presentation, I draw on principles of positive psychology, or the study of happiness, to propose an approach to teaching composition that focuses on raising happy writers. This approach, called positive composition, provides a foundation for future scholarship and reminds educators of the infinite possibilities that writing holds for students. I offer conceptual models for what positive composition might look like and propose three specific classroom applications intended to improve students' attitude, engagement, and perception of writing assignments as meaningful—all necessities for a happy writer. My goal is to provide a way for professors and students alike to start thinking about and discussing positivity in composition settings. For many students, even on the Morris campus, writing is frightening, overwhelming, and seemingly impossible to do well; positive composition offers practical solutions to these common problems by building in students the tools they need to grow both as writers and fulfilled individuals.

---

**Presenter:** Kyle Klausing

**Project Adviser:** Donna Chollett (Latin American Area Studies)

**Title:** Evaluating the Sustainability of Oil Based Development in Ecuador

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #111, 3:50 p.m.

The election of Rafael Correa in 2006 as Ecuador's president resulted in vast increases in government spending on health, infrastructure, education, and social welfare. Correa's "Citizen Revolution," part of a broader pivot towards left-wing populist alternatives to neoliberalism in Latin America, coincided with a historic rise in the price of oil. Consequent increases in state oil revenue were used to finance the major public sector expansion. This investigation assessed the sustainability of Ecuador's oil based model of development in the long term by looking at fiscal, historical, and socio-political factors. Statistical data collected from the Ecuadorian government and various global financial institutions indicate growing contradictions between the government's need for higher revenue to sustain development and growing fiscal pressures (such as the recent collapse in the price of oil, dwindling natural reserves, and monetary restraints of dollarization). Additionally, the investigation evaluated the impact of government policies on oil production and economic management, concluding that efforts by the state to circumvent these limitations ultimately fail to address larger structural flaws. Finally, a wider historical lens was applied to evaluate the economic and environmental sustainability of previous single-export models of growth, both in Ecuador and contemporary Latin America. The investigation found that oil based development in Ecuador is not viable in the long term. Without wider structural reforms, Ecuador's historical dependency on a single export will only continue to prohibit sustainable approaches to social and economic growth.

**Presenter:** Jennifer Guadarrama  
**Project Adviser:** Nicholas Leonard (Psychology)  
**Title:** Perceptions of Diversity in Rural College Students  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #113, 11:00 a.m.

The number of racial and ethnic minorities enrolled in institutions for higher education continues to grow rapidly. My research focuses on students' perceptions of their campus diversity. My primary focus is to examine whether there are differences between diversity perceptions of underrepresented students (i.e. students of color) and Caucasian students at the University of Minnesota Morris campus. The instrument used to assess the students' perceptions of their campus diversity is the Cultural Attitudes and Climate Questionnaire (CACQ) developed by Helm, Sedlacek, and Prieto. The CACQ is composed of 100 questions on cultural attitudes and climate. Using a Likert-scale the students will report their perceptions of their campus climate. Helm, Sedlacek, and Prieto proposed that students' perceptions of diversity issues would differ by racial group. My hypothesis is that underrepresented students of color view their campus as less diverse than Caucasian students. Furthermore I argue that this is because underrepresented students of color feel that their racial and/or ethnic group is not represented well on campus. My presentation will discuss such questions as whether racial minorities feel that UMM campus is diverse, which the results of my research will help to address.

---

**Presenter:** Kari Hanson  
**Project Adviser:** Lory Lemke (Philosophy)  
**Title:** Defeating Knowledge of Perception  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #113, 11:40 a.m.

Philosophers define knowledge as "a justified true belief," which Edmund Gettier challenges with thought experiments wherein people seem to have justified true beliefs but not knowledge. Matthias Steup argues that Gettier's counterexamples work because they contain factual defeaters, or facts about the situation that "defeat" knowledge by falsifying the subject's evidence. Steup uses factual defeaters to revise the definition of knowledge to "an undefeated justified true belief." I apply factual defeaters to an argument by A.J. Ayer against the reliability of perception, one typical source of knowledge. This argument says that for any dreamer unaware that a nightmare is not real, there is an implication that there is no way to say from experiences alone whether they are real. I argue that nightmares act as a factual defeater for all waking perceptions, and that this has the consequence of making a more effective skeptical argument using dreams to defeat knowledge of any perception.

**Presenter:** Rachael Blais  
**Co-Presenter:** Tessa Hagen  
**Project Adviser:** Kerry Michael (Psychology)  
**Title:** The Relationship between Cortisol, Perceived Stress, and Mindfulness Meditation among College Students  
**Type of Presentation:** Poster or Visual Display #26

Previous research has found that mindfulness meditation, bringing oneself into present awareness by focusing on breathing and heart rate, reduced perceived social stress and concluded that mindfulness training could be a protective coping strategy against stress. This study aimed to determine whether mindfulness meditation could be a factor for decreasing perceived stress and stress hormone levels, while also increasing protective health behaviors among college students. Participants were randomly assigned into one of two groups, experimental and control. The experimental group participated in a 30-minute mindfulness meditation activity, while the control group read a magazine for the equivalent amount of time. Measures taken included the Perceived Stress Scale, the Positive and Negative Affect Scale, and salivary cortisol samples. Personality and health behaviors were taken into account for analysis. Main analysis used ANOVAs, where the experimental (meditation) and control groups (no meditation) were the independent variables, and stress hormone and perceived stress levels were the dependent variables. Stress hormone levels were quantitatively measured using a salivary assay kit. The expected results of this study are that perceived stress and stress hormone levels will decrease in the meditation group. Many young adults use maladaptive coping mechanisms to reduce stress levels. If a brief mindfulness meditation intervention can reduce perceived stress and stress hormone levels, future college students may be able to use this technique as a positive coping strategy to "de-stress."

---

**Presenter:** Teresa Brockman  
**Project Advisers:** Stephen Burks (Economics and Management), Jon Anderson (Statistics) and Rebecca Haider (Center for Small Towns)  
**Title:** Methods to Increase Matching Yield from Case-Control Draws  
**Type of Presentation:** Poster or Visual Display #23

A case-control study compares subjects who have a factor of interest (cases) with similar subjects who do not have that factor (controls) to determine an association between the factor of interest and a specific uncertain outcome. Such studies are observational and retrospective, so case-control draws are performed to match each case randomly with a comparable control. A higher yield of matches when doing a case-control draw leads to clearer and more statistically precise conclusions of the study. As part of a larger analysis by UMM's Truckers and Turnover Project of the relationship between a medical condition and the cost of medical insurance claims in commercial drivers, this study compared methods of improving yield in case-control matches to determine which would provide the best matching success with the least amount of additional data manipulation. We matched cases with controls that had similar amounts of time of exposure (in our case, health insurance enrollment, which controls for a potentially confounding variable). We used different precision levels of exposure (weekly, bi-weekly, monthly) to compare matching success. Additionally, we compared the number of matches when allowing for replacement versus without replacement. We found that matching with replacement added some challenges to the process, but the increase in matching success was worth it. Overall, allowing for replacement and matching on a medium level of time precision (here bi-weekly enrollment) increased matching yields in each draw, so we will implement these conditions in the balance of the larger analysis.

**Presenter:** Calvin Cicha

**Project Advisers:** Robert Gardner and Michael Ceballos (Biology)

**Title:** Dissolved Inorganic Carbon Optimization for Enhanced Microalgal Pigment Production

**Type of Presentation:** Poster or Visual Display #2

With rising atmospheric CO<sub>2</sub> concentrations and high cost of petroleum becoming progressively evident, algal biofuels have emerged as a front runner for renewable energy. Although algal biofuel production has enormous environmental benefits, improvements to its economic sustainability must be addressed. Previous studies to improve algal bio-oil production have mainly focused on improving triacylglyceride lipid concentrations. To further promote the commercial attraction of algal fuel, a variety of co-products, such as pigments, can simultaneously be produced alongside lipid biofuel precursors. Marketability of these pigments, such as  $\beta$ -carotene and astaxanthin, holds very high value and may add to the economic stability of algae biofuel; yet little is known about optimizing pigment production in algae. This project focuses on optimizing the growth of *Dunaliella* and *Haematococcus*, pigment-producing algae, by introducing an inorganic carbon source, bicarbonate, to enhance production of  $\beta$ -carotene and astaxanthin. As bicarbonate has already been proven to enhance lipid production as shown by Gardner, this method is ideal for maximum productivity. Improvements in pigment concentration were observed by extraction, and reverse phase high pressure liquid chromatography analysis was used to quantify the pigments by comparing the yield data to astaxanthin and  $\beta$ -carotene standards. This information adds to the overarching goal to create an environment that combines enhanced lipid biogenesis and optimal pigment production. The results of this research will contribute to algae culturing strategies that are potentially transformative to commercial biofuel/value-added chemical production.

---

**Presenter:** Taylor Evansen

**Project Adviser:** Rich Hardy (Sport Studies and Athletics)

**Title:** The Relationship between Energy Drink Consumption and Nutritional Knowledge among NCAA

**III Student-Athletes**

**Type of Presentation:** Poster or Visual Display #18

Athletes are always searching for ways to bolster performance. Some believe that consuming energy drinks (Monster, Rock Star, etc.) is the solution for improving performance and consequently overlook the importance of a healthy diet. We compared the level of human nutrition knowledge and GPA between athletes that consume to athletes that do not consume these drinks. The sample (N=194) was drawn from five schools that compete in the Upper Midwest Athletic Conference. Participants completed a modified version of the Nutritional Knowledge Questionnaire (NKQ) and answered demographic questions. Participants that acknowledged using energy drinks answered an additional set of questions pertaining to their consumption habits. The results showed a significant difference between energy drink consumers and non-consumers. The energy drink consumers tended to be male, had a lower GPA, had a lesser understanding of diet-disease relationships and food-nutrient sources, and scored lower on the NKQ. Overall, we demonstrated that athletes who consume energy drinks have a lower understanding of their dietary needs, an important component for strong athletic performance.

**Presenter:** Marlin Farley

**Project Adviser:** Barbara Burke (Communication, Media, and Rhetoric)

**Title:** Native American Representations in Professional Sports

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #111, 11:00 a.m.

In previous research on the psychological consequences of American Indian mascots, Fryberg (2008) examines sports mascots and the possible effects of these representations on Native American students. Because a considerable amount of time has passed since Fryberg's study, and the controversy regarding whether there is a need to change these mascots continues, my current research project remains important. This project asks: 1) What are the possible perceptions and resultant effects on Native American subjects? and 2) In what ways do mascots influence the perceptions of the dominant group (white Americans)? Using an online research survey, I recruited local participants who evaluated a selection of professional sports mascots' images of Native Americans. Participants also ranked their responses to the presented stereotypes and associations linked to these images. Because the University of Minnesota, Morris undergraduate campus has a greater cultural and demographic diversity than was sampled in earlier studies, the results from my research reflect opinions from a more diverse community. The effects of the representations of Native Americans through professional sports mascots and the interconnections between Native American social/cultural stereotypes derived from mascots influence the dominant society's perceptions of Native Americans. They also influence cultural stereotypes, which have existed for centuries and which include, but are not limited to, the "noble savage." Additionally, this research study finds supporting evidence of a hypothesis I have developed that suggests that those with greater exposure to the American professional sports culture are less likely to find Native American mascots offensive and reinforcing of historical stereotypes.

---

**Presenter:** Brittany Grady

**Project Adviser:** Tisha Turk (English)

**Title:** "Be Original": Remix Theory in the Classroom

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #114, 3:10 p.m.

Discussions of originality within composition studies have developed fairly recently, and participating scholars have contributed to them almost exclusively in the context of plagiarism. A particular segment of research focuses on the threat the Internet poses to originality and strategies for how to maintain it. But as Johnson-Eilola and Selber point out, scholars have been operating within a flawed framework, one that presupposes that any threat to originality is an obstacle to be overcome. In my presentation, I'll build on Johnson-Eilola and Selber's work by further exploring not how to maintain originality, but whether or not it can—or should—be maintained. I'll then elaborate on their suggested framework called remix theory, considering specifically how it could be adapted by students and instructors in college classrooms. Implementing remix theory has the potential to alleviate misconceptions about the role of originality in writing, which will ultimately allow students to see it for what it really is: a process of collaboration and contribution.

**Presenter:** Gabrielle Crain

**Project Adviser:** Tisha Turk (English)

**Title: Writing Is the Worst: How Multimedia Writing Can Bridge the Gap between Public and Academic Spheres**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #112, 3:10 p.m.

At most college campuses, academic discourse is the primary method of writing taught to students. This language has its merits; it pushes students to write and think at a more advanced level and prepares them for future coursework and endeavors in their academic field. However, this highly complex language reinforces students' perceptions of a gap between the public and the academy, even though the studies of the academy are supposed to benefit the public by finding, creating, and promoting knowledge to help the world function in a more meaningful way. While academia finds and creates knowledge, its difficulties in reaching a popular audience is diminishing the public's respect for and understanding of its value. Writing is one source of the problem, but writing can be a solution as well. By studying the works of scholars in composition studies and applying their recommendations for promoting academic inquiry through personal projects, I prepared and produced one such possibility for promoting academic discussions outside academia. The route chosen was a video, now on YouTube, that explains the field of composition studies, and yes, it does it by comparing the act of writing to the creation of sausages. In my presentation, I will discuss how new media writing such as my project can be taught to and implemented by students across the academy, helping them both to act as liaisons between the academy and the public and to further develop their own writing skills and processes for their careers in the public sphere.

---

**Presenter:** Ashley Dial

**Project Adviser:** Michael Lackey (English)

**Title: The Biographical Novel: What Is Considered Truth?**

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #112, 11:40 a.m.

The biographical novel is one of the most recent innovations in writing; the implications of this affect both authors and historians. The novels that biographical authors are writing must answer an important question: What kind of truth are we, as readers, being given? The central idea being communicated to readers in this literary format becomes complicated when readers must differentiate between the truths the author is communicating and what historians believe to be fact. A novelist can choose between the biographical subject, the generational truth of the time period, or the reader as their main focus for their work. From this we can decipher what story is being conveyed and where the author's loyalties lie. The authors that I will be examining are Arna Bontemps, William Styron, and Barbara Chase-Ribound, whose novels all revolve around events occurring in the 1800's. By learning where these authors stand on the representation of facts during this time period, we can uncover the literary agreement between author and reader, and how that determines what the author decides to keep as historical fact or change to fit their literary goal. An example of a potentially upset audience is Styron's arguable misuse of Nat Turner's actual confession statement given in 1831, specifically the changes Styron made to Turner's sexuality. The impact of the biographical novel as a new form of literature will affect how future novelists confront the idea of truth in their literature, and the future implications of those choices will be seen in their biographical works.

**Presenter:** Blake Gerold

**Co-Presenter:** Rachel Bohling

**Project Adviser:** Ted Pappenfus (Chemistry)

**Title: Synthetic Methods of CTS and CZTS Nanocrystals**

**Type of Presentation:** Poster or Visual Display #8

The design of materials for use in electronic applications such as solar cells and transistors is an active area of research in the chemical sciences. Materials containing earth-abundant elements are especially attractive in the context of sustainability. As a result we focused on elements such as copper, zinc, sulfur and tin as they are relatively abundant. The syntheses of various morphologies of copper zinc tin sulfide (CZTS) and copper tin sulfide (CTS) nanocrystals were explored to discover and produce more energy efficient and green reactions. The syntheses were carried out at relatively modest temperatures and under normal atmospheric conditions. Products were analyzed with powder X-ray diffraction and compared to simulated powder patterns of known structures. The syntheses of CTS nanocrystals required the reaction to be heated overnight under an inert atmosphere, whereas the reaction used for the synthesis of CZTS nanocrystals required less energy and only required the reaction to be heated for four hours. Solvents used in the syntheses also influenced the final chemical structures of the materials. The various nanocrystals produced assisted us in achieving our overall goal of developing an energy efficient and effective synthesis of CZTS and CTS nanocrystals using earth-abundant and low cost materials.

---

**Presenter:** Hannah Goemann

**Project Adviser:** Michael Ceballos (Biology)

**Title: Carbon Partitioning during Bicarbonate-Induced Triacylglycerol Accumulation in Chlorophyta**

**Type of Presentation:** Poster or Visual Display #3

Microalgae are unicellular eukaryotic microorganisms that live individually, as chains, or in clumps. These photosynthetic super-factories can produce valuable molecular substrates such as lipids and carbohydrates with exceptionally low spatial needs and greater percent biomass compared to other alternative biofuel feedstock. Therefore, microalgae are a research focus for many alternative energy studies, including the production of biofuel from fatty acid methyl esters (FAMES) derived from triacylglycerol (TAG) from algal biomass. Recent studies have shown significant increases in TAG production and FAME accumulation in several strains of microalgae grown in nitrogen-limited cultures with bicarbonate in the media. Increasing lipid content is desirable for the production of algal-based bio-oil, which can be used for fuel. However, carbohydrate and protein content in bicarbonate-enriched algal cultures has not been described. This project seeks to characterize and quantify the nature of carbon partitioning in the microalga, *Chlorella* PF-1, grown in standard media versus bicarbonate-enriched cultures to determine the relative amounts of protein, chlorophyll, and carbohydrate production under various growth conditions. Bradford-style protein assays, high performance liquid chromatography, and gas chromatography will be used to quantify molecular composition of algal biomass. This project tests the hypothesis that supplemental bicarbonate increases TAG accumulation. This project will contribute to the understanding of the functions of intercellular catabolic pathways and to the advancement of sustainable fuel sources.



**Presenter:** Morton Greenslit  
**Co-Presenter:** Wesley Brand  
**Project Adviser:** Robert Matson (Physics)  
**Title:** Computational Analysis of Wake Field Flow between Multiple Identical Spheres  
**Type of Presentation:** Poster or Visual Display #16

There is presently no known method for predicting which configurations of objects will be stable while moving through a fluid. Objects moving through a fluid perturb the motion of objects in the same fluid, however, some configurations of objects moving through a fluid have little inter-object perturbation. In this research, the motions of two spheres in water were simulated in COMSOL MultiPhysics. The combinations of two or more simulations were used to extrapolate the forces on multiple spheres to locate configurations where the total forces on each sphere were negligible and the vertical forces on each sphere were equal. The forces for each model were calculated by analyzing the pressure data for each model in Mathematica. Several techniques were used during this research. In the first method, the forces in three two sphere models were combined to represent each interaction in a three sphere system. In the second method, the pressure fields from two two-sphere models were averaged to create a new pressure field for a three sphere model. In the third method, we used the bisection method to find points where the force components were zero. Our current investigation examines the effects of allowing the spheres to rotate, on the interaction of forces created by the spheres. Establishing a successful prediction model is expected to simplify optimization of configurations and has many applications in fields such as naval and aerospace engineering.

---

**Presenter:** Chloe Hanson  
**Co-Presenters:** Laura Borkenhagen and Allison Christiansen  
**Project Adviser:** Timna Wyckoff (Biology)  
**Title:** A Potential Interaction between Csd1 and Csd2, Two Cell Shape Determining Proteins in *Helicobacter pylori*  
**Type of Presentation:** Poster or Visual Display #1

*Helicobacter pylori* is a bacterium that colonizes 50 percent of the world's human population and is linked to stomach ulcers and gastric cancer. The organism's helical shape promotes host colonization. Understanding how *H. pylori* generates its helical shape could lead to the development of species-specific therapy. Previous research has shown that cell shape determining (Csd) proteins, of which eight are known, work together to modify the peptidoglycan cell wall, creating both curvature and twist. Genetic work provides evidence that Csd1 and Csd2 are involved in creating twist. However, Csd2 is missing two conserved putative active site residues, and previous data show that Csd1 is unstable in the absence of Csd2. We hypothesize that Csd2 may act as a scaffold protein that stabilizes and directs Csd1 modification of the cell wall. We probed the importance of one putative zinc binding residue shared by Csd1 and Csd2 by creating strains that contain mutations at this position in each protein (D173C mutation in Csd1 and D169C mutation in Csd2). Mutants were made using stitch PCR and transformation, and were confirmed via gel electrophoresis and sequence analysis. Visualization of the cells shows that the D173C mutation in Csd1 leads to a strain with curved shape, but that the analogous Csd2 D169C mutant strain is helical. These results are consistent with our model of the requirement for enzymatic activity for Csd1 function, but not for Csd2 function. These results support our model of enzymatic Csd1 protein and a non-enzymatic Csd2 scaffold protein.

**Presenter:** Britta Buchanan  
**Project Adviser:** Tisha Turk (English)  
**Title:** Designing a New, Writing-Based Pedagogy for Lower Level History Courses  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #114, 3:30 p.m.

It is well known within the university setting that lecture-based lower level courses offer little chance for discussion or even writing. While lecture can and is beneficial in relaying information across to students, the current method utilized in many introductory, lecture-based courses—which involves class lectures, assigned textbook readings, and occasional exams—is not conducive for students to develop any sort of critical thinking skills. Critical thinking is especially important within the history discipline, but lecture-based introductory history courses very rarely allow students the chance to write; this is a problem, since the writing process is exceptionally important for developing necessary critical thinking skills to succeed in the history discipline. There are a number of discussions in the scholarly community regarding the implementation of better writing assignments in history courses and a few conversations regarding the implementation of a better pedagogy in lower level history courses. However, these theoretical ideas have yet to be implemented in the classroom setting together. In my paper, I argue that to successfully foster critical thinking skills for students to grasp the analytical nature of the study of history, a completely new, writing-based pedagogy must be implemented—one that focuses less on lecture and more on in-class discussions that utilize thoughtful and creative in-class and out-of-class writing assignments.

---

**Presenter:** Ravi Butler  
**Project Adviser:** Barbara Burke (Communication, Media, and Rhetoric)  
**Title:** “Do I Really Like My Job?”: Workplace Relationships Viewed in Comedy Movies  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #112, 2:50 p.m.

Workplace relationships are a unique kind of interpersonal relationship for the individuals involved and for the organizational setting in which the relationships form. Previous research has examined the effect of these relationships on the workplace, while others have focused on organizational goals and interpersonal communication outcomes in workplace relationships. Little research has been done on how workplace relationships are portrayed and understood in fictional movies. Research about film argues that as viewers, the audience has the opportunity to see and relate to multiple perspectives simultaneously. Studying relationships in movies is useful in the field of communication because movies have the potential to tell us about how people might think of social reality. In watching movies we have a chance to see behaviors and their consequences as experienced by characters we come to recognize. Furthermore, movies show us models of organizations, assumptions of workplace systems, and responses to business trends in comical ways within the familiar but slightly exaggerated settings we would otherwise not experience. Applying leader-member exchange theory and organizational culture theory, this research focuses on workplace communication strategies and patterns regarding co-worker friendships, co-worker romances, and supervisor-employee relationships using the methods of systematic critical analysis and case study to examine *Office Space* (1999), *Employee of the Month* (2006), and *Horrible Bosses* (2011). These movies are particularly useful because of their popularity, and they reinforce the notion that laughter can lead to indirect learning, cultural sensibilities, and anticipatory socialization regarding workplaces.

**Presenter:** Oluwatomisin Bello

**Project Adviser:** Farah Gilanshah (Sociology)

**Title:** Exploring Reasons for the Persistence of Girl-Child Marriage in Nigeria

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #114, 11:20 a.m.

Child marriage, here, is defined as marriage after the onset of puberty but before the age of 18. This is a problem particularly for adolescent girls, although it affects boys as well. Although the Child's Rights Act passed in Nigeria in 2003 defines the legal minimum age of marriage as 18 and thus criminalizes child marriage, child marriage is still occurring in various parts of the country. The problem of girl-child marriage in Nigeria is significant because it is a leading cause of reproductive health issues, specifically obstetric fistulas. Acknowledging the latter, one pressing question remains: "Why is child marriage continuing?" In this presentation, I will discuss how my research employs the structural functional theory of sociology, which focuses on how function and dysfunction between societal institutions contribute to various societal phenomena, as a tool to understand why child marriage persists in Nigeria. Furthermore, I will discuss some of the health and socio-economic impacts of girl-child marriage and some suggestions on how to reduce the practice of girl-child marriage in Nigeria.

---

**Presenter:** Eden Broberg

**Co-Presenter:** Mathea Krogstad

**Project Adviser:** Nicholas Leonard (Psychology)

**Title:** Academic Success and Christian Affiliation in College

**Type of Presentation:** Oral Presentation

John Q. Imholte Hall, Room #113, 3:10 p.m.

The goal of our study was to provide a more thorough understanding of the relationship between religious attitudes and academic success, and will provide direction for future research in this domain. Our research examined the relationship between Christianity, academic achievement, and mediating variables in college-aged students. Past studies regarding religion and academic success have found that in some communities, academic success is positively correlated with religious involvement. However, these studies primarily looked at academic success in relation to involvement in a religious community, and not to personal attitudes regarding religion. To gain a better understanding of the role of personal religious attitudes in academic success, this study specifically examined academic success in relation to Christian affiliation and spirituality, as well as intrinsic dispositions of positivity and mastery. These mediating variables were included to control for factors that may relate to both academic success and religiosity, providing a more complete view of the relationship between religious attitudes and academic success. Study participants included college students currently attending a small, public, liberal-arts university. The study utilized a descriptive research design in which participants self-reported details about their demographics, academic performance (i.e. GPA and participation in honors programming), religious beliefs, and personality characteristics associated with outlook and hopefulness. Our presentation will examine the results of our study in relation to questions regarding the role of personal beliefs and dispositions in academic success.

**Presenter:** Isaac Johnson

**Co-Presenter:** Rachel Forrest

**Project Adviser:** Jess Larson (Studio Art)

**Title:** X-ternal Anatomy: Examining the Impermanent

**Type of Presentation:** Poster or Visual Display #22

People have always been obsessed with immortalizing the world around them by documenting their personal moments. We decided to explore that range of ideas regarding permanence and how it relates to our lives via a collaborative series of artworks. In the process, we also dredged up questions about permanence in the fields of photography and drawing. The drawings for this series are done with ink (which fades) on skin (which ages). These "temporary tattoos" are then washed away forever after the moment has been documented. However, the memory of the drawing is forever immortalized by photographic documentation. Film photography (as opposed to digital) was chosen to compliment the language and style of the drawings, capturing them in a timeless fashion that produces tangible and physical evidence of that something lost. As the photographic prints of the drawings are reproduced and distributed, they offer the original drawings a longevity not otherwise possible. Future works continue an investigation of these concepts with larger scale drawings and complimentary prints expanding both subjects and locations on the human body to further mine the permanent, the immortal, and the space between them.

---

**Presenter:** Torri Jordan

**Co-Presenter:** Allison Wolf

**Project Adviser:** Rich Hardy (Sport Studies and Athletics)

**Title:** Traumatic Brain Injury and its Effect on Performance Measures of Major League Soccer Players

**Type of Presentation:** Poster or Visual Display #17

Traumatic Brain Injury (TBI) is a growing concern among professional athletes. Concern increased in soccer after several players immediately returned to play following TBI during the 2014 World Cup. The purpose of our study was to determine if individual performance measures (total years pro, total seasons, total games played, total games started, total minutes, total goals, total assists, total shots, and total shots on goal) were affected by TBI that occurred while competing in Major League Soccer (MLS). We also investigated if there were differences in career performance measures of MLS players with TBI versus without TBI in their career. Our sample consisted of 97 field players that competed in MLS between 1996-2014. After determining if the player suffered a TBI while competing in MLS, they were placed in either the TBI or the non-TBI group. We compared individual game performance measures of the TBI group prior to the year of TBI to performance measures occurring after the year of TBI. Furthermore, we compared total career performance measures of both groups and noted statistically significant differences between performance measures. Our research showed that certain individual player performance measures decreased after TBI. The players competed in fewer games, started fewer games, and played fewer minutes. Comparisons of the TBI to the non-TBI group, the TBI group competed longer in MLS and the non-TBI group had a greater number of assists. Both of our hypotheses were supported, showing TBI has an impact in player performance.

**Presenter:** Saesun Kim  
**Project Adviser:** Barry McQuarrie (Math)  
**Title: Determining Parameters of Dynamical Systems Using B-Spline Least Square Minimization**  
**Type of Presentation:** Poster or Visual Display #29

Fitting ordinary differential equations (ODE) based dynamical systems to data sets is an increasingly important technique that allows a researcher to estimate model parameters, as well as investigate the feasibility of different models that could fit the data set. This work investigates Brewer's method that determines the system parameters through a least squares optimization process using B-Splines. Although the method requires that the parameters are linear in the model, since the method does not require an initialization, it can be particularly useful if estimates of the model parameters are not known. In the original method, the parameters are computed by solving a linear system of equations, which is iterated until the solutions converge. This iteration process can be slow in practice, due to solving for some parameter values which are in fact known. We improved this technique by rearranging the matrix for the linear system to reduce the dimension of the system being solved by removing some of these parameters. We first applied the method to two systems, Predator-Prey and Chua circuit, to estimate parameter, and this form of rearrangement for specific model decreased the running time, making it up to six to seven times faster with the same accuracy of the parameter errors of our previous approach of Brewer's model.

**Presenter:** Saesun Kim  
**Project Adviser:** Michael Korth (Physics)  
**Title: Three-Particle Distribution Functions in the Hard-Sphere Model**  
**Type of Presentation:** Poster or Visual Display #16

Complex fluids, such as colloidal suspensions, bio-fluids, liquid foods, and personal care products, are all around us and play important roles in our lives. To better understand the structure of these fluids, scientists have developed a variety of approaches. Several of those approaches start with a hard-sphere model, in which each particle is a sphere and the particles interact only by bouncing off one another. Our approach is based on Shinomoto's model, to which it is particularly convenient to add features (such as making the particles elliptical or mixing two sizes of particles together). The spatial structure of a fluid is often described by the two-particle correlation function  $g_2(r_{12})$ . This function is the probability of a second particle being located a distance  $r_{12}$  from a first particle. In order to calculate the two-particle correlation function exactly, it is necessary to know the three-particle function  $g_3(r_{12}, r_{13}, r_{23})$ . This function is the probability of a third particle being located a distance  $r_{13}$  from the first particle and  $r_{23}$  from the second particle. We obtained  $g_3$  and used it to calculate an improved  $g_2$ . Early results, when compared with published results obtained using different approaches, show improvement in the two-particle correlation function, giving us confidence that our model can be used to understand fluid structure. In the future, we will add features to our model so it can be used to understand the structure of more complex fluids.

---

**ORAL PRESENTATIONS**  
**John Q. Imholte Hall Room #'s: 111, 112, 113, 114**

---

**Presenter:** Alexandra Asche  
**Project Adviser:** Tisha Turk (English)  
**Title: Putting Writing Back in the Writing Process**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #111, 2:50 p.m.

The writing process taught in secondary school classrooms often bears little resemblance to the writing processes identified by scholars in composition studies. Writing in the classroom is typically centered around a linear, three-step process: prewriting, writing, and revising, or in other words, producing an outline, a rough draft, and a final draft. While scholars in composition studies have long argued for conceptualizing the writing process as adaptable, flexible, and recursive, secondary schools and even colleges have been slow to incorporate this theoretical framework into their curricula. The consequences of this rest primarily on the shoulders of students, who are taught to believe that they cannot be inventive with their own writing processes. This undermines their ability not only to write effectively but also to be motivated to spend time with their writing and thus improve their skills with time and practice. To close this gap between theory and practice, I will propose a less rigid approach to the teaching of the writing process, replacing it with a more realistic and versatile model. This model is based on compartmentalizing the various concerns of writers at work (content, organization, diction, etc.) as they move through the various phases of drafting and on encouraging student writers to produce more text at all stages of the writing process. My argument draws not only on research in composition studies but on my own experiences as a student writer and writing consultant, bringing student voices into the conversation surrounding writing pedagogy.

**Presenter:** Nicole Bailey  
**Project Adviser:** Barbara Burke (Communication, Media, and Rhetoric)  
**Title: The Ultimate Midnight Snack: Chocolate**  
**Type of Presentation:** Oral Presentation  
 John Q. Imholte Hall, Room #114, 2:30 p.m.

According to statistics, Americans spent 20.6 billion dollars in 2014 on chocolate. Individual commercials from three brands of chocolate were chosen for analysis: Hershey Kisses, Dove pieces, and Godiva boxes. These were chosen to represent different price points, but surprisingly, they demonstrate different ideologies as well. A set of critical analyses was conducted to determine the relative rhetorical and persuasive power of each commercial. My analysis begins with Bitzer's rhetorical situation that considers the exigence, audience, and constraints. I then use Saussure's theory of semiotics that is the study of signs and symbols, for example clothing and consumption of product. I conclude using Bezanson's domination theory to explore the nature of the ideology supported by each commercial. The combination of methods employed in this rhetorical criticism demonstrates that even when the product remains the same, in this case chocolate, the commercials support quite distinct ideologies.

**Presenter:** Sarah Strenge  
**Co-Presenter(s):** Hunter McFall-Boegeman  
**Project Adviser:** Ted Pappenfus (Chemistry)  
**Title: Synthesis of Organic Materials for Use in Printable Organic Photovoltaics**  
**Type of Presentation:** Poster or Visual Display #7

As the need for alternative energy sources, like solar energy, increases, the industry will require a better way of mass producing solar cells. A simple solution would be to print them like a common poster. A promising and affordable option would be to use organic materials as electronic inks for printing solar cells. However, most organic materials, including macromolecules, have limited solubility. To overcome this, functional groups that make the organic materials more soluble, like tert-butoxycarbonyl, can be added, but they often negatively affect the electronic capabilities of the molecule. The electronic capabilities are useful in the conversion of energy from sunlight to electricity. In our study, we started with 2,5-di(2-thienyl)pyrrole, an organic molecule with good electronic properties but limited solubility, and attempted to synthetically add the thermally-labile and solubilizing group tert-butoxycarbonyl. When applied as ink, this material can be processed into thin films as active layers in solar cells. By simply applying heat, the tert-butoxycaronyl group is removed, leaving behind the initial molecule with its electronic capabilities unchanged. While we successfully synthesized the target molecule, there were problems in removing the tert-butoxycarbonyl group. Our presentation will focus on our synthesis and characterization of this key molecule.

**Presenter:** Ellen Titus  
**Co-Presenters:** Caitlyn Horsch, Drew Larson, and Abby Mallek  
**Project Advisers:** Peter Wyckoff (Biology) and Jon Anderson (Statistics)  
**Title: Pressures on the Prairie-Forest Ecotone of Minnesota**  
**Type of Presentation:** Poster or Visual Display #25

Ecotones are the geographical intersections of biomes and mark the changes in the predominant species and climate of the environment between two separate biomes. Historically, these ecotones were determined by natural forcings such as the climate and species environmental tolerance. Human impacts on the local and global environment have shifted the two Minnesotan ecotones dramatically in the past couple hundred years, and will certainly continue to do so. In this presentation, we focus on the prairie-forest ecotone in western Minnesota and report natural seedling regeneration and invasive earthworm population data from the third year of a five-year seedling transplant study. Data collected this past summer indicate that worm population size and species composition seem to be functions of the size and species of canopy trees. High populations of juvenile *Lumbricus sp.* earthworms were found around Basswood (*Tilia americana*), while Bur Oak (*Quercus macrocarpa*) had large populations of *Octolasion sp.* comparatively. In a separate but related experiment, we found that recruited seedling populations are largely influenced by the surrounding canopy trees, presumably due to limited distribution of seeds. Interestingly, the dominant tree in the Minnesotan prairie-forest ecotone, Bur Oak, seems to be regenerating less successfully than the mid successional trees such as the Basswood, Sugar Maple (*Acer saccharum*), and Ash (*Fraxinus pennsylvanica*) in most of our study plots.

**Presenter:** Michelle King  
**Project Adviser:** Sylke Boyd (Physics)  
**Title: A New Method of Image Analysis for Measurement of Cirroform Clouds**  
**Type of Presentation:** Poster or Visual Display #29

Understanding climate requires study of the radiation balance of the earth. The earth receives energy from the sun as visible light and loses energy as infrared radiation. Our understanding of the effect of clouds and aerosols on the radiation balance carries a large uncertainty due to the difficulty assessing the spatial and temporal coverage and composition, particularly for cirroform clouds. Cirrus clouds are transparent but often lead to optical effects such as halos. An all-sky camera, located at the top of the science building, captures images of the entire sky at 30-second intervals. The objective of this project is to create a Mathematica program that analyzes images from the all-sky camera for halo presence. Images are divided into color channels. The position of the sun is detected. The intensity is measured in circular masks of increasing radii around the sun. The radial fluctuation in brightness is used to detect a halo. This process is repeated for large sets of images from the all-sky camera and creates a record of the frequency and intensity of halos in the image record. This gauges the presence of cirrus clouds. I will present my program and data sets in halos.

**Presenter:** Broc Kokesh  
**Project Adviser:** Heather Waye (Biology)  
**Title: The Effects of Water Quality on the Habitat Use of Tiger Salamanders in Prairie Wetlands**  
**Type of Presentation:** Poster or Visual Display #4

The tiger salamander (*Ambystoma tigrinum*) is a wide-ranging amphibian of North America common to prairie wetlands. Nevertheless, little is actually known about their ecology, including what water quality conditions are desirable and what effects water quality may have on established populations. In this study, I assessed how water quality parameters affect salamander survival and microhabitat use in the prairie pothole region of Western Minnesota. My goal was to assess if differences in water quality between ponds act as potential indicators of microhabitat preferences among salamander populations. I took water quality samples and trapped salamanders from four ponds with differing pH levels. Results suggest that salamanders tend to prefer areas with higher pH levels relative to the rest of a pond. Furthermore, pH increased in shallow regions as the summer progressed, which correlated to higher trapping rates in shallow water. These results can help us understand how natural and human-caused changes in water quality affect wetland communities as a whole and lead to future research in seasonal water quality dynamics.

**Presenter:** Garrison Komaniecki

**Project Adviser:** Nancy Carpenter (Chemistry)

**Title:** Multiple Neuronal Changes Caused by Optogenetic Astrocyte Stimulation

**Type of Presentation:** Poster or Visual Display #14

Deep brain stimulation (DBS) is a powerful clinical technique that has shown to be therapeutically effective in treating many types of pathological brain activity including essential tremor and even depression. Unfortunately, much of the mechanism behind DBS is not well understood. Most of the current research has been focused on the role neurons hold in DBS. However, there is little work that has been done concerning astrocytes—the most numerous cell in the brain—as it is thought that neurons are more influential in the above afflictions. Nonetheless, astrocytes have been shown to play pivotal roles in many functions of the brain. Thus, it is highly beneficial to study their role in DBS. The electrical stimulation generated by DBS activates all cells in the area of stimulation, making it hard to study the role of a single cell type. In order to target just astrocytes, we employed optogenetics. Optogenetics is a technique whereby a cell-type specific virus is used to make target cells light sensitive to a specific wavelength of light. Using optogenetics, we activated astrocytes in mouse brains and studied the resultant activity with fluorescence microscopy which allowed us to look at each cell type individually. We observed multiple changes following stimulation including changes in neuron firing and cell shape. These findings could eventually help explain the mechanism behind DBS leading to more effective treatment.

---

**Presenter:** Maryanna Kroska

**Project Adviser:** Zachary Mensinger (Chemistry)

**Title:** Adsorption of Peptides in Metal-Organic Frameworks: A Focus on Neurodegenerative Proteins

**Type of Presentation:** Poster or Visual Display #9

Metal-organic frameworks (MOFs) are a class of infinite crystalline lattices formed by metal ions bridged by organic linkers. In the past, their porous interiors have been examined for gas separation and storage, catalysis, and more recently, the adsorption of proteins and peptides. The aim of our research was to understand the adsorption behavior of MOFs toward peptides with high propensity for aggregation relative to neurodegenerative diseases. By sequestering peptides within the interiors of the MOFs, peptide conformations could be locked and any additional aggregation halted, providing us with a valuable tool to interrogate their structures. Several MOFs from various literatures were synthesized and examined for their adsorptive properties toward amyloid-beta (1-16) peptide fragments. These fragments were selected due to their behavior to mimic the full-length peptide, as well as for their easy manipulation in lab. By studying the adsorption, we aimed not only to gain insight of the MOFs but also to ultimately understand the structures of these peptides for possible interpretation of mechanisms in neurodegenerative diseases.

**Presenter:** Emma Sax

**Co-Presenters:** Paul Schliep and Aaron Lemmon

**Project Adviser:** Elena Machkasova (Computer Science)

**Title:** Developing Beginner-Friendly Programming Error Messages

**Type of Presentation:** Poster or Visual Display #12

The motivation for our work is to introduce a recently developed programming language, Clojure, in a beginner computer science class at the University of Minnesota, Morris. Clojure is an industry-accepted programming language that provides significant benefits for beginner programmers, such as focus on a functional approach to programming, which in UMM's experience provides a good foundation for subsequent computer science curriculum. Learning Clojure in an introductory class opens opportunities for students to collaborate on numerous worldwide projects, as well as take advantage of improvements in modern computing hardware. However, Clojure is challenging to use because of its complicated handling of programmers' mistakes. Mistakes in computer programming are a natural part of developing software. When a mistake happens, there is a system to notify the programmer of an error. The specific information that the programmer receives, known as an error message, may or may not be helpful in identifying the issue. Clojure error messages are notorious for being confusing to beginners. We are developing a system that intercepts the existing Clojure error messages and automatically rephrases them for beginner programmers. We will conduct usability tests by observing the interactions between beginner programmers and our system, and the feedback we receive will be used to further improve our project. We will also present our new error message handling and discuss testing our system with new programmers.

---

**Presenter:** Isaac Smolund

**Project Adviser:** Kristin Lamberty (Computer Science)

**Title:** Assisting the Development of Emergent Readers through Computational Manipulatives

**Type of Presentation:** Poster or Visual Display #13

The process of learning to read is an extremely important phase in a child's intellectual development, and many different methods exist for facilitating this. "Emergent readers" are at the stage in which they begin to understand how letters combine to form words but still rely upon recognizing specific memorized words, or "sight words," for comprehension. Readers at this level often work with flash cards, word tiles, or other objects to practice their sight words. While these physical manipulatives provide opportunities for individual practice, they require direct support from teachers and parents and don't scale easily to a classroom setting. Our objective is to allow students to creatively engage with sight words beyond what is currently available. To this end, we are creating a mobile application that provides a digital manipulative tool that can give emergent readers an engaging, interactive learning experience with sight words. The focus of this presentation is the design of the software tool we are developing. Our software development process has been guided by theories about how to support and engage learners. Constructionist research suggests that producing an artifact for an audience is one of the best ways to encourage learning. Our software gives readers the ability to write stories by combining sight word tiles in an easy-to-understand fashion. Future work with this software will include studies to understand how our tool compares to using other means for story creation (invented spellings or physical word tiles).

**Presenter:** Rose Peterson  
**Project Adviser:** Siobhan Bremer (Theatre Arts)  
**Title:** *Costume Design for A Midnight Dreary*  
**Type of Presentation:** Poster or Visual Display #20

When designing the costumes for the University of Minnesota, Morris Theatre Discipline's fall production of *A Midnight Dreary* by Scott Dixon, I researched the life of Edgar Allan Poe and the fashions of the first half of the 19th century. My intentions were to make each costume true to the period, while still having them be representative of the individual character, through use of design elements like color and line. For example, John Allan was an uptight, stingy man. I had him in green to represent greed and designed a very stiff looking costume. Most of the characters in this play are actual figures from history, either members of Poe's family or individuals that worked with him in his lifetime. *A Midnight Dreary* is a unique play in that, although it technically takes place in the events leading up to Poe's death in 1849, most of the scenes are flashbacks (in Poe's imagination) from the decades before, which gave me some freedom in the costume design and allowed me to bring many styles from different times onto the stage. For instance, Poe's birth mother, Elizabeth, died in 1811. I was able to put her in a dress inspired by the styles of that time, which was quite different from the costumes of the other women. The director wanted to go with a dark dream-like concept for the play, since it is ultimately made up of Poe's delusions while he is on his deathbed. The subject matter of the play made it easy to take inspiration from Poe's work, which, like his life, was quite dark and tragic.

---

**Presenter:** Rose Peterson  
**Project Adviser:** Jess Larson (Studio Art)  
**Title:** *Woven Test Screens*  
**Type of Presentation:** Poster or Visual Display #21

The work in this series is made up of many woven "televisions" showing static or testing screens, created to match a 3:4 height-width ratio that was the standard before widescreen HD televisions were common. Each "screen" was handwoven separately on a 15-inch rigid heddle loom with acrylic yarn and a crocheted border. A rigid heddle loom only has the ability to make a plain over-under weave. The weight and colors of the yarn were chosen to be the best representation of the image. For this project, I researched weaving techniques and focused on gaining technical knowledge of how different colors and textures interact on the loom as well as exploring the concept of television screens. The way that the two directions of fibers—the warp and weft—are visible makes for a good material representation of the television static, as well as having a nuanced effect on the colored "screens." Since handwoven items have long been replaced by machine-made textiles, it is a very fitting medium to represent the outdated analog television format, which was replaced by digital broadcast in the 2010s.

**Presenter:** Andrew Kroska  
**Project Adviser:** Mary Elizabeth Bezanson (Communication, Media, and Rhetoric)  
**Title:** *Calvin and Hobbes: Public Education through a Child's Eyes*  
**Type of Presentation:** Poster or Visual Display #11

Imagination plays an integral role in the development of a child. With imagination, worlds unknown to adults can be explored and adventures can be had. Children submerged in the public education system learn to lose imagination and instead memorize what is required of them to generate good grades for school assessments. One of the leading researchers on child imagination in the public education system, E. Paul Torrance, has shown in his studies that even though IQ scores rise with every generation, the CQ scores (Creative Quotient) is falling. Bill Watterson used one of the most underappreciated rhetorical mediums, comic strips, to convey his distaste for the system of American education in his famous strip, Calvin and Hobbes. The story arc of the strips examined in this research was written in September of 1990, and it depicts Calvin as his alter ego, Spaceman Spiff, attempting to crash Planets 5 and 6. The strips flash between reality and imagination as Calvin struggles during a math exam. The story arc gives adults a fresh perspective through the eyes of a child on how the education system discourages imagination as a key component of learning. The rhetorical criticism used Bitzer's rhetorical situation, Burke's pentad, and Bang's ten principles to demonstrate that Watterson did indeed create a rhetorical and persuasive message designed to convince adults that children's imaginations, not just rote learning, can be used to learn about the world. Through his strip, Watterson exposes us to a scene that is often overlooked: the mind of a child inside a system that is detrimental to his learning and personal growth into society.

---

**Presenter:** Matthew McDonough  
**Project Advisers:** Siobhan Bremer and Craig Moxon (Theatre Arts)  
**Title:** *Sound Design for A Midnight Dreary*  
**Type of Presentation:** Poster or Visual Display #19

As a sound designer, my goal is to evoke emotion and reaction from the audience during a production. My presentation covers my sound design process for the University of Minnesota, Morris Theatre Discipline's fall production of *A Midnight Dreary*, which is focused around the last days of Edgar Allan Poe's life. The play has only been performed one other time, and like every new production, my sound design is original. The first section of the presentation covers my research and process of finding and selecting music that would evoke the appropriate emotional response. Through profound choices of music and effects, the reaction of an audience can be carefully manipulated. Thus, I wanted the audience of *A Midnight Dreary* to feel Poe's fear, remorse, and despair through the music and sound effects that underscored the play. The second section focuses on the research and editing process that went into finding and selecting sound effects, including effects that needed to be recorded live, pre-recorded effects that needed to be edited, and effects that I needed to engineer. My presentation illustrates the long process of research, analysis, selection, and implementation a sound designer must go through in order to pull the audience into the world of the play.

**Presenter:** Clare Miller  
**Project Adviser:** Gordon McIntosh (Physics)  
**Title: Long-Term Analysis of the Velocity Centroid Data from SiO Maser Emissions**  
**Type of Presentation:** Poster or Visual Display #28

It is difficult for astronomers to gather data about star systems past 16 million light-years from Earth due to the difference in brightness between planets or secondary stars and the main star in the system. Observations of the maser emissions of stars allow astronomers to investigate the existence of satellite planets or stars. Masers are a type of detectable electromagnetic radiation. I have investigated the velocity centroid, or the weighted average of velocity, of the silicon monoxide maser spectra from fourteen stars. The data on these stars were taken at different times and by multiple observatories, in particular the Centro Astronomico de Yebes and the Mopra observatory. Uniquely, my research has combined sets of data from these observatories, making the analysis of velocity centroid data over a longer period possible. Most of the stars showed no obvious trends. VX Sagittarii exhibited a possible periodicity, which could indicate a possible satellite object or variation in the circumstellar environment.

---

**Presenter:** Brad Mondloch  
**Co-Presenters:** Ellie Hoffer, Meagan Rollins, and Michael Maudal  
**Project Adviser:** Rachel Johnson (Biology)  
**Title: Investigating the Influence of CD80/B7-H1 Signaling on Anti-tumor Immune Responses Mediated by CD8+ T Cells**  
**Type of Presentation:** Poster or Visual Display #5

A promising approach for cancer therapy is to harness the power of the immune system to destroy tumor cells. CD8+ T cells, a group of lymphocytes in our immune system, are capable of killing tumor cells throughout the body, but tumor cells employ a wide range of mechanisms to evade CD8+ T cells. One such mechanism is the expression of B7-H1 on the surface of tumor cells. Interactions between B7-H1 tumor proteins and PD-1 proteins on CD8+ T cells are known to result in apoptosis, or programmed cell death in T cells. One way apoptosis is induced through this B7-H1/PD-1 interaction is by inhibiting the activation of an intracellular protein called Akt. By inhibiting Akt activation, Bim, another intracellular protein, is stabilized which normally induces cell death. B7-H1 also interacts with another surface protein on CD8+ T cells called CD80. However, details of this interaction are unclear. Using flow cytometry and western blots, we are currently investigating the signaling events that result from B7-H1/CD80 interactions and how this may lead to apoptotic signals in CD8+ T cells. Our findings will provide insights for the development of more effective immunotherapies for cancer that target B7-H1 signaling on CD8+ T cells.

**Presenter:** Margareta Nivison  
**Project Adviser:** Zachary Mensinger (Chemistry)  
**Title: The Modification of Hydrostability in MOF-5 for Selective Amyloid-Beta Peptide Adsorption Studies**  
**Type of Presentation:** Poster or Visual Display #10

Metal-organic frameworks (MOFs) are an intriguing class of materials that consist of infinite crystalline lattices formed when metal ions are bridged by organic molecule linkers. Their porous, sponge-like interiors have highly variable properties, depending on the metals and linkers used. In the brain, amyloid-beta ( $A\beta$ ) peptides can transform from their normal, healthy form to a sick, misfolded form and can then “infect” other copies of the same peptide, propagating this sick form. These sick forms stick together and build up, resulting in amyloid plaques that are observed in Alzheimer’s patients’ brains. In my research, I have examined ways that we can control this clumping together by adsorbing  $A\beta$  in MOFs. Thus far I have discovered that the metal-organic framework MOF-5 readily adsorbs proteins and peptides, and I have tested its ability to adsorb  $A\beta$ , our peptide of interest. However, MOF-5 deteriorates in water, so I looked at ways to increase its stability, as water is the most relevant solvent for proteins and peptides. When small amounts of different metal ions are added, the main structure of MOF-5 remains the same, but its stability in water increases and its peptide adsorption behavior changes. Through these studies, I seek to determine how these structural differences relate to adsorption of  $A\beta$  and ultimately use MOF-5 derivatives to adsorb peptides and proteins from aqueous solutions.

---

**Presenter:** Corrie Nyquist  
**Project Adviser:** Tracey Anderson (Biology)  
**Title: Evaluating the Role of Crayfish as Vectors of Organic Matter in Prairie Pothole Lakes**  
**Type of Presentation:** Poster or Visual Display #6

The breakdown of coarse particulate organic matter originating from plants and other organisms in the area near a shore, known as the littoral zone, makes up an essential part of aquatic food webs. This breakdown provides bottom dwelling or benthic organisms with food that they would not be able to obtain otherwise. The literature surrounding crayfish indicate that they facilitate the transfer and breakdown of littoral organic matter, yet it is not clear to what extent they are involved in this process. For my research, I hypothesized that crayfish could potentially be moving large amounts of organic material away from the littoral zone and making it available for benthic organisms in the form of feces. In order to investigate this process, I am studying the gut content from the native crayfish, *Orconectes virilis*, in Cottonwood Lake, a prairie pothole lake in Grant County, Minnesota. The gut content from these crayfish reveals that they are, in general, omnivorous animals, feeding on both plant and animal material. Quantifying the amount of each type of material found in their stomachs promises to clarify the extent to which they are vectors of littoral organic matter. Results from this research imply that crayfish play a significant role in making food from the near shore environment available for benthic organisms that occur in deeper waters away from the shore.