Foreward from Dean Joe Dieker

The following pages present the schedule for the 19th annual Student Symposium at Cornell College, along with the abstracts of the oral, performance, and poster presentations to be featured on this day. The Student Symposium serves as a venue for some of our most engaged and accomplished students to share their work with the broader campus community and others. It demonstrates the remarkable range of interests pursued in and beyond the classroom at Cornell. This year features 108 students, working with 38 faculty members across 23 different departments and programs. There will be 34 oral presentations, 2 performances, and 33 poster presentations. Each of these is listed on the detailed schedule on the following pages.

The organization of the Student Symposium celebrates the liberal arts. At Cornell College, students draw meaning and gain a richer sense of knowledge through the connections made across disciplines and subjects. Sociology is paired with English. Psychology presents with the Classics. Biology is paired with Theatre. The Student Symposium committee worked throughout the opening months of 2015 to connect presentations in meaningful ways. If at first a session seems disjointed, take time and listen. Let the students of Cornell College stimulate the intellectual curiosity within each audience.

This year's symposium was coordinated by the Center for Teaching & Learning and the faculty of the Student Symposium committee: Carol Lacy-Salazar (Spanish), Aparna Thomas (Gender, Sexuality, and Women's Studies and Politics), and Emily Walsh (Geology). The logistics and technical aspects of the symposium were handled by Brooke Bergantzel, Greg Cotton, Shawn Doyle, Laura Farmer, Amy Gullen, Jessica Johanningmeier, Jennifer Rouse, Kristin Reimann, Paul Waelchli, Meghan Yamanishi, and Matt Zhorne. I offer my heartfelt thanks to them, and to the faculty members serving as session moderators, for their contributions to this project.

I invite you to participate in what promises to be a thought-provoking, exhilarating, and reflective day in our intellectual, creative, and community life.

R. Joseph Dieker, Dean of the College

SCHEDULE

Session I
9:00 - 10:15

DURHAM:
Parameters for Understanding Change in the Natural World

HALL-PERRINE EAST:
Challenges of International Intervention

HEDGES:
Reinventing the World Through Art

MLK:
Personal Narratives and Medicine

RUSSELL:
Addressing Social Issues through Creative Expression

B R E A K

DURHAM:
Earth History Revealed Through the Rock Record

HALL-PERRINE EAST:
Power, Politics, and Pay

HEDGES:
Cultural Ideals of Citizenship

MLK:
Impact of the Subconscious

RUSSELL:
Gender and Racial Identity: The Struggle for Empowerment

Session II
10:45 - 12:00

OVERVIEW

THE ORANGE CARPET:
Morning Posters

Session III
1:30 - 2:30

10:00 - 11:30
Poster
Sessions
1:00 - 2:30

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DURHAM:
PTSD Through Different Lenses

HALL-PERRINE EAST:
Data Analysis in Popular Culture

HEDGES:
Literature and Social-Political Change
(en Español)

RUSSELL:
Regional and International
Conservation Efforts

THE ORANGE CARPET:
Afternoon Posters

Oral Symposium Sessions

Morning Session One 9am - 10:15am

Parameters for Understanding Change in the Natural World

Durham Room | Moderated by Kara Beauchamp

- ☐ **Evolution Towards Larger Body Size and Hypercarnivory in *Hesperocyon* of the White River Group Over the Eocene-Oligocene Boundary**
  Geology
  Author: Scott Kottkamp
  Sponsor: John Orcutt

- ☐ **Testing the Accuracy of C.L.A.M.P. by Comparing it to the Paleosol Record**
  Geology
  Author: CJ Frazer
  Sponsor: John Orcutt

- ☐ **Peatland Carbon Cycle: Microbial Respiration in Response to Low Molecular Weight Carbon Compounds**
  Environmental Studies
  Authors: Kelsey King, Dr. Ashley Keiser & Dr. Kirsten Hofmockel
  Sponsor: Craig Teague

Challenges of International Intervention

Hall-Perrine East Room | Moderated by Devan Baty

- ☐ **National Security in Jordan and the Middle East**
  Arabic and International Relations
  Author: Erinn Voas
  Sponsor: Lynne Ikach

- ☐ **Repercussions of Failed Nation-Building: Operation Iraqi Freedom and the Development of the Islamic State**
  International Relations
  Author: Amir El-Aswad
  Sponsor: Aparna Thomas

- ☐ **Tibet: Genocide and the International Community**
  Political Science
  Author: Rebekah Kurtz
  Sponsor: David Yamanishi

Reinventing the World Through Art

Hedges Conference Room | Moderated by Greg Cotton

- ☐ **The Sorcerer Bemused: Magic and Melancholy in Salvator Rosa's *Democritus in Meditation***
  Art & Art History
  Author: Jon David Stroud
  Sponsor: Christina Penn-Goetsch

OVERVIEW
Oral Symposium Sessions

Morning Session One 9am - 10:15am

Unconventional Materials: Exploring Electronic Music Through "The Ra Expeditions" ☐
Music
Author: Stephen Smith
Sponsor: Aaron Perrine

Redefining Art History: Making 3D Digital Models of Ancient Tombs from Mexico ☐
Art & Art History
Authors: Ve'Amber Miller & Catherine Quinn
Sponsor: Ellen Hoobler

Personal Narratives and Medicine
Martin Luther King, Jr Room | Moderated by Julie Barnes

What Do You Do When Life Gives You Lemons? ☐
Academic Support
Author: Aubrey Kohl
Sponsors: Ian Ely-Cate & Craig Tepper

The Art of Medicine: Taking the Vitals Through Performance Based Research ☐
Theatre
Author: Lydia Meece
Sponsor: Janeve West

Physician Writers of Russian: Anton Chekhov and Mikhail Bulgakov ☐
Russian Studies
Author: George Callaway
Sponsor: Lynne Ikach

Addressing Social Issues Through Creative Expression
Russell Room| Moderated by Dr. Aparna Thomas

African American Vernacular English: Identity and Tradition through Language ☐
English & Creative Writing
Author: Rachel Foster
Sponsor: Shannon Reed

Staging Terror: Directing *Boy Gets Girl* ☐
Theatre
Author: Sara Cooper
Sponsor: Janeve West

Beyoncé: Pop Sensation or Feminist Icon? ☐
Sociology
Authors: Vanessa Iraheta & Brenna Glaeser
Sponsor: Tori Barnes-Brus

Oral Symposium Sessions

Morning Session Two 10:45am - Noon

Earth History Revealed Through the Rock Record

Durham Room | Moderated by Emily Walsh

☐ **What Can Isotopes Reveal to Us About Iberian Climate in the Past?**
Geology
Author: Setsen Altan-Ochir
Sponsor: Rhawn Denniston

☐ **The Understanding of Ultrahigh-Pressure Eclogites in Tso Morari through the Study of Major and Trace Elements**
Geology
Author: Nicole Ahline
Sponsor: Emily Walsh

Power, Politics, and Pay

Hall Perrine-East Room | Moderated by Ross Sowell

☐ **The Sex of the Immediate Supervisor and the Gender Pay Gap**
Economics & Business
Author: Trang Hoang
Sponsors: Jerome Savitsky & Todd Knoop

☐ **Message Bias: Campaign Strategy as Seen through TV, Mail, and Electronic Communications**
Political Science
Author: Nicholas Marn
Sponsor: Hans Hassell

Cultural Ideals of Citizenship

Hedges Conference Room | Moderated by Shannon Reed

☐ **Ascanius: The Backbone of the *Aeniad***
Classical Studies
Author: Morgan Hoffman
Sponsor: John Gruber-Miller

☐ **Teomama: Merchant as the Bearer of Aztec Society**
Art & Art History
Author: Brenda Mejia
Sponsor: Ellen Hoobler

☐ **Trobairitzes and Troubadours: Poetic Innovation in the Countess de Dia's 'A Chantar'**
Music
Author: Eleanor Backman
Sponsor: Jama Stilwell

OVERVIEW
Oral Symposium Sessions

Morning Session Two 10:45am - Noon

Impact of the Subconscious

Martin Luther King, Jr Room | Moderated by Carol Lacy-Salazar

Evaluative Conditioning: Is it Possible without Awareness? ☐
Psychology
Author: Marco Renzi
Sponsor: Suzette Astley

Decreased R Wave Amplitude across Experimental Paradigms in Women with Bulimia Nervosa and Women with Subclinical Binge/Purge Symptoms versus Asymptomatic Women ☐
Psychology
Authors: Kristen Fernandez-Kong, Tyler Thorne, Mary Willis, Shuhan Reyes, Jessie Lingbert, Ruby Linkhart, & Molly Johnson
Sponsor: Melinda Green

Gender and Racial Identity: The Struggle for Empowerment

Russell Room | Moderated by Lynne Ikach

Let's Talk About Sex ☐
Sociology
Authors: Allison Bauman & Rose Reed-Maxfield
Sponsor: Tori Barnes-Brus

Women's Empowerment and Health Poverty: The Effects of Women's Self-Help Groups in Himachal Pradesh ☐
Political Science
Author: Rebekah Kurtz
Sponsor: Aparna Thomas

Saving Justice in Population Control ☐
Sociology
Author: April Richards
Sponsor: Tori Barnes-Brus

Oral Symposium Sessions

Afternoon Session 1:30pm - 2:30pm

PTSD Through Different Lenses

Durham Room | Moderated by Melinda Green

- ☐ **The Never Ending Battle: Odysseus and PTSD**
  Classical Studies
  Author: Janessa Weightman
  Sponsor: John Gruber-Miller

- ☐ **Psychological Implications on Child Survivors of the Rwandan Genocide with Regards to Mental Health**
  Psychology
  Author: Shivani Suresh
  Sponsor: Carol Z. Enns

Data Analysis in Popular Culture

Hall Perrine-East Room | Moderated by Tony deLaubenfels

- ☐ **Making the Extra-point Plays Fair**
  Mathematics & Statistics
  Authors: Mason Chow, Thao Nguyen, & Dillon Pape
  Sponsor: Tyler Skorczewski

- ☐ **Topic Mapping: Finding Themes and Threads in Ferguson Tweets**
  Computer Science and Statistics
  Authors: Tanner Stirrat & Thao Nguyen
  Sponsors: Ross Sowell & Ann Cannon

OVERVIEW

Oral Symposium Sessions

Afternoon Session 1:30pm - 2:30pm

Literature and Social-Political Change

en Español

Hedges Conference Room | Moderated by Marcela Ochoa-Shivapour

Pablo Neruda: Poetry and Politic ☐
Spanish
Author: Annie Broutman
Sponsor: Marcela Ochoa-Shivapour

Desesperanza en las minas: El naturalismo de Baldomero Lillo en los cuentos de Subterra (Hopelessness in the mines: Naturalism as a literary style in the stories of "Subterra" by Baldomero Lillo) ☐
Spanish
Author: Ariadne Penalva
Sponsor: Marcela Ochoa-Shivapour

A Precise History of Anti-negritude: the Dominican Republic ☐
Spanish
Author: Vashti Blackmon
Sponsor: Marcela Ochoa-Shivapour

Regional and International Conservation Efforts

Russell Room | Moderated by Paul Waelchli

Exploring Conservation Systems in Madagascar ☐
Environmental Studies
Author: Elijah Schumacher
Sponsor: Tammy Mildenstein

Lead Poisoning in the Bald Eagles of Iowa ☐
Environmental Studies
Author: Kerry Flynn
Sponsor: Andy McCollum

Poster Symposium Sessions

Morning Session 10:00am - 11:30am

1a Unknown Feeling Handy? An Examination of Handedness Based Upon Lithic Analysis in Relation to Site 13ML139
Classical Studies
Author: Zach Altman
Sponsor: John Gruber-Miller

2a Microsatellite Analysis of Parentage in the Western Burrowing Owl
Biology
Author: Jarod Armenta
Sponsor: Marty Condon

3a Systematic Characterization of Resveratrol in Planar Lipid Bilayers by Single-Molecule Studies
Chemistry
Authors: Maddie Ball & Sydney Strunk
Sponsor: Jai Shanata

4a Special Relativity and Muons
Physics
Authors: Lawrence Dennis
Sponsor: Derin Sherman

5a Permanent Instability: An Evaluation of the Foster Care System in Relation to Outcomes for Orphanage Alumni
Sociology
Author: Stacey Harrison
Sponsor: Erin Davis

6a The Visitor Effect as it Applies to Humboldt Penguins (*Spheniscus humboldti*) at the Oregon Zoo
Environmental Studies and Biology
Author: Caitlin Huff
Sponsor: Marty Condon

7a Inadvertent Plagiarism and Interpersonal Relationships
Psychology
Author: Elizabeth Jerkins
Sponsor: Suzette Astley

8a Development of Antioxidant Peptides as a Treatment for Pulmonary Hypertension
Chemistry
Author: Thao Luu, Juan M. Martinez, Ji Hye Chun, Leah Villegas, & MyPhuong Le
Sponsor: Cynthia Strong

9a Using Program MARK and a Modified Minimum Number Alive to Estimate Survival, Capture Probabilities, and Population Trends in Two Subpopulations of Ornate Box Turtles (*Terrapene ornata ornata*) in Eastern Iowa
Chemistry
Authors: Nikita Martinson, Emma Narotzky, Dr. S. Andrew McCollum, & Dr. Neil P. Bernstein
Sponsor: Andy McCollum

OVERVIEW
Poster Symposium Sessions

Morning Session 10:00am - 11:30am

Rediscovery and Lithic Analysis of Rummells-Maske Site 13CD15 **10a**
Geology
Author: Natalie Nish
Sponsor: Rhawn Denniston

The Elusive Doubling Time **11a**
Biology and Chemistry
Author: Allen Norton
Sponsor: Jeff Cardon

Identification of Novel Interacting Partners of Tumor Suppressing Kinase LATS1 **12a**
Biochemistry & Molecular Biology
Author: Ariadne Penalva
Sponsor: Craig Tepper

Service Learning: Guatemala's Politics, Poverty, and Perseverance **13a**
Civic Engagement
Authors: Benjamin Rosen, Halee Schomburg, Caryn Shebowich, Arturo Castillo, Nolan Schillerstrom, Emma Kaboli, Justin Pruitt, Angelica Hall, Anne Weitekamp, Eleanor Cotton, Gabe Flippo, Kaitlynn Long, Katie Brogan, Thao Luu, Michael Johnson, & David Burgess
Sponsor: Carol Lacy-Salazar

The Analysis of Ceramics from Site 13ML168 **14a**
Classical Studies
Author: Victoria Rothe
Sponsor: John Gruber-Miller

Types of Pathology in Megalodon Shark Teeth and the Implications for Feeding Habits and Health **15a**
Geology
Author: Ryan Shanks
Sponsor: John Orcutt

Evaluating Neuronal Survival by Nuclear Morphology and Luciferase Assays **16a**
Biochemistry & Molecular Biology
Authors: Jihang Wang, Ronald Merrill, & Stefan Strack
Sponsor: Barbara Christie-Pope

Grazers vs. Browsers: A Study of Diet Among the Horses at Ashfall Fossil Beds, Nebraska **17a**
Geology
Author: NicoleWerling
Sponsor: John Orcutt

Poster Symposium Sessions

Afternoon Session 1:00pm - 2:30pm

1b **The Factors that Increase the Risk of ACL Injuries in Females**
Kinesiology
Author: Kelsey Boss
Sponsor: Kristin Meyer

2b **Testing Bergmann's Rule on North American *Hyaenodon* Throughout the Eocene and Oligiocene**
Geology
Author: Jake Butts
Sponsor: John Orcutt

3b **Morphological Variations within Subspecies of *Strauzia longipennis* in Iowa**
Biology
Authors: Maren Elnes, Kristen Fernandez-Kong, Halee Schomberg, & Alex Young
Sponsor: Marty Condon

4b **The Distribution, Identification and Rock-Ice Dynamics of Permafrost Melting on Alpine Mountains**
Geology
Authors: CJ Frazer
Sponsor: Emily Walsh

5b **Homebirth Midwifery: An Empowering Alternative to Medicalized Childbirth**
Gender, Sexuality, & Women's Studies
Author: Brenna Glaeser
Sponsor: Tori Barnes-Brus

6b **A New Way to Measure Competitive Balance across the NFL, MLB, and the NBA**
Mathematics & Statistics
Authors: Jacob Lehman, Jordan Wolfe, & Brian Cristion
Sponsor: Tyler Skorczewski

7b **Paleomonsoon Implications of Carbon Isotopic Variability in Late Holocene Aragonite Stalagmites from the Central Australian Tropics**
Geology
Author: Stephanie Lucker
Sponsor: Rhawn Denniston

8b **Finding an Edge for Female Collegiate Athletes: a Paleo or a Gluten-Free Diet?**
Kinesiology
Author: Rikki Mulloy
Sponsor: Kristin Meyer

OVERVIEW
Poster Symposium Sessions

Afternoon Session 1:00pm - 2:30pm

Effect of Leucine Supplementation in a Reduced Protein and Energy Diet on Skeletal Protein Synthesis in Neonatal Pigs **9b**
Biology
Authors: Nguyet Minh Hoang, Rodrigo Manjarín, Daniel A. Columbus, Marta L. Fiorotto, Agus Suryawan, Adriana D. Hernandez-García, Hanh V. Nguyen, Rosemarie Almonaci, & Teresa A. Davis
Sponsor: Barbara Christie-Pope

Exploration of Dye-Derived Organic Compounds and Co-Crystal Formation in the Solid State **10b**
Chemistry
Author: Justin Pruitt
Sponsor: Charles Liberko

Millennial Scale Climate Variability of the Last Glacial Period from Blanchard Springs Cavern, Arkansas **11b**
Geology
Author: Veronika Reidel
Sponsor: Rhawn Denniston

An Examination of the Millepore-Symbiodinium Relationship using Quantitative Polymerase Chain Reaction (qPCR) **12b**
Biology
Authors: Shuhan Reyes & Megan Rueth
Sponsor: Craig Tepper

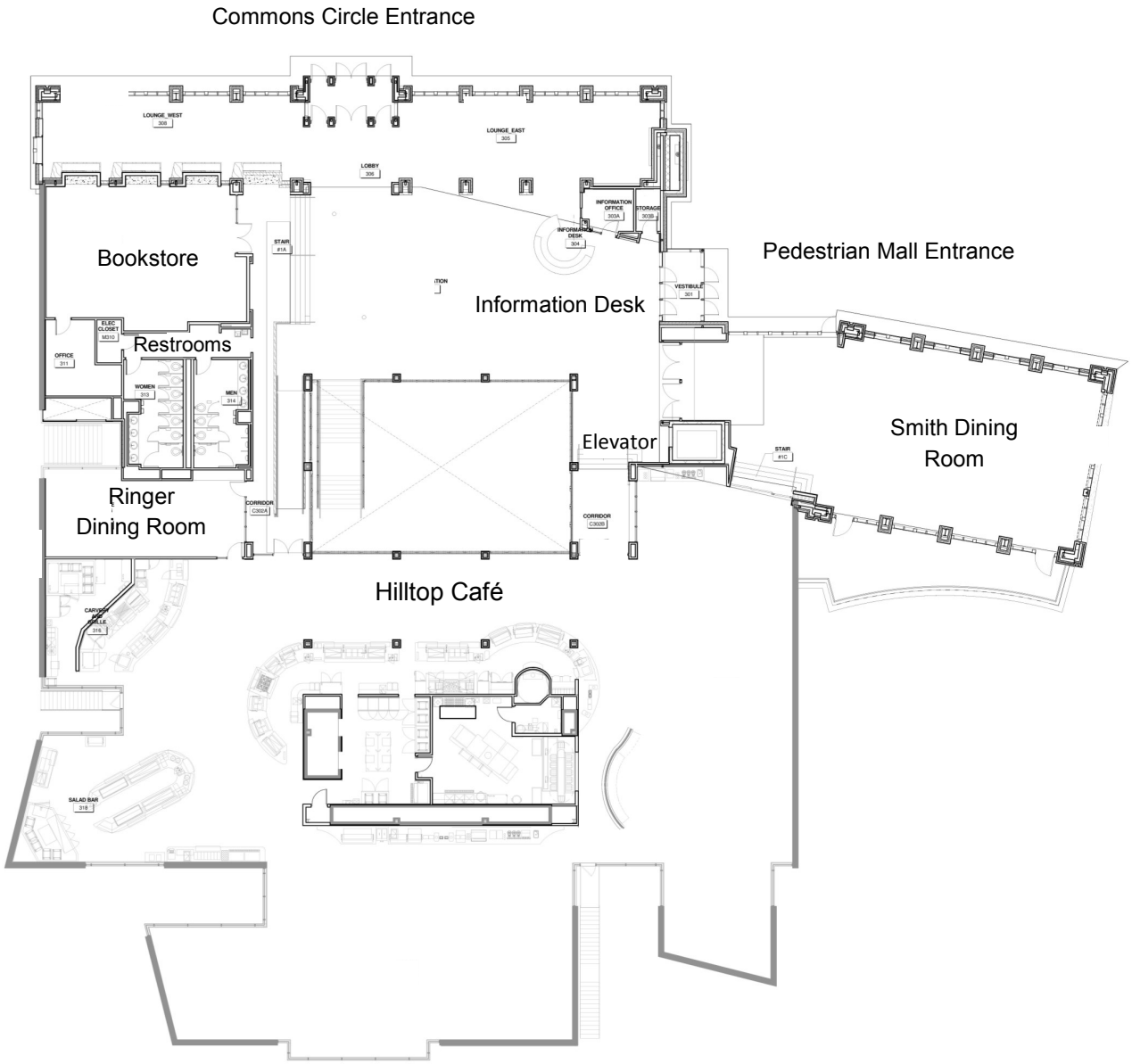
A More Environmentally Friendly Photochromic Compound Procedure **13b**
Chemistry
Author: Jesse Sackett
Sponsor: Charles Liberko

Investigation of CO2 Capture and Separation in Room-temperature Ionic Liquid **14b**
Chemistry
Authors: Jihang Wang, Shannon Mahurin, Chi-Linh Do-Thanh, De-en Jiang, Kimberly Nelson, & Sheng Dai
Sponsor: Craig Teague

Coral Mortality Recorded in Bahamian Reef Sediments **15b**
Geology
Author: Emmet Wilder
Sponsor: Ben Greenstein

A Modified Continuous Flow Multi-step Syntheses of MOED and Its Derivatives **16b**
Chemistry
Author: Tianzi Zhang
Sponsor: Charles Liberko

Thomas Commons
Upper Level

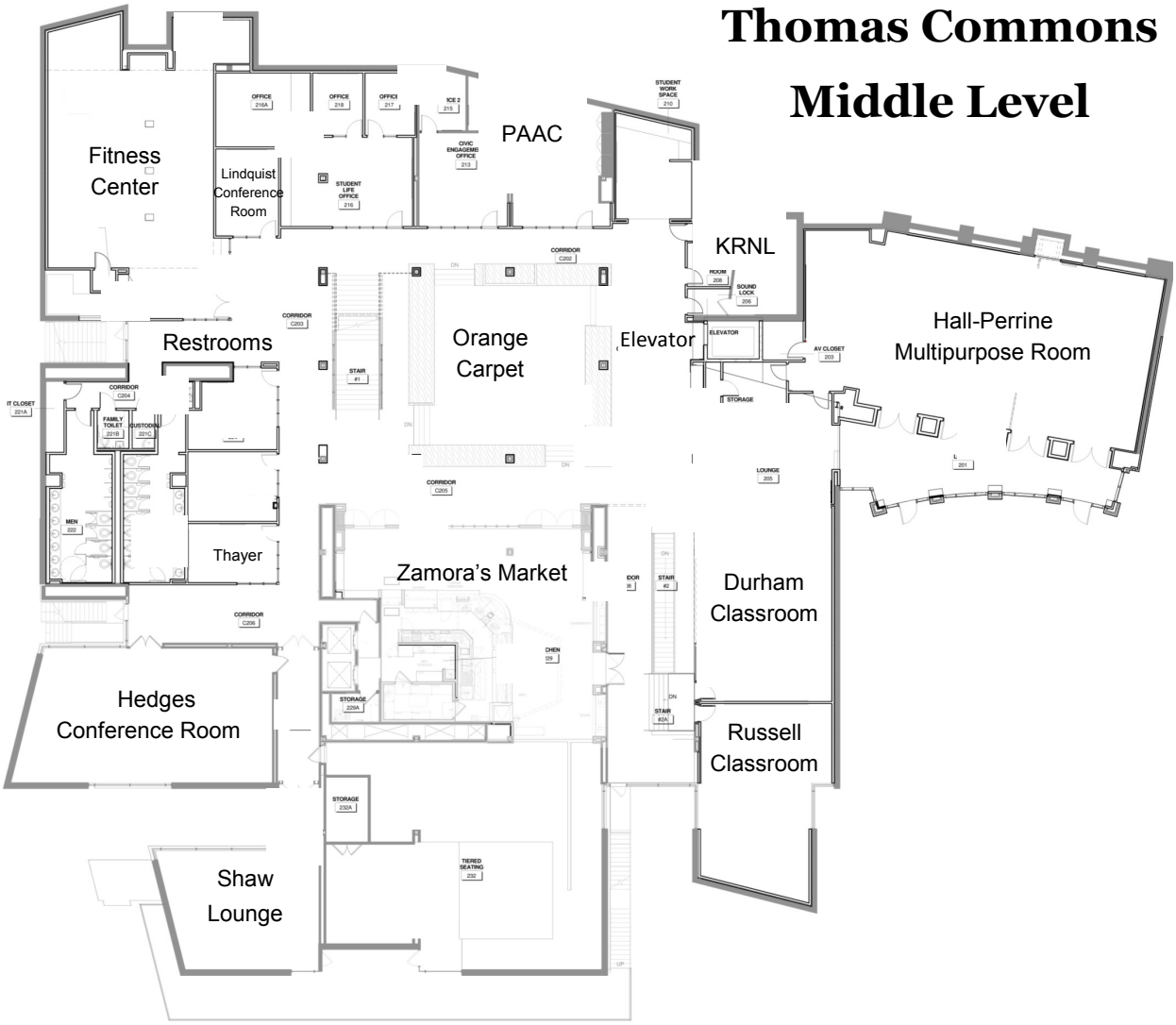


Cornell College
EDUCIMUS

SYMPOSIUM

The Thomas Commons

Thomas Commons Middle Level



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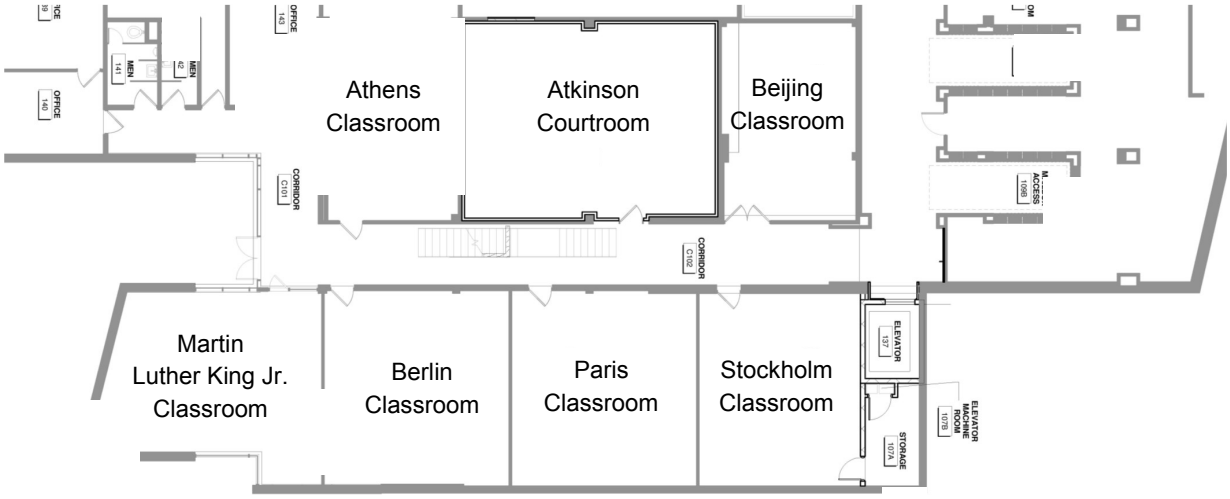

ABSTRACTS

Nicole Ahline, '15
Geology

Lemont, IL
Sponsor: Emily Walsh

The understanding of ultrahigh-pressure (UHP) eclogites in Tso Morari through the study of major and trace elements

When the Indian and Asian plates collided to form the Himalayas starting 45 million years ago (mya), sheets of rock were thrust up and exposed at the surface. These sheets, known as nappes, provide windows into the formation of the mountain building event. In the northern Indian Himalayas lies the Tso Morrari nappe. This area has linear intrusions of magma from the Ordovician Period (~450 Mya) that were metamorphosed into eclogites, rocks formed at extremely high pressures and temperatures. In this study, we used an electron microprobe and a scanning electron microscope to analyze the trace element chemistry of the eclogites. These chemical data were used to reconstruct the pressure and temperature paths of formation of the Tso Morrari eclogites. These data support the idea that the eclogites form at anomalously high pressure (called ultra high pressure) areas within the mountain belt, suggesting that these rocks were exhumed from deep within the Himalayas.

Setsen Altan-Ochir, '15
Geology

Ulaanbaatar, Mongolia
Sponsor: Rhawn Denniston

What Can Isotopes Reveal to Us About Iberian Climate in the Past?

Marking the southwestern coast of Europe, the Iberian Peninsula (IP) is a hotspot for studying transitions of climatic signals from high-to-mid latitudes, because it is a sensitive region to abrupt climatic variations. There are numerous paleoclimate studies on marine cores from the Iberian Margin that reveal synchronous changes in SST inferred from isotopic ratios (O18/O16) of foraminifer shells and terrestrial plant species from pollen records deposited from land. However, lack of data from terrestrial proxies is necessitates investigation of local responses to climate forcing, which may show different patterns.

In this study, we analyzed stalagmites from Rabbit Farm cave in the western coast of Portugal to extend previous study conducted on stalagmites from the nearby Glory Hole and Almanda caves that dated back to 132000 years ago, and to get a more complete picture of climatic changes in this area. We determined the ratios of oxygen (O18/O16) and carbon (C13/C12) isotopes in the stalagmite calcite ($CaCO_3$), because they reflect local or regional climatic changes. With the dates obtained by U-Th dating to get the chronologies of the stalagmites, we developed age models to construct isotopic profiles of the stalagmites through time. The stalagmites from Rabbit Farm cave were found to respond to regional and local variables. While they stopped growing during major Heinrich events, there is no sign of deglaciation around 178,000 years ago that are present in Greenland records, alluding to dominance of local factors.

Zach Altman, '15
Classics

New Port Richey, FL
Sponsor: John Gruber-Miller

Unknown Feeling Handy? An Examination of Handedness Based Upon Lithic Analysis in Relation to Site 13ML139

In the past there have been attempts to examine handedness in prehistoric populations through the analysis of lithic cores and the flakes associated with them. However, these attempts all deal with flakes of a certain type and only reveal information about the creators of flakes. This poster presents a possible method of determining handedness based upon the location of scarring and polish on flakes used for cutting bone, meat, hide, and wood, which would provide information about the handedness of those using a flake rather than those making the flakes. This method is then applied to artifacts excavated at an earthen lodge in Mills County, Iowa (site 13ML139) to demonstrate possible applications as well as the ease with which it could be used.

Jarod Armenta, '15
Biology

Homedale, ID
Sponsor: Marty Condon

Microsatellite Analysis of Parentage in the Western Burrowing Owl

Social monogamy is a common reproductive strategy in birds and is present in Western Burrowing Owls. However, differences between behaviorally observed and genetically determined parent-offspring relationships are noted in many socially monogamous species. Genetic mismatches between nestlings and caregivers arise in at least two ways: extra-pair fertilization (EPF) and conspecific brood parasitism (CBP). CBP is expected to occur in species nesting in high density, where nesting sites are limited, and host nests are available for extended periods of time. Indeed, Burrowing Owls fit these criteria. Previous studies of parentage (e.g., Johnson 1997) in a declining California population of Burrowing Owls report that EPF resulted in 5-10% of offspring and that CBP possibly occurred as well. We aimed to determine parentage patterns in a Burrowing Owl population of southern Idaho and to compare our results with Johnson's (1997). We isolated DNA from blood and used microsatellite regions to detect genetic mismatches between nestlings and their caregivers. Our poster reports initial results and discusses ecological correlates of EPC and CBP in southern Idaho Burrowing Owls.

Eleanor Backman, ’16 **Burnsville, MN**
Music *Sponsor: Jama Stillwell*

Trobairitzes and Troubadours: Poetic Innovation in the Countess de Dia’s ‘A Chantar’

The 12th-century Occitan troubadour culture produced hundreds of songs – a lyric and musical legacy illustrating a world of chivalry, courtly love, knights, and ladies. Though the artists of this culture were mostly male, a healthy number of female “trobairitzes” contributed as well. Disappointingly, however, only one trobairitz song remains fully intact with text and melody – “A chantar” by the Countess of Dia. This singularity has certainly interested historians. Yet some scholars have gone further still in their assessment of the uniqueness of “A chantar,” claiming that it is set apart by its unusual poetic meter and textual organization, along with its subject matter, a direct critique of the ideals of courtly love at the heart of the male troubadours’ works. I argue, however, that while the piece is indeed unconventional, it is not unique for these particular reasons; as I will show, there are other trobairitz pieces that fit this description. Instead, it is unique because of how the Countess de Dia seems to have utilized a unique kind of text painting, evoking her raw, deeply personal subject matter via the jarring, seemingly asymmetrical poetic structure.

Maddie Ball, ’16 **Dallas, TX**
Sydney Strunk, ’17 **Ottumwa, IA**
Chemistry *Sponsor: Jai Shanata*

Systematic Characterization of Resveratrol in Planar Lipid Bilayers by Single-Molecule Studies

Resveratrol, a naturally occurring polyphenol found in red wine, has the ability to embed within cell membranes, potentially altering the bilayer’s physical properties, and is hypothesized to have life-extending capabilities. The experiments in this research apply electrophysiology to determine the impact of resveratrol on lipid bilayer physical properties, in particular by using incorporated gramicidin A lifetime durations as a readout. Gramicidin lifetimes were measured in the presence and absence of resveratrol at 10 nM. Resveratrol’s effect on cell membrane properties may indicate the mechanism behind its purported life-extending properties.

Allison Bauman, '15 **Brooklyn, IA**
Rose Reed-Maxfield, '15 **Decorah, IA**
Sociology *Sponsor: Tori Barnes-Brus*

Let's Talk About Sex (PSA Video)

Sex is something that our society is simultaneously obsessed with and embarrassed to openly talk about. One area in which this juxtaposition is particularly prevalent is in the way sexual education is taught in public schools. The Title V State Abstinence Education Grant exclusively provides funding for abstinence only education and prohibits teaching about safe sex. Numerous studies have been conducted showing that abstinence-only education is ineffective. Research from the Guttmacher institute indicates that the U.S. has one of the highest rates of teen pregnancy in the developed world. U.S. teenagers have similar levels of sexual activity as teenagers from other developed countries, but are less likely to use contraceptives. Findings suggest that while abstinence-only education does not prevent teens from having sex, it does prevent them from practicing safe sex.

United States policy makers have a growing awareness of the ineffectiveness of abstinence-only education and have made policies that include a more comprehensive sex education. The Personal Responsibility Education Program (PREP), implemented by the U.S. government in 2010, supports scientifically accurate sex education programs that teach abstinence in addition to safe sex. PREP encourages programs to be inclusive of lesbian, gay, bisexual, transgender and questioning youth rather than focusing exclusively on heterosexual sex. Currently, federal funding is available for both Title V abstinence only and PREP-funded sexual education programs. As of October 2014, 32 states still received Title V funding. In order to bring about change and encourage comprehensive sex education in all states, it is important to show support for PREP-funded sex education rather than Title V, and promote open and honest conversations about the importance of safe sex.

Vashti Blackmon, '15 **Cincinnati, OH**
Spanish *Sponsor: Marcela Ochoa-Shivapour*

A Precise History of Anti-negritude: the Dominican Republic

This oral presentation will examine the origins of racism in the Dominican Republic from past to present through a historical lens. Using this history, along with modern race relations in the DR, this presentation will give light to the larger issues at play concerning racial identity and racism in the Dominican Republic today.

Kelsey Boss '15 **Deltona, FL**
Kinesiology *Sponsor: Kristin Meyer*

The Factors that Increase the Risk of ACL Injuries in Females

The anterior cruciate ligament (ACL) is important in providing stability in the knee joint. In the United States there are anywhere from 100,000 to 300,000 ACL injuries each year. Females are two to ten times more likely than males to sustain a ligament injury of the knee. In females there is higher proportion of noncontact ACL injury, meaning the injury occurs without contact being made at the knee or the body. The purpose of this literature review was to determine what factors have the greatest effect on the higher incidence of ACL injuries in females; with a focus on neuromuscular control, quadriceps recruitment, and hormone association. When a female had some background in neuromuscular training there was a decrease in risk for ACL injury, compared to a female athlete with no neuromuscular training. It was found that females had greater quadriceps to hamstring contraction compared to males, which increased their risk of ACL injury. This was due to a lack of trunk control, which inevitably led to knee instability; leading to injury of the knee ligaments. It was also found that there was an association between a female athlete's menstrual cycle, and the athlete's injury. This association was found with an increased injury rate during the female's ovulatory phase of the menstruation process. All three of the factors stated above seemed to increase the risk for female ACL injury. These findings can help direct prevention strategies for female athletes, so that they can decrease their risk for noncontact ACL injuries.

Annie Broutman, '16 **Highland Park, IL**
Spanish *Sponsor: Marcela Ochoa-Shivapour*

Pablo Neruda: Poetry and Politic

Art, whether it be paintings, film, or even poetry, can serve as a crucial form of propaganda, swaying public opinion. In the novel *El cartero de Neruda* by Antonio Skármeta, Chilean poet Pablo Neruda, aside from his literary accomplishments, establishes a reputation in politics. The communist writer held a variety of political positions and late in his career began incorporating his ideology into his poems. The story takes place during the election of Salvador Allende during the 1970s, during which Neruda worked for his political campaign. Here, Skármeta presents both lives of the poet, arguing that in spite of Neruda's beliefs, the fame brought to him by his art has distanced him too much from the proletariat class, making him a poor representative of communist Chile. I will be examining essential moments in Skármeta's piece to analyze how the two lives of Neruda create a dualistic image of the character.

Jake Butts, '15 **Watertown, WI**
Geology *Sponsor: John Orcutt*

Testing Bergmann's Rule on North American *Hyaenodon* Throughout the Eocene and Oligiocene

In this study, I conducted research on the cause and effect relationship between *Hyaenodon*'s body size and the fluctuating climate throughout the Eocene and Oligocene. *Hyaenodon* is an extinct genus of mammals that belonged to a group of carnivorous creodonts called *Hyaenodon*tidae. My focus will be the study of *Hyaenodon*'s teeth, a proxy for body size in mammals. *Hyaenodon* was a fierce predator due to its extremely powerful jaws. Furthermore, *Hyaenodon*'s teeth were specially adapted for slicing through meat, making food digestion more efficient. All of the *Hyaenodon* fossil collections material I measured was stored in the Field Museum of Natural History in Chicago.

I will be testing the theory of Bergmann's Rule on *Hyaenodon* dental data. Bergmann's Rule states that during periods of changing temperatures, the result of that change will be an alteration in the size of an animal, reflecting the warmer or cooler temperatures. What his theory illustrates is that during warmer periods, we expect to see smaller-bodied animals because they have an easier time releasing heat in hot temperatures. For cooler temperatures, we expect to find larger-bodied animals because it is easier for them to store heat to adapt for colder temperatures. Approaching the Eocene and Oligocene boundary, we saw a sharp rise in temperature called the Eocene Thermal Maximum, about 50 million years ago. Across the boundary, there was a fast drop in temperature. This provides a perfect change in climate for Bergmann's Rule to be tested. I expect to find that *Hyaenodon* increased in body size over the Eocene and Oligocene boundary, due to the decreasing temperature.

I tested the relationship of body size in *Hyaenodon* and changing climates across the Eocene and Oligocene boundary, and found positive results supporting Bergmann's Rule. In the warmer climates of the Eocene, I found there were smaller-bodied *Hyaenodon* than during the cooler climate of the Oligocene.

George Callaway, '15 **Portland, OR**
Russian Studies *Sponsor: Lynne Ikach*

Physician Writers of Russian: Anton Chekhov and Mikhail Bulgakov

It is no secret that an author's personal life is integral to the content of their works. As many authors were not capable of supporting themselves solely as writers, a secondary profession (often totally unrelated to literature) has historically been common. One profession which many authors have pursued is that of a medical practitioner. Notable examples include Friedrich Von Schiller, John Keats, and Sir Arthur Conan Doyle.

This presentation focuses on the lives of Anton Chekhov and Mikhail Bulgakov, both of whom were trained physicians before they began their careers as writers. In the case of these two early 20th century Russian writers, their careers as physicians contributed greatly to their subject matter, writing style, and characters. For either writer, choosing to practice medicine was a pivotal decision which would incur serious consequences in most aspects of their lives. It can most certainly be said for Chekhov, if not also for Bulgakov, that the physician and the writer must exist simultaneously. Chekhov once wrote to a colleague, "Medicine is my lawful wife and literature my mistress; when I get tired of one, I spend the night with the other."

Mason Chow, '16 — **Washington, D.C.**
Thao Nguyen, '15 — **Ho Chi Minh City, Vietnam**
Dillon Pape, '16 — **Houston, TX**
Mathematics & Statistics — *Sponsor: Tyler Skorczewski*

Making the Extra-point Plays Fair

This year, the NFL experimented with a new rule to make the "extra point" more appealing to the audience. This rule moved the extra point line to 25 yards instead of 2 yards from the endzone. The change decreased the likelihood of successful kicks from 99.6 % in the 2013 season to 94.3 % in this year's preseason. We created a logistic regression model to map out the successful rate of extra point attempts based on the kicker's distance to the endzone. Using this model, we compared our data with the successful rate of scoring a "2-point conversion" on the 2 yard line.

Since there is only a 2-yard distance where extra points are attempted, it is difficult to build a statistical model. We assume that the situational conditions of a field goal and an extra point attempt are similar. We combined data on field goal and extra-point in 2013 season and the extra-point in 2014 preseason. We choose Logistic Regression to model the relationship between yard line and scoring probability. The resulting model:

$$\text{Log}(P(x)/(1 - P(x))) = 3.93846 - 0.9906 * \text{yard line}$$

Our mean squared error is 0.022. The two coefficients are both statistically significant. The model fits data well until yard line reaches 40. However, teams rarely attempt to score field goal further than 40 yard line, we do not have enough data to make meaningful conclusion. The predicted success probability of 25 yard line is 81 %.

We assumed that the coach chooses either extra point attempt or two-point conversion based on the expected value that each option brings. Using our logistic regression model, we find that at 8 yard line, the probability is 95%. So if the extra point is at 8 yard line, it is equally desirable to choose between extra point and 2 point conversion.

We propose the further consideration of whether also moving back the line for the two-point conversion to the same yard line as the extra point attempt may be a feasible option since it retains the strategic benefit of being able to make either attempt on the fly. The touchdown data indicate that the probability of a one-play touchdown success decreases rapidly as yards from end zone increases. Consequently, moving the two-point conversion attempts back to even the 3- or 4-yard line would likely require increasing the point value from two to three to retain a comparable expected value for the play, and the requisite point value goes to four by the 5- or 6- yard line. However, this increase in the point differential over the extra-point kick may be something to embrace, for it opens up strategic possibilities of attempting the conversion for teams who are several points behind and could substantially benefit from such a point boost. Moving the conversion line back as well furthermore opens the possibility of compromising the kick and conversion placements by locating them both at the 6- or 7-yard line.

Sara Cooper, '16 **Prairie Village, KS**
Theatre *Sponsor: Janeve West*

Staging Terror: Directing *Boy Gets Girl*

This presentation will focus on the preproduction and process of the show *Boy Gets Girl* by Rebecca Gilman, which was directed as a Cornell student production earlier this year. The production discussed stalking, dating and sexual violence. This presentation will focus specifically on the design aspects- how the cast was educated about the issues represented in the play, and how the audience was impacted by the performance.

Lawrence Dennis, '15 **Portland, OR**
Physics *Sponsor: Derin Sherman*

Special Relativity and Muons

Special relativity, developed by Einstein, describes how events differ according to observers in reference frames that are moving relative to each other. We report an attempt to replicate an early experiment to prove relativity, involving the study of cosmic ray muons. Cosmic ray muons travel near the speed of light (β=0.994-0.998), so they experience significant relativistic effects; they take much longer to decay than they would without time dilation. This poster describes an attempt to build a portable muon detector capable of measuring muon counts at various altitudes in order to observe the effect of time dilation on the lifetime of the muons.

Amir El-Aswad, '15 **Bloomfield Hills, MI**
International Relations *Sponsor: Aparna Thomas*

Repercussions of Failed Nation-Building: Operation Iraqi Freedom and the Development of the Islamic State

After eight years of vicious warfare, the President declared that the U.S. was leaving behind a sovereign, stable, self-reliant Iraq with a representative government. This optimistic idea crumbled, however, when insurgent forces, calling themselves the Islamic State, blew through the weakened Iraqi army and seized swaths of territory throughout Iraq and Syria.

Despite popular beliefs that the Islamic State developed from the Syrian Civil War, its origins can be directly traced back to the failures of Operation Iraqi Freedom, the U.S. nation-building effort in Iraq. This presentation will analyze the development of the Islamic State and how it may be related to the massive U.S. military operation in Iraq.

The presentation will explore how key mistakes during the nation-building project, such as failing to promote a local economy or dismantling the entire political infrastructure, may have instigated spikes in military resistance and religious fundamentalism which ultimately opened the door for the development of the Islamic State. The presentation will conclude by providing key lessons that U.S. foreign policy makers must adhere to in order to avoid another similar calamity.

Maren Elnes, '15 — **Dubuque, IA**
Kristen Fernandez-Kong, '15 — **Ewa Beach, HI**
Halee Schomberg, '16 — **Dubuque, IA**
Alex Young, '16 — **Des Moines, IA**
Biology — *Sponsor: Marty Condon*

Morphological variations within subspecies of *Strauzia longipennis* in Iowa

Recent genetic data suggests that *Strauzia longipennis*, is not a single species but a complex representation of at least three divergent lineages that may deserve species status. High levels of genetic differentiation between these divergent sympatric populations suggest these populations represent the potential for incipient species.

Strauzia subspecies across Iowa were compared in order to determine how allocronic differentiation, influence observed patterns of species abundance. Pupae and live flies collected from *H. tuberosus* sites across Iowa were compared and identified using wing and thorax morphology.

Statistically significant results were obtained from chi-square tests examining subspecies abundance and temporal differences $p<0.000$. This study summarizes the results obtained and elements which may potentially influence these relationships.

Kristen Fernandez-Kong, '15 — **Ewa Beach, HI**
Psychology — *Sponsor: Melinda Green*

Decreased R Wave Amplitude across Experimental Paradigms in Women with Bulimia Nervosa and Women with Subclinical Binge/Purge Symptoms versus Asymptomatic Women

Additional Authors: Tyler Thorne '15 (Waimea, HI) Mary Willis '15 (Osceola, WI) Shuhan Reyes '16 (Houston, TX Jessie Lingbert '15 (Forest Lake, MN) Ruby Linkhart '16 (Denver, CO) Molly Johnson '15 (Boulder, CO), Melinda Green, & Jen Rogers

The purpose of the present study was to examine differences in mean R wave amplitude across 5 experimental paradigms among women with bulimia nervosa (n=12), women with subclinical binge/purge symptoms (n=20), and asymptomatic women (n=20) in order to assess risk for ventricular cardiac dysfunction across groups. Specifically, mean R wave amplitude was assessed via 3-lead electrocardiography (ECG) during 5-minute intervals recorded during supine posture (baseline supine rest), immediately following a posture shift to a seated position (posture shift 1), 5-minutes after a posture shift (posture shift 2), immediately after a 3-minute static handgrip exercise protocol (postexercise 1), and 5-minutes after exercise (postexercise 2). Results indicated statistically significant differences in mean R wave amplitude as a function of eating disorder status. Women with bulimia nervosa and women with subclinical binge/purge symptoms demonstrated significantly reduced mean R wave amplitudes compared to asymptomatic women. This may represent an important cardiac biomarker for cardiac risk in eating disorder populations.

Kerry Flynn, '15 **St. Paul, MN**
Environmental Studies *Sponsor: Andy McCollum*

Lead Poisoning in the Bald Eagles of Iowa

Lead poisoning is one of the leading causes of injury to bald eagles. By interning at the MacBride Raptor Project I was given hands on training with bald eagles and other raptor birds. In addition to hands on training I was also given the opportunity to look into the records of the MacBride Raptor Clinic. I analyzed this data to determine the common causes of raptor injuries, specifically focusing on bald eagles.

The widespread effect of lead in bald eagles is not commonly known. The use of lead bullets in rodent, coyote, fishing and large game hunting is the main cause of lead poisoning in eagles. Carcasses which are left behind are then fed on by eagles. Lead fragments are then consumed resulting in lead poisoning. Hunters also often clean their kills in the field leaving behind the offal of their kills which leaves the lead behind. Lead poisoning causes the eagle to not eat and become depressed, the eagle can then die from starvation or the exposure itself.

By working with the MacBride Raptor Clinic I was given hands on experience with injured raptors including bald eagles which were admitted there. By looking into the projects years of records I found significant data of lead poisoning among the bald eagles brought to the clinic. I then looked at the chances of survival in those eagles, whether they could be released or whether they died or had to be euthanized due to the extent of their poisoning. This data will show the wide spread effects that lead has on the eagles of Iowa.

Changes can be made to stop the spread of lead among eagles like non lead bullets. It is important for hunters to know about their effect on eagles therefore possibly changing their minds on what bullets they use. In addition to looking at the effects of lead, it is important to look into alternatives as well.

Rachel Foster, '15 **Quincy, IL**
English & Creative Writing *Sponsor: Shannon Reed*

African American Vernacular English: Identity and Tradition through Language and Literature

Language plays a vital role in literature—it is essential to create the world of the story and give authenticity to both the characters and the author. The use of African American Vernacular English (AAVE) in literature allows the characters to establish an identity through a voice that resembles the African oral tradition; but a lack of traditional African literary elements within the AAVE will leave both the character and the author lacking in authenticity. Authors such as Sapphire and Toni Morrison utilize the African oral tradition of signifying to establish various identities—socioeconomic, educational, and the like—for their characters. The paper analyzes AAVE as applied to literature through the criteria of signification constructed by Henry Louis Gates. Signifying language, according to Gates, consists of the oral elements of the African storytelling tradition that can still be evidenced through the works of African American authors today. To demonstrate the linguistic importance of AAVE in literature, this paper will address identity and the African American literary tradition through the use of AAVE in the novels *Push* by Sapphire and *Song of Solomon* by Tony Morrison.

CJ Frazer, '15 **Des Moines, IA**
Geology *Sponsor: John Orcutt*

Testing the Accuracy of C.L.A.M.P. by Comparing it to the Paleosol Record

Climate Leaf Analysis Multivariate Program (C.L.A.M.P.) is a program that allows us to score the leaf fossil characteristics of angiosperms to generate a paleoclimate record with respect to mean annual temperature (MAT). The experiment is a comparison between the C.L.A.M.P. record and the Paleosol record for the Miocene flora found in Oregon. The test will analyze how accurate the C.L.A.M.P. record is when it is compared to the known, well constructed Paleosol record.

CJ Frazer, '15 **Des Moines, IA**
Geology *Sponsor: John Orcutt*

The Distribution, Identification and Rock-Ice Dynamics of Permafrost Melting on Alpine Mountains

A review of existing literature was done to understand how ice interacts with rock, specifically in Alpine mountains when permafrost is present. Due to recent global climate change, permafrost has been melting at an increasing rate. This melting is causing talus slopes and various types of landslides to occur. It is through studying the rock-ice dynamics that we will be better able to prepare ourselves for the damage that is to come.

Brenna Glaeser, '15 **Mound, MN**
Gender, Sexuality, & Women's Studies *Sponsor: Tori Barnes-Brus*

Homebirth Midwifery: An Empowering Alternative to Medicalized Childbirth

The hospital industrial complex oversees ninety-nine percent of all births in America. Despite its dominance, the medical model of childbirth is deeply flawed and responsible for the United States' poor maternal and infant mortality and morbidity statistics compared to the rest of the developed world. This presentation, based on my senior thesis in women's studies, argues against the medical model of childbirth and advocates for the expansion of homebirth midwifery. Homebirth midwifery challenges the ideologies upon which the medical model of birth is based and offers holistic maternity care that is far more empowering, nurturing, and individualized. In order to understand the context of midwifery in contemporary American birth culture, the medical model will be detailed, followed by a brief history of how it came to be the dominant ideology of childbirth. After offering critiques of the medical model, the midwifery model of care and its benefits will be presented in contrast to the practices of the medical model of childbirth. Lastly, is a discussion of the construction of knowledge about birth and how each model conceptualizes authoritative knowledge. In comparing and contrasting the medical and midwifery models of maternity care, the overwhelming benefits of homebirth midwifery are elucidated.

Stacey Harrison, '16 **Peoria, IL**
Sociology *Sponsor: Erin Davis*

Permanent Instability: An Evaluation of the Foster Care System in Relation to Outcomes for Orphanage Alumni

According to American cultural dogma, a stable, two-parent home with a few biological children is the ultimate ideal and the foundation of a thriving society. Hence, U.S. policymakers have opted to enroll children without suitable caregivers in a foster care system that provides pseudo-idealistic families rather than rely on state-sponsored supervision like orphanages. In fact, the formal orphanage system has been completely disbanded within America since the anti-institution movement of the 1960s. Recently, there has been a collective effort towards re-instituting American orphanages on the grounds that the foster care system is overtaxed, ill-suited to more vulnerable subsets of children, and has questionable outcomes for the success of "aged out" adults. The purpose of this study is to reevaluate the orphanage system as an option for American youth since the child welfare literature reveals widespread dissatisfaction with the instability of the foster care system despite its emphasis on permanency planning. In the end, these destabilizing effects do exact penalties from foster care alumni in the realms of criminal justice, housing, and education. There is therefore ample reason to more critically consider the merits of orphanages in the context of contemporary American society.

Nguyet Minh Hoang, '16
Biology

Ho Chi Minh City, Vietnam
Sponsor: Barbara Christie-Pope

Effect of Leucine Supplementation in a Reduced Protein and Energy Diet on Skeletal Protein Synthesis in Neonatal Pigs

Additional Authors: Rodrigo Manjarín, Daniel A. Columbus, Marta L. Fiorotto, Agus Suryawan, Adriana D. Hernandez-García, Hanh V. Nguyen, Rosemarie Almonaci, and Teresa A. Davis

Short-term dietary leucine (Leu) supplementation improves lean mass accretion in newborn pigs by acting as a building block for protein synthesis and as an anabolic agent via the mTOR pathway. However, it remains unknown whether long-term Leu inclusion in the diet upregulates protein synthesis in neonates, and thus could be used as a therapeutic protocol to improve infant growth. The objective of this study was to test whether Leu supplement coupled with 30% reduction in crude protein (CP) and metabolic energy (ME) would increase the efficiency of protein utilization for skeletal protein synthesis, and whether this increase would be correlated with the upregulation of mTOR pathway-related proteins in the skeletal muscle. Nineteen piglets were allotted into a control diet (CON), 30% reduced CP and ME diet (R), and R supplemented with Leu (RL). Piglets were fed via gastric tube into the stomach for 8 d, and euthanized to measure fractional protein synthesis rate and protein abundance (i.e. S6K1, 4EBP1, and eIF4E-4G) in skeletal muscle by using radiolabeled Phe and western blot assays, respectively. Blood samples were taken prior euthanasia for measuring glucose, insulin and Leu levels at 7 time points: 0, 30, 60, 90, 120, 180, and 240 min post-feeding. Fractional protein synthesis rate and protein abundance in skeletal muscle was measured, as well as blood glucose, insulin and Leu levels. Results showed that glucose concentration was not different at any time point between the three groups. Insulin concentration was higher for R compare to RL at 30 min and for CON compared to R and RL at 90 and 120 min. Leucine concentration was higher for RL compared to R and CON at all time points. Leucine supplementation did not increase overall piglet growth or protein synthetic activity in skeletal muscle, but increased the activation of proteins involved in mTOR pathway. Leu stimulation of protein synthesis seems to be substrate dependent, and thus it cannot be used to improve muscle growth in infants if supplemented alone in a CP and ME deficient diet.

Trang Hoang, '15
Economics & Business

Hanoi, Vietnam
Sponsors: Jerome Savitsky and Todd Knoop

The Sex of the Immediate Supervisor and the Gender Pay Gap

In his 2012 re-election campaign, President Barack Obama stated that "women (are) paid 77 cents on the dollar for doing the same work as men," which quickly provoked outcries from some economists. Is the gender pay gap entirely due to discrimination against women like the President claimed? Or are there other factors that come into play?

Using data from the National Longitudinal Surveys of Youth 1997, I aim to unpack the wage gap and investigate determinants other than discrimination that potentially contribute to male and female wage inequality. My research will focus on the impact the sex of the immediate supervisor has on a worker's earnings. Given the fact that the immediate supervisor can influence a worker's wage directly through job evaluations or indirectly through discriminatory attitude and behaviors at work, this study can provide more insights into the sources of the gender pay gap.

Morgan Hoffman, '15 **Middleburg, PA**
Classical Studies *Sponsor: John Gruber-Miller*

Ascanius: The Backbone of the *Aeniad*

The Odyssey and *Aeneid* are both epics about finding home and father-son relationships. Yet, unlike *The Odyssey*, which shows Telemachus as unsure and without the role model of his father Odysseus, the *Aeneid* shows Ascanius (Iulus) accompanying his father Aeneas and as always being confident in his qualities and abilities. Aeneas' son is an essential part of the story and we see him grow along this journey. He appears at key moments in the text always to illustrate something of importance. First, he serves as a motivation for the journey to Italy to continue. At key moments, when the journey seems to halt, Aeneas is prompted to continue because of his son Ascanius. Second, in the absence of his father, Ascanius steps into a leadership role and embodies key Roman qualities of behavior, like duty and bravery, that teach Roman youth how to act. Third, in various prophetic pronouncements, he represents the future of Rome, linking Aeneas to Augustus through the Julian line. Ascanius moves the journey, and thus the poem forward, through his presence and actions at key moments. Without him, the Aeneid would not hold the same meaning.

Caitlin Huff, '15 **Portland, OR**
Environmental Studies and Biology *Sponsor: Marty Condon*

The Visitor Effect as it Applies to Humboldt Penguins (*Spheniscus humboldti*) at the Oregon Zoo

The visitor effect, or the idea that the presence of guests can affect the behavior of zoo-housed animals, is an important area of study in zoos and aquariums. The three main scientific hypotheses are that visitor presence may 1) increase animal stress, 2) have no impact due to habituation, or 3) act as additional enrichment for the animals. In my study, I observed the behavior of Humboldt Penguins (*Spheniscus humboldti*) in order to determine whether there is a correlation between the number of guests and penguin behavior. Visible penguin behavior was distinguished as either being on land or in the water. These behaviors were selected for observation based on the zoo's penguinarium design. In this exhibit, guests are able to have direct contact with the exhibit glass and may be mere inches from the swimming penguins. Penguins on land are somewhat more separated from guests by the water, which spans the width of the exhibit windows. Counts were divided between the three exhibit viewing windows, counting the number of guests, visible penguins on land, and penguins in the water at each window. If guests are acting as additional enrichment, it was expected that more penguins would be seen in the water; whereas, if visitors were contributing to animal stress, I expected more penguins to remain on land or in other areas not as easily visible to guests. Based on initial findings, both visible land penguins and penguins in the water increased with the number of guests. From this, we can speculate that guests are providing a form of additional enrichment for all penguins in this exhibit.

Vanessa Iraheta, '17 **Chicago, IL**
Brenna Glaeser, '15 **Mound, MN**
Sociology *Sponsor: Tori Barnes-Brus*

Beyoncé: Pop Sensation or Feminist Icon?

At the *2014 MTV Video Music Awards*, Beyoncé stood in front of a video screen with the word "feminist" 20 feet tall behind her, declaring her new found feminist ideology on nationwide television. Her self-titled album was the next evolution of her girl power movement, which started with "Single Ladies" and continued with songs like "Run the World (Girls)," but does this mean its feminist? We decided to examine Beyoncé and her move towards a feminist self-presentation because she is an apt example due to her widespread success and fame. In her sixteen year music career, she has won 17 Grammy Awards and sold over 75 million albums as a solo artist. To help determine a feminist self-presentation, we chose a sampling of three music videos from her early career and three music videos from her latest album and coded for the male gaze, the role of men and her dancing among other factors. The difference legitimizes or disproves her feminist claim. In comparing her early career to her most recent and highly feminist album, we randomly selected music videos from her first two solo albums, *Dangerously in Love* (2003) and *B'Day* (2006); our sample included "Baby Boy," "Me, Myself, and I," and "Ring the Alarm" from her early career. From the visual album, *Beyoncé*, we examined "Pretty Hurts," "Drunk in Love," and "Flawless." It is difficult to define what makes a modern day feminist, but we aimed to decode whether or not Beyoncé embodies the role of the strong and independent woman; for if she is a new feminist icon, the impact could reach millions and form the beginnings of a new feminist generation.

Elizabeth Jerkins, '15 **Coralville, IA**
Psychology *Sponsor: Suzette Astley*

Inadvertent Plagiarism and Interpersonal Relationships

Inadvertent plagiarism, also known as cryptomnesia, involves being presented with another person's idea and then reproducing it later, believing it to be a new idea. Although this type of plagiarism is unintentional and is usually completely unconscious, it can still have serious consequences. Though inadvertent plagiarism has been studied before, the degree of familiarity between the plagiarizer and the original author has never been studied as a factor. In the present study, researchers studied whether study participants were more likely to inadvertently plagiarize people they knew as opposed to strangers. Subjects were asked to generate words from given categories with a group of subjects of varying familiarity. Following a distractor task, subjects were given a memory test over the items previously generated and were asked to avoid responses generated by other subjects. Results suggest that closer familiarity of participants increases the likelihood they will inadvertently plagiarize.

Kelsey King, '15
Environmental Studies

Ankeny, IA
Sponsor: Craig Teague

Peatland Carbon Cycle: Microbial Respiration in Response to Low Molecular Weight Carbon Compounds

Additional Authors: A.D. Keiser, and K. Hofmockel

Subarctic peatlands have the ability to sequester carbon, which is undermined by the warming temperatures of climate change. Recent evidence suggests that the eminent rising temperatures will, through indirect effects, cause greater losses of carbon each year. These peatlands primarily release carbon through carbon dioxide, which is carried out by the microbial community. To understand why these microbes respire more during warming we must begin to pick apart this system's carbon cycle. The first responder to changes in soil environment is the most sensitive pool of carbon, the water extractable organic carbon pool which contains low molecular weight carbon compounds (LMWCC) from plant inputs. In this experiment we provided peat with 5 different LMWCC at varying concentrations while maintaining field moisture. Throughout the 60 day incubation experiment carbon dioxide was measured after 24 hours of accumulation. Final sampling will be in March, however, preliminary results provide insights into the effectiveness of these untested methods. For example, oxalate concentrations reached a threshold after which respiration was suppressed, but citrate concentrations did not affect respiration. So far, this experiment is successful in that it has allowed us to refine our methods, and given us knowledge about untested LMWCC.

Aubrey Kohl, '17
Academic Support

Bettendorf, IA
Sponsors: Ian Ely-Cate & Craig Tepper

What Do You Do When Life Gives You Lemons?

At some point in life everyone faces adversity. Adversity comes in all shapes and sizes and produces differing effects in each person. What can a person do when life has given them lemons, metaphorically speaking? In this oral presentation, I explore this question and how I have dealt with this in the context of being born with a rare genetic disorder known as Turners Syndrome. Girls with Turners Syndrome statistically have high rates of depression. With that fact in mind, my analysis explores what makes girls with Turners Syndrome who suffer from depression distinct from those who do not. I am of the latter category, and my aim through this presentation is not only to educate about the basics of what Turners Syndrome actually is but to present how it is that I ended up in that latter category. What I have discovered is that, although facing adversity may be inevitable, what one chooses to do with the lemons is what really counts.

Scott Kottkamp, '15 **Aurora, IL**
Geology *Sponsor: John Orcutt*

Evolution Towards Larger Body Size and Hypercarnivory in *Hesperocyon* of the White River Group Over the Eocene-Oligocene Boundary

There have been three major groups of dogs: the hesperocyonines, the borophagines, and the canines. The former two groups both diversified, dominated a niche as hunters of large prey, and then declined to extinction in turn. This radiation and subsequent decline of dog clades mirrors a wider pattern in faunal succession of large predators throughout the Tertiary. Each predatory ecomorphological role seems to be filled by a given family for 10 million years or so before that group declines and is replaced by another. Since this pattern of extinction repeats predictably in major taxa of mammalian predators, its possible causes are worth investigating. Furthermore, results may inform conservation methods for modern analogues.

The purpose of this research project was to test the hypothesis made by previous researchers that larger body size and hypercarnivory evolved together in hesperocyonines. This was done by seeing if their predictions were supported in specimens from the White River Group, a region with an excellent fossil record from a time when hesperocyonines were dominant. This would help determine whether changes in size and diet were universal or varied by region in hesperocyonines. Since the White River covers the Eocene-Oligocene boundary, this study also aimed to discern if the climate shift that occurred across that boundary had any influence on hesperocyonine evolution.

Data collection methods involved taking measurements of craniodental features strongly correlated with body size and carnivory, primarily the length of the first lower molar (m1) and the length of its trigonid. The sample tested at the Field Museum totaled 93 specimens, all *Hesperocyon* (some identified to species as *Hesperocyon gregarius*). Data analysis was performed by averaging measurements for all specimens from the same period or North American land mammal age, and then graphing the average lengths versus times.

The resulting data display an increase in both m1 length and relative blade length over the Eocene-Oligocene boundary. The increase in relative blade length is proportionally larger than the increase in m1 length: average m1 length increased by about 2.7% from the Eocene to the Oligocene, while relative blade length increased by 5.86%. Furthermore, the change in relative blade length is significant within a 90% confidence interval, while the change in m1 length is not. This suggests that changes in hesperocyonine diet over the Eocene-Oligocene boundary were more significant than changes in body size, and thus may have been the greater driving force in hesperocyonine evolution at that time.

Rebekah Kurtz, '15 **Chandler, AZ**
Political Science *Sponsor: David Yamanishi*

Tibet: Genocide and the International Community

China has been committing genocide against Tibetans since the 1950s. Because of Chinese Communist rule, Tibetans are not allowed to practice their religion nor most aspects of their culture. This study seeks to understand why the international community has not intervened in Tibet in reaction to the genocide. Three different dominant perspectives are presented through a literature review. First, Lemarchand argues that international actors have not and are not intervening in Tibet because China's secrecy and efforts to rewrite history has turned Tibet's tragedy into a forgotten genocide. Second, Goldstein, Xu, and Craig argue that the international community did not intervene

in Tibet during the Cold War because geopolitics was priority over human rights. Finally, after the cold war, according to Goldstein, Xu, and Nathan the West did attempt to intervene in Tibet, through U.S. Congressional support and UN action, along with action from other countries and major non-governmental organizations. In an analysis of all of these scholars' arguments, the geopolitical explanation is sufficient for the Cold War era. But the argument for the international community to intervene in Tibet after the Cold War is incomplete and overly optimistic, owing to the lack of critical examination of all given evidence and absence of consideration of the United States' strong economic ties to China. Presently, the United States and other major Western powers were and are unwilling to take strong actions against China because of economic interests.

Rebekah Kurtz, '15 **Chandler, AZ**
Political Science *Sponsor: Aparna Thomas*

Women's Empowerment and Health Poverty: The Effects of Women's Self Help Groups in Himachal Pradesh

In India, where poverty is still a large issue, 70% of the Below the Poverty Line (BPL) population is made up of women. Additionally, Indian Society is intensely patriarchal, leading to a lack of voice and control for many women, especially in rural areas. One of the recent approaches instituted in India to alleviate women's poverty and gender inequality is Women's Self-Help Groups (SHGs). Behind the use and popularity of this approach is the theory that that as women's agency goes up poverty goes down. This study seeks to investigate this theory: as women gain agency, overall poverty decreases. Through empirical research, this study aims to test the theory on the ground. Making the theory concrete, this study conceptualizes Women's Self Help Groups as vehicles of providing women with agency. It defines poverty narrowly as infant mortality, infant illness, and infant malnutrition. Finally it will look at utilization of health and nutritional services for children as an indicator of decreasing poverty. Working with women who are associated with an SHG sponsored by CORD a non-governmental organization (NGO) in Himachel Pradesh, using the specific tools of personal interviews, focus group discussions, and questionnaires, this paper first seeks to discover if women in SHGs have increased confidence and awareness of governmental nutritional and health services for children. Secondly, using the same methods, this study seeks to find if and how the combination of increased confidence and awareness of services resulting from involvement in an SHG cause an increased utilization of government health and nutrition services for children.

Jacob Lehman, '16 **Iowa City, IA**
Jordan Wolfe, '16 **Waukon, IA**
Brian Cristion, '17 **Port Angeles, WA**
Mathematics & Statistics *Sponsor: Tyler Skorczewski*

A New Way to Measure Competitive Balance Across the NFL, MLB, and the NBA

We analyze data from the three professional athletic leagues: NFL, MLB, and NBA. Our data include the final record of each team and whether or not each team participated in the post-season in its respective league to determine whether a team ended its season in a winning or non-winning state. Our measure of competitive balance is based on a Markov model with transition values determined from the length of consecutive winning and non-winning season streaks. Our new measurement shows that there is the most competitive balance in the NFL followed by MLB and the NBA. In addition, we show that after the onset of free agency competitive balance increases in the NFL but decreases in MLB and the NBA. We discuss how this affects fan psychology and potential revenue across leagues.

Stephanie Lucker, '15 **Bozeman, MT**
Geology *Sponsor: Rhawn Denniston*

Paleomonsoon Implications of Carbon Isotopic Variability in Late Holocene Aragonite Stalagmites from the Central Australian Tropics

Summer monsoons provide the majority of annual precipitation in much of the global tropics. In northern Australia, the hydroclimate is dominated by the Indo-Australian Summer Monsoon (IASM). This monsoon provides 70-90% of yearly rainfall, all within the austral summer, supporting agriculture and regional ecosystems. Historical records of the IASM began in the late nineteenth century and reveal limited monsoon variability. In order to better understand how the IASM may respond to anthropogenic warming of the oceans and atmosphere, previous studies utilized oxygen isotopic ratios of stalagmites from the Kimberley region of easternmost tropical Western Australia. As a complement to that work, I analyzed the carbon isotopic ratios of the same stalagmites. The addition of carbon isotopic data provides a more complete picture of hydroclimate variability.

Thao Luu, '16 **Ho Chi Minh City, Vietnam**
Chemistry *Sponsor: Cynthia Strong*

Development of Antioxidant Peptides as a Treatment for Pulmonary Hypertension

Additional Authors: Juan M. Martinez, Ji Hye Chun, Leah Villegas, MyPhuong Le

Oxidative stress is caused by an imbalance in the production of reactive oxygen species (ROS) and antioxidant defenses. The development of pulmonary hypertension (PH) is one disease that can be attributed to oxidative stress, and studies have shown antioxidants as potential therapeutics. Peptides extracted from botanical sources are widely used for this purpose and have been shown to have bioactive properties such as antimicrobial, anticancer, antihypertensive and antioxidant properties, which are well suited for pharmaceutical development. Using bioassay-guided isolation methods, this study identified bioactive peptide candidates, isolated from our botanical library, for the development of improved antioxidant treatment for PH. Total protein of more than 300 botanicals was extracted and analyzed via polyacrylamide gel electrophoresis. Antioxidant capacity of botanical peptides was analyzed using the Oxiselect Total Antioxidant Capacity (TAC) assay (Cell Biolabs) and the SOD activity assay (Dojindo Molecular Tech). The initial screens of protein extracts identified at least three botanical sources (BOT0123, BOT0044, and BOT0353) with up to 2557 μM copper reducing equivalents (CRE). The EC50 of the uric acid positive control was 1.093 μM CRE. Our preliminary results have identified botanical protein extracts with antioxidant bioactivity that will be used in further bioassay-guided isolation and identification of specific peptides. Future studies will focus on defining effective concentrations (EC50 and ECmax) in vitro, testing candidate antioxidant peptides in cell culture and in animal models.

Nicolas Marn, '16 **Brookfield, WI**
Politcal Science *Han Hassell*

Message Bias: Campaign Strategy as seen through TV, Mail, and Electronic Communications

Using a survey of campaign staff we study how campaign attributes affect the representativeness of campaign messages in different communication mediums. Analyzing different communications can

skew understanding about political campaigns.

Since the beginning of the 20th century, the tools for conducting political campaigns have grown significantly with media ranging from TV and radio to more recently websites and e-mail. A body of research has been conducted by previous scholars about how these various forms of political communication reach voters. However, little is known about how different campaigns employ these tools and if they use them in the same way. How targeted and specialized are these different forms of communication relative to a candidate's overall message? In order to examine this question, we conducted a survey of congressional and senatorial campaign staff in the 2014 election about how campaigns employed various means of communication such as TV, radio, print mail, and electronic advertising. We find that characteristics of political campaigns affect the choice to tailor and specialize messages in these different mediums of communication. We argue that the study of campaigns and campaign messages requires that scholars be aware of how analyzing campaigns using some forms of communication can skew understanding about the messages of political campaigns.

Nikita Martinson, '15 **Medina, MN**
Emma Narotzky, '15 **Casper, WY**
Biology *Sponsor: Andy McCollum*

Using Program MARK and a Modified Minimum Number Alive to Estimate Survival, Capture Probabilities, and Population Trends in Two Subpopulations of Ornate Box Turtles (*Terrapene ornata ornata*) in Eastern Iowa

Additional Authors: Dr. S. Andrew McCollum, Dr. Neil P. Bernstein

Ornate box turtles (*Terrapene ornata*) are a threatened species in Iowa due primarily to prairie habitat loss. We analyzed data from a 21 year mark-recapture study to assess the survival of ornate box turtles in two subpopulations at Hawkeye Wildlife Area in Johnson County, Iowa. We used Program MARK to generate estimates of survival and capture probabilities at each site. We then used the capture probabilities in a modified Minimum Number Alive (MNA) to estimate the population size at each site during each year of the study.

When we put a constant capture probability into the modified MNA model, it showed that the population at Mallard Pools was stable and the population at Greencastle was declining. When we used MARK to generate population estimates using time and site dependent capture probabilities from the Cormack-Jolly-Seber (CJS) model, the population estimates were similar to those from MNA, but the populations at both sites appeared stable.

Since the MARK analysis found that capture probability varies significantly between years and between sites, we decided to run the MNA analysis again with the capture probability estimates from MARK. We then compared these population estimates to those found using a constant capture probability with MNA and those found using the CJS model. We found that CJS was less reliable than MNA. From this we can conclude that our hypothesis that Mallard is stable and GC is declining was supported.

Lydia Meece, '15 **Jackson, MO**
Theatre *Sponsor: Janeve West*

The Art of Medicine: Taking the Vitals Through Performance Based Research

Throughout my undergraduate career I have sought to marry the studies of biology and medicine with theatre and performance. For my 2014 internship I worked with Gesundheit Institute!, a foundation for clowning as a tool for public health in Iquitos, Peru. There I was able to shadow both physicians and other medical professionals along with amateur clowns like myself.

The presentation will explore the possibilities of incorporating theatrical knowledge in the healthcare setting. This performance is meant to exemplify the potential of performance and clowning techniques to address the problems that exist in modern medicine today. The project shares my own experiences and my own family history in order to illustrate how the conversation could begin in monologue form. Personal narratives connect to systemic issues and by sharing these accounts one can persuade others that a systemic change is necessary.

Stories can convince when numbers cannot. Stories can teach empathy when a standard of perfection cannot. Stories can convince patients and improve the resilience of our physicians. Storytelling is not only helpful in expanding our understanding; it is integral to re-framing our experiences for a more healthful world.

Brenda Mejia, '15 **Oakland, CA**
Art & Art History *Sponsor: Ellen Hoobler*

Teomama: Merchant as the Bearer of Aztec Society

In this paper, I will discuss an Aztec stone sculpture held at the University of Iowa Museum of Art (UIMA), a figure referred to by the museum as teomama, or god bearer. The statue portrays a plainly dressed male figure in a loin cloth, his back hunched over as he carries a deity figure on his back. This small sculpture is one of few that have been found with similar iconography, however, little is known about them. The identity of the male figure is of particular importance in this piece because the entire sculpture has been titled by who the male figure is believed to be. However, because the identity of the male figure is unknown the titles museums have applied to this sculpture vary greatly, from slave, to merchant, to man carrying deity figure, and sometimes, to Teomama. My senior thesis and this presentation discuss what spurred the creation of this piece, what influenced its depiction, and what the cultural significance of this piece was, in order to advance knowledge about this class of Aztec sculpture.

I will discuss my piece through the lenses of socio-economic power, trade, and religion; all three primary functions of artistic expression in the Aztec empire. The piece has usually been referred to as a god-bearer, an important figure in the Aztec's ancient migration from their homeland. However, this argument has always failed to take into account the specificity of the deity carried by the figure. I argue that rather than a mythical or real-god bearer, this sculpture represented an Aztec long-distance merchant. The merchant class had a considerable amount of socio-economic power in society, one that may have rivaled the nobility class, and therefore were able to have sculptures like this made. We can distinctly see references to trade spread through the composition of the piece, for example,

the portrayal of the tumpline that was utilized in carrying objects while in trading processions. Lastly, it is through religion that the merchant class had linked themselves to greatness, for the founders of the Aztec empire were four god-bearers that traveled around the Valley of Mexico as lowly people who carried their patron lord and all of his ritual paraphernalia on their back in search of their promised land. However, in the case of the UIMA figure, the deity being carried is Chicomecoatl, a corn goddess that was vital to the livelihoods of the Aztec and an essential deity for their survival, just as the merchant class as well was essential for Aztec society.

Ve'Amber Miller, '15 **Matteson, IL**
Catherine Quinn, '15 **Seattle, WA**
Art & Art History *Sponsor: Ellen Hoobler*

Redefining Art History: Making 3D Digital Models of Ancient Tombs from Mexico

During the summer of 2014, we (Ve'Amber Miller, '15 and Catherine Quinn, '15) worked alongside Art History Professor Ellen Hoobler on a project that involved looking at art history (and archaeology) in a new way by incorporating 3D digital modeling. 3D imaging is currently making a huge impact in multiple fields such as medical treatments, archaeology and architecture. By travelling to Mexico, we were able to measure and photograph tomb and house sites in situ at the archaeological site of Monte Albán, Oaxaca, in southern Mexico. Using this data, we constructed a 3D model of a Zapotec tomb using the 3d modeling software package Maxon Cinema 4d. This model was processed in the Unity game engine to create a more dramatic experience of a portion of Monte Albán, a UNESCO World Heritage site. Using Dr. Hoobler's previous archival research data, we reconstructed the tomb along with the artifacts that had been excavated in the 1930s, helping to add a significant new dimension to existing knowledge about this ancient site.

Rikki Mulloy, '15 **Phoenix, AZ**
Kinesiology *Sponsor: Kristin Meyer*

Finding an Edge for Female Collegiate Athletes: a Paleo or a Gluten-Free Diet?

Three female athletes from an NCAA Division III basketball team and three from a soccer team were evaluated to determine if a Paleo diet or a gluten-free diet would act as an ergogenic aid. Recent studies and articles have been written describing these two diets, but there has been no research conducted comparing the two diets as an ergogenic aid for performance enhancement. The diets' ability to enhance an athlete's performance was assessed through measurements of three domains: body composition, strength and acute cardiorespiratory response. The specific measurement tools used are weight measurement by scale, BMI calculation, one repetition max test of a squat and the bench press, a 300-yard shuttle run and a three-site skinfold test. The data indicated that improvement was detectable amongst the athletes, suggesting that nutrition as an ergogenic aid may positively affect the performance of female athletes. As this was a preliminary study, additional studies may be warranted.

Natalie Nish, '15
Geology

College Station, TX
Sponsor: Rhawn Denniston

Rediscovery and Lithic analysis of Rummells-Maske Site 13CD15

The Rummells-Maske site, 13CD15, lost within the memories of those who originally excavated it back in 1968, may be seen once again. With the archeology field classes' efforts in 2012 and 2014 and the guidance of professionals from the department of the state archeologist of Iowa, this site may once again be observed and studied. John Doershuk and Mark Anderson, among others, have studied a site near Cornell College that exhibits evidence of Paleo-Indians. This site, 13CD15, was thought to be the home of an excavation that took place in 1968-1969. It was labeled a "find-spot" due to the bundle of fully fluted Clovis points found in 1968 and a scattering of flakes and points found throughout the site. However by re-evaluating the maps, journals, and photographs, we believe that this is not a find-spot or a Clovis cache, but instead a hunter-butcher site. After years of search, we have come across enough evidence to definitively outline the boundaries of 13CD15. Through the lithic analysis of artifacts found at the Rummells-Maske site, we can confirm that the lost "find-spot" has not only been found, but actually is more than a "find-spot". We will discuss why we believe it is actually a hunter butcher site left behind from Clovis people. As one of only three known Clovis sites in Iowa, this is an exceptional chance to continue our studies of the original paleopeoples of America.

Allen Norton, '15
Biology & Chemistry

Manchester, IA
Sponsor: Jeff Cardon

The Elusive Doubling Time

My research was on a TOR 2 (target of rapamycin) temperature sensitive (ts) mutation in yeast. TOR 2 has two functions, the first being a signaling pathway that is used in the activation of translation initiation and early G1 progression in the cell cycle. The second function mediates the cell cycle dependent polarization of the actin cytoskeleton. I tried to establish a doubling time of the TOR 2 ts mutant at different temperatures. This would be used to observe the growth of mutated TOR 2 cells under different conditions. A variety of methods utilizing solid media, semi-solid media, and liquid media were tested. It was found that solid media resulted in better data than the others. A method designed for this media was used to measure the yeast colony with a hemocytometer. This provided one way of establishing a doubling time. However, this only gave the colonies area, which is not factoring in the height of the colonies. A method of measuring all three dimensions was desired for more accurate data and this was done by using the hemocytometer to count the actual number of cells in a set volume to approximately measuring colony size. I have developed two different methods that may lead to a doubling time based on all three dimensions. Both methods were tested briefly and from the preliminary data no results could be obtained. Further testing and development of these techniques is required.

Ariadne Penalva, '15
Spanish

Bahía de Banderas, Mexico
Sponsor: Marcela Ochoa-Shivapour

Desesperanza en las minas: El naturalismo de Baldomero Lillo en los cuentos de Subterra

Hopelessness in the mines: Naturalism as a literary style in the stories of "Subterra" by Baldomero Lillo

"Subterra" is a compilation of short stories written by nineteenth century Chilean author Baldomero Lillo whose theme revolves around the miserable everyday lives of Chilean miners living in a small village. This presentation delves into and summarizes the way Lillo utilized naturalistic elements within "Subterra" to reflect, and attempt to change, the crude reality of Chilean miners. Lillo´s tales, although fictional, strive to reflect the crude reality of mining conditions. Through elements of the literary style of naturalism (such as hopelessness, fatality, loss of individuality and clear division between "oppressors" and "oppressed") Baldomero attempted to make a difference in the real mining situation through his fictional literary tales. (In Spanish)

Ariadne Penalva, '15
Biochemistry & Molecular Biology

Bahía de Banderas, Mexico
Sponsor: Craig Tepper

Identification of Novel Interacting Partners of Tumor Suppressing Kinase LATS1

Large Tumor Suppressor Kinase 1 (LATS1) is a serine/threonine kinase previously associated with regulation of cellular proliferation and enhancement of apoptosis. However, the specific protein-protein interactions of LATS1, particularly in the brain, are not entirely known. In order to elucidate this interaction, the objective of the presented project centered on screening novel neural interacting partners of LATS1. Potential LATS1 interacting partners were identified through the use of a yeast-two-hybrid screen between LATS1 and a rat brain-derived cDNA library. Potential interacting partners were subsequently assessed for co-immunoprecipitation with LATS1 when co-expressed in human embryonic kidney cells (HEKC). The results of this study confirmed a previously found interaction between LATS1 and proteins AMOT and NEDD-4 and suggested a potential novel interaction between LATS1 and proteins Rab 11 FIP2 and KIBRA.

Justin Pruitt, '16 **Parker, CO**
Chemistry *Sponsor: Charles Liberko*

Exploration of Dye-Derived Organic Compounds and Co-Crystal Formation in the Solid State

There are systems of compounds that exhibit [2+2] photodimerization when exposed to UV light when co-crystallized with an apposite template molecule. Co-crystals, crystalline structures made up of two or more compounds in a specific stoichiometric ratio, help position molecules in the specific orientation necessary for the [2+2] photodimerization to occur, which can be detected by analysis via 1H NMR spectroscopy.

4-[(E)-2-(Pyridin-4-yl)vinyl]phenol ("OED"), a dye-derivative, exhibited potential for photodimerization in a co-crystalline state. Analysis of co-crystal synthesis attempts via Raman spectroscopy showed that unaltered OED is unable to form cocrystals with the customary templating molecules, invoking the unprecedented synthesis confirmed by 1H NMR spectroscopy of an OED-derived compound, bis-OED phthalate, for further investigation as a photoreactive compound.

Marco Renzi, '15 **Prescott, AZ**
Psychology *Sponsor: Suzette Astley*

Evaluative conditioning: Is it possible without awareness?

Evaluative conditioning occurs when a person changes how he or she views a previously neutral stimulus. Because EC changes how people consider previously neutral stimuli, it takes a central role in helping us understand how different human preferences develop, and it is thus very important to research. The aspect of evaluative conditioning that this paper focused on was whether or not awareness of what the neutral stimulus was paired with impacted how the participant's view of the stimulus changed. This experiment used a computer program to examine whether or not awareness is necessary for evaluative conditioning to occur. Participants were introduced to the different stimuli (varying neutral spacecraft) during a distractor task where each stimulus was paired with a specific positive or negative sound. Both item awareness (what the neutral stimulus was paired with) and valence awareness (if the neutral stimulus was paired with a positive or negative sound) of the spacecraft were evaluated for each participant. To do this, explicit measures in the form of a questionnaire and implicit measures using a modified Brief Implicit Association Test were utilized. Participants were 54 Cornell students, most of whom were in psychology classes. Results indicated that item awareness had no significant impact on evaluative conditioning occurring amongst the participants. However, there was a small effect seen in the trials where participants were valence aware of the stimuli pairings, which supports the notion that valence awareness is necessary for evaluative conditioning effects to be observed.

Shuhan Reyes, '16 **Houston, TX**
Megan Rueth, '15 **Saint Charles, IL**
Biology *Sponsor: Craig Tepper*

An examination of the Millepore-Symbiodinium relationship using quantitative polymerase chain reaction (qPCR)

The genus Symbiodinium is a dinoflagellate (Protista) that forms symbiotic relationships with many marine organisms, including several coral species (Muscatine, 1990). Symbiodinium reside within membrane bound cavities called symbiosomes located within gastrodermal cells, receiving shelter and access to sunlight. In return, Symbiodinium provide coral with photosynthetic products which promote growth, reproduction and skeletal calcification (Muscatine and Porter, 1977). Symbiodinium have been linked to host thermal tolerance (Berkelmans and van Oppen, 2006) and host disease susceptibility (Stat et al., 2008). Hence, Symbiodinium may provide coral with a mechanism to cope with increasing ocean temperatures. However, the vast majority of the research examining coral-Symbiodinium relationships has focused on Scleractinian (stony) corals, while ignoring the important reef framework building Millepores (fire coral).

The purpose of our research was to examine the Millepore-Symbiodinium relationship using quantitative polymerase chain reaction (qPCR). We used clade-specific rDNA primers to detect the presence and abundance of Symbiodinium clades A through D in Millepores (N= 22) collected from various reefs surrounding San Salvador, The Bahamas. The goal of our research is to develop an understanding of Millepore-Symbiodinium diversity.

Our results showed a high prevalence of Symbiodinium clade B and a low abundance of clade A. There was no correlation between clade presence and morphology, nor a correlation between clade presence and reef location.

April Richards, '15 **Sheridan, WY**
Sociology *Sponsor: Tori Barnes-Brus*

Saving Justice in Population Control

Exponential population growth cannot be sustained on a planet with finite resources, yet we find that the human population has exceeded the Earth's carrying capacity and continues to grow. This trend persists despite pleas from population control advocates who argue that limiting the population is essential for avoiding additional environmental degradation. Historically, efforts at controlling population targeted women's reproductive choices with a disproportionate emphasis on poor and minority women. This is problematic for reproductive justice advocates who promote a more holistic approach to reproductive rights with a focus on marginalized groups. Members of this movement have traditionally been opposed to population control due to the threat of limiting reproductive freedom. However, it is possible to work with, rather than against the reproductive justice movement and explore ways to limit population growth while preserving reproductive agency. Promoting full agency over reproductive health paired with increased educational opportunities, mandated comprehensive sex education, and furthering the prohibition of discrimination in all socioeconomic spheres lowers population growth and maintains reproductive justice.

Benjamin Rosen, '15 **Portland, OR**
Halee Schomburg, '16 **Dubuque, IA**
Civic Engagement *Sponsor: Carol Lacy-Salazar*

Service Learning: Guatemala's Politics, Poverty, and Perseverance

Additional Authors: Halee Schomburg, Caryn Shebowich, Arturo Castillo, Nolan Schillerstrom, Emma Kaboli, Justin Pruitt, Angelica Hall, Anne Weitekamp, Eleanor Cotton, Gabe Flippo, Kaitlynn Long, Katie Brogan, Thao Luu, Michael Johnson, David Burgess

This project is the investigation of Guatemala's culture and people through the act of service. Working with a combination of guided mentors and service sites, our group experienced an illustrative grasp of societal issues faced in Guatemala. Through a week of volunteering with various programs, including a home for people who have disabilities, a women's cooperative, a daycare and after school program, as well as our sister school, Juan Sisay, we gained insight into Guatemalan culture. We experienced the poverty of women in Las Rosas and the tradeoffs they make between feeding their families, funding their businesses and choosing educational opportunities. We saw the inability to help the neediest and underserved, such as women in abusive relationships or people living with disabilities. But, most importantly, we saw the perseverance in people to find creative ways to survive and work towards a better tomorrow.

Victoria Rothe, '15 **Alton, IL**
Classical Studies *Sponsor: John Gruber-Miller*

The Analysis of Ceramics from Site 13ML168

Rowe Ware is considered to be much older than Sterns Creek Ware; however, the evidence at the site suggests otherwise. At the research excavation site, both Rowe and Sterns Creek ceramic wares were found. These ware types were found in the same excavation levels, which suggests a shared time period of use. This research project explores a number of explanations as to how this could be, including 1) natural causes such as animals, 2) human interference, or 3) that the ware types are not so far apart in age as we previously thought.

The purpose of this project was to collect and analyze data concerning the ceramic collection from the research excavation site 13ML168. The collected data raised questions about the ages of the ceramics found based on the depth in which they were uncovered.

Jesse Sackett, '16
Chemistry
Sponsor: Charles Liberko

A More Environmentally Friendly Photochromic Compound Procedure

The compound 2-(2,4)-dinitrobenzyl pyridine (DNBP) is a photoreactive crystal that changes from a sandy-brown to a dark purple color when exposed to light. It then remains dark purple for several hours after being exposed to light. The original synthesis procedure was developed at Cornell by Professor Ault and Cornell students. Since its development, it has been improved several times and is still run in the Organic Chemistry Lab course today. The procedure for making DNBP involves an ether extraction with large amounts of the solvent, along with the use of sodium hydroxide. Both of these compounds have drawbacks. Sodium hydroxide is a caustic compound with a high pH. Ether is a low boiling solvent that produces fumes that were at one time used as an anesthetic. Also, ether is highly flammable and open flames need to be avoided in the lab when it is in use. During the summer, the procedure was altered in order to eliminate the use of both ether and sodium hydroxide from the procedure.

The sodium hydroxide was replaced by sodium carbonate, a weaker base. The ether extraction was replaced with a precipitation and filtration that used ethanol instead of ether. The original procedure along with the revised procedure was run in the Organic Chemistry Lab course this year in block six, in order to see how the yields and quality of the crystals compare to each other.

Elijah Schumacher, '15 **Marshfield, VT**
Environmental Studies
Sponsor: Tammy Middlestein

Exploring Conservation Systems in Madagascar

The impoverished island of Madagascar is frequently considered one of the world's highest biodiversity conservation priorities due to its high rate of species endemism and severe habitat destruction. I traveled to Sainte-Luce, a small fishing town in Southeastern Madagascar, to explore some of the conservation strategies used to protect the endangered littoral forest and the rare creatures it holds. The research focused on volunteer-scientist based conservation in which people volunteer time to collect data, teach English and Environmental education, and learn about the littoral forest. This project offers an overview of specific conservation projects ongoing in Sainte-Luce, a discussion of some of the obstacles to implementing conservation strategies, cultural values that may assist or detract from conservation efforts, and an assessment of pros and cons of volunteer based conservation systems.

Ryan Shanks, '16 **Des Moines, IA**
Geology *Sponsor: John Orcutt*

Types of Pathology in Megalodon Shark Teeth and the Implications for Feeding Habits and Health

Deformities such as pathologies and pseudopathologies found within fossil specimens can be informative about an ancient species. One species in particular about which we still know far too little is *Carcharodon megalodon* (the largest shark species in history). In this study I examined the types of pathologies and pseudopathologies and their frequency in *C. megalodon* teeth in order to determine their patterns of occurrence and what they meant for the species. From this research and future research, I hope to be able to draw insight into factors of *C. megalodon* life, such as its hunting style and be able to compare the patterns of pathology and pseudopathlogy in *C. megalodon* to other shark species in an attempt to determine whether *C. megalodon* belongs to the genus *Carhcarodon* or the genus *Carcharocles*. The research I conducted consisted of recording data on *C. megalodon* teeth from the Field Museum. I recorded general information including the size of the teeth, their positions in the mouth, and whether there were any pathologies or pseudopathologies and if so, what types. I then determined the rates of pathology and pseudopathology in the teeth sorted by different variables in order to understand how each variable effects the pathology rate.

I found that as size increases, the rate of both pathology and pseudopathology increases and that more often than not, pathologies and pseudopathologies occur towards the front of the mouth. In addition to physical reasons, there may also be behavioral reasons for why large teeth seem to be more susceptible to pathology and pseudopathology such as the larger, adult *C. megalodon* sharks hunted larger prey such as whales and other marine mammals (as apposed to the fish that juveniles hunted), and the bone of marine mammals enable the teeth to be knocked out and bitten more easily. A possible explanation for the pattern of pathology relating to teeth from the front area of the mouth of *C. megalodon* is that this area had a greater chance for injury from feeding and thus, a greater chance for the formation of pathologies and pseudopathologies

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Stephen Smith, '15 **Coventry, RI**
Music *Sponsor: Aaron Perrine*

Unconventional Materials: Exploring Electronic Music Through "The Ra Expeditions"

The *Ra Expeditions* is a musical work for fixed media that I composed in spring of 2014. The title comes from a particular transatlantic voyage of Thor Heyerdahl, in which he sailed Ra, a boat he made out of papyrus. The piece was created by recording various household, non-musical sounds, including the crumpling of paper (in homage to Heyerdahl's papyrus boat), the dropping of coins, and the flicking of rubber bands. Each sound was edited by changing the pitch, equalization, reverb time, phasing, etc, creating a sound palette with which to compose. The challenge then was to organize the resultant sounds into a form that resembles music, through special attention to timbre and the layering of different sounds. The notion of using prerecorded, household sounds, and the formal emphasis on timbre can be traced back to the influence of electronic composers including Edgar Varese and Karlheinz Stockhausen, as well as acoustic sound-mass composers like György Ligeti. In my presentation, I will explore the process of changing raw sounds into musical motives and discuss the historical movements that influenced this approach.

Tanner Stirrat, '15 — **Tucson, AZ**
Thao Nguyen, '15 — **Ho Chi Minh City, Vietnam**
Computer Science and Statistics — *Sponsors: Ross Sowell & Ann Cannon*

Topic Mapping: Finding Themes and Threads in Ferguson Tweets

This study sought a programmatic way to analyze large bodies of Twitter data to find thematic and semantic trends. Many current approaches to Twitter data analytics rely on fairly basic searches, such as identification of particular hashtags. While these hashtags can be useful and descriptive when it comes to finding the threads of conversations revolving around a particular topic, not every Twitter user uses them, nor is the content of the tweet necessarily reflected by the hashtag used. The current approach sought to rectify this shortcoming, looking specifically at the body of the tweet and its language. As an example of this approach, we present our analysis of a body of tweets that center on the events in Ferguson, MO and the threads of discussion that we found. Additionally, we anticipate that what we've learned can be applied to any Twitter analysis, agnostic of topic or event.

Jon David Stroud, '15 — **Mount Vernon, IA**
Art & Art History — *Sponsor: Christina Penn-Goetsch*

The Sorcerer Bemused: Magic and Melancholy in Salvator Rosa's Democritus in Meditation

Salvator Rosa's etching *Democritus in Meditation* appears at first glance to be nothing more complex than a particularly intricate depiction of the vanity of human endeavors, and most scholars choose to analyze it in this context alone. Deeper scrutiny, however, reveals a fertile link to Renaissance notions of the artist and the melancholy temperament, specifically in regards to the figure of the melancholic sorcerer. Following the suggestions of Ernst Kris and Otto Kurz in *Legend, Myth, and Magic in the Image of the Artist*, it becomes unmistakably clear that the artist has always been attributed supernatural faculties, operating somewhere between "evil magician and mighty creator." By taking into consideration the preexisting melancholy portraits that preceded and influenced Rosa's *Democritus* and the group of symbols common to both melancholy and arcane subjects, as well as the corpus of witchcraft paintings executed by Rosa, we can positively identify a subtext of magic in a work which is ostensibly only about vanitas, thereby establishing a link between attitudes toward melancholy and the belief in the occult.

Shivani Suresh, '15
Psychology

Kigali, Rwanda
Sponsor: Carol Z. Enns

Psychological Implications on Child Survivors of the Rwandan Genocide with Regards to Mental Health

What are the psychological implications on child survivors of the Rwandan genocide? The Rwandan genocide of 1994 was one of the most brutal massacres in history with over a million people killed in less than 100 days. Some of the outcomes of this for the still living are multiple cases of psychological trauma, incidents of post-traumatic stress disorder (PTSD), and several mental health issues as perpetrators as well as survivor victims grapple with the scale of the carnage that took place in the country. This research looks at the psychological effect of genocide survivors, particularly on children aged 8-18, with regards to posttraumatic-stress disorder, trauma, depression and anxiety. Methodology for data collection include surveys, measuring trauma on the IES (Impact of Event Scale) and first person accounts. This research showed that some sub-groups within the age group of 8-18 are more vulnerable to mental health issues, particularly children who are also heads of households, older children (13-18) and females. It highlights the need for adequate and immediate need for mental health care for those children. However, due to lack of education, poverty and/or geographic location, several thousand children are kept from receiving them.

Erinn Voas, '15
Arabic and International Relations

Chanhassen, MN
Sponsor: Lynne Ikach

National Security in Jordan and the Middle East

Jordan is a small developing country in the Middle East with an evolving set of national security problems. While studying in Amman for an academic year, I held an internship with the Middle East Scientific Institute for Security (MESIS). The organization connects international development agencies with local professionals and scientists in order to improve Jordan's national security. Instead of strictly defining national security to military matters, MESIS focuses on comprehensive border, energy, environmental, and weapon security. This holistic approach will prepare Jordan for a changing political future. Expanding this approach to the rest of the Middle East would help with pressing environmental concerns, sustainable growth, and regional military security.

Jihang Wang, '15 **Centuria, WI**
Biochemistry & Molecular Biology *Sponsor: Barbara Christie-Pope*

Evaluating Neuronal Survival by Nuclear Morphology and Luciferase Assays

Mitochondria are essential for cellular respiration and ATP synthesis. Mitochondrial fusion is associated with genomic integrity and neuroprotection while mitochondrial fission is related to the increase in cell death and neuronal vulnerability. Mitochondrial fission requires the recruitment of dynamin-related protein 1 (Drp1) to the outer mitochondrial membrane where it assembles into ring-like structures which split the membrane via GTP hydrolysis. Mutations of the two short Drp1-interaction repeats of mitochondrial fission factor (Mff) block the recruitment of Drp1 and therefore the fission process. We correlated neuronal survival with mitochondrial length following culture models of stroke injury. The luciferase assay and nuclear morphology assay were used to evaluate the survival of differently-transfected neurons. Our work would provide a novel avenue to the alleviation of stroke and other neurodegenerative diseases by screening for biologically-active small molecules which would silence key players in mitochondrial fission to increase overall mitochondrial integrity.

Jihang Wang, '15 **Centuria, WI**
Chemistry *Sponsor: Craig Teague*

Investigation of CO2 Capture and Separation in Room-temperature Ionic Liquid

The ability to selectively and efficiently separate CO2 from gas mixtures is of huge interest due to the prevalence of CO2 as an industrial byproduct and its global-warming potential. Compared to amine solutions, separation by room-temperature ionic liquids (RTILs) possess numerous advantages including negligible vapor pressures and low desorption energies. To understand the interaction of the surface of RTILs with CO2 at the molecular level, we characterize CO2 binding mechanisms using analytical methods including X-ray diffraction (small/wide-angle X-ray scattering), gravimetric/thermogravimetric analysis, viscosity measurements, Raman spectroscopy, and Fourier transform infrared spectroscopy (in situ variations of pressure and temperature). Our collaborators from the University of California – Riverside are substantiating our results with theoretical calculations. We also investigate the flow of CO2/N2 mixture through RTILs and polymer membranes, using membrane test systems coupled with gas chromatography, to identify materials with high selectivity and fast diffusivity. Our work aims to produce future energy savings consistent with the mission of U.S. Department of Energy.

Janessa Weightman, '15 **Roscoe, IL**
Classical Studies *Sponsor: John Gruber-Miller*

The Never Ending Battle: Odysseus and PTSD

War is not just physical combat, but also an emotional struggle. After ten years of a physically and emotionally taxing war in Troy, Odysseus had another ten-year journey of extreme physical and emotional peril before he was able to complete his nostos—his journey home. Odysseus' behavior throughout *The Odyssey* bears striking similarity with those who experience Posttraumatic Stress Disorder (PTSD) after years in war: depression, extreme emotional responses, and hyperarousal. Following the ten years of combat exposure detailed in *The Iliad*, the succeeding ten years in *The Odyssey* chronicles three specific forms of trauma: combat exposure, disasters of supernatural proportions, and the loss of companions. The tension built throughout the poem culminates in the slaughter of the suitors residing in his home. Homer's *The Odyssey*, stripped of the epic overtones, tells the tale of a man who is attempting to cope with the trauma he has experienced throughout the last twenty years of his life.

Nicole Werling, '15 **Cedar Rapids, IA**
Geology *Sponsor: John Orcutt*

Grazers vs. Browsers: A Study of Diet Amount the Horses at Ashfall Fossil Beds, Nebraska

The evolution of equids (horses) has been extensively studied and is often used as an example of how evolution occurs, and has many times been used to prove that evolution does in fact occur. Horses appear in North America early in the Eocene at about 55-50 Ma. The story of horse evolution in North America focuses mainly on how horses have adapted to changes in the environment. Before grasslands emerged horses are thought to have been browsers, meaning that their diet consisted mostly of soft leafy vegetation or fruits. As grasslands started to replace forests during the Miocene (23-5.3 Ma), it is believed that the main food source for horses became the abrasive grasses found in the grasslands. This meant that horses would benefit from higher crowned teeth that would not wear down as easily while eating these abrasive grasses.

Recently, multiple studies have questioned this simple evolutionary story as evidence has been found that horses were still browsers long after they evolved hypsodont teeth.

In this study, mesowear analysis was performed on the teeth of 22 specimens from the Ashfall Fossil Bed site in Antelope County, Nebraska. These specimens represent 4 different genera that were alive and living together in this area around 11.8 Ma.

Even though there were multiple species of horses competing for the same food source, and, in contrast to other recent studies, the results support the traditional horse evolution story. The horses at Ashfall were mainly grazers, and there was little variation between the different genera.

More data from other sites in Nebraska would provide validation to this study. Also, mesowear

analysis data from a site in Oregon that is similar in age to Ashfall would give a good set of comparison data and show if a different environment with a different variety of food sources would yield different results, results in which the hypsodont horses were actually browsers.

Emmet Wilder, '15 **Oak Park, IL**
Geology *Sponsor: Ben Greenstein*

Coral mortality recorded in Bahamian reef sediments

Coral populations have declined significantly over the past few decades in a phase shift towards macroalgae. Until the advent of white-band disease in the early 1980's, Acropora cervicornis was a dominant coral in reefs throughout the Caribbean. In an effort to determine precedence for such a die-off, scientists tested for a signature in the Pleistocene fossil record. The current mass-mortality of A. cervicornis is found to be unprecedented in the fossil record. Yet, preservational bias of soft macroalgae could allow for this event to pass unseen in the fossil record. An increase in coral mortality leads to a higher ratio of coral skeletons to other constituent particles. If recent mortalities are recorded in the sediment, then a particle analysis of several reefs surrounding San Salvador Island, Bahamas should reflect their different histories and mortalities. I tested this hypothesis by doing a constituent particle analysis on the aforementioned reefs and comparing the results to coral mortality history. Preliminary results suggest that reef sediments are indeed influenced by coral mortality.

Tianzi Zhang, '15 **Xi'an, China**
Chemistry *Sponsor: Charles Liberko*

A Modified Continuous Flow Multi-step Syntheses of MOED and Its Derivatives

Merocyanine dyes exhibit fascinating chromic effects which make them good materials for undergraduate students to explore the fundamental knowledge of solvatochromic, thermochromics effects, and even aggregation and fluorescence of the conjugated compound. MOED (1-methyl-4-[(oxocyclohexadienylidene)-ethylidene]-1,4-dihydropyridine) has been noted for its solvatochromic effect, which means that the color of the solution will change when the compound is dissolved in solvents with different polarities. However, the long and complex synthesis steps have made MOED unavailable for undergraduates as a satisfactory organic chemistry lab experiment. This poster outlines a one-pot synthesis of MOED, which aims to shorten the time, save materials, and get a higher yield. Therefore, students could finish the experiment in a regular three-hour lab period. The modified experimental procedure has made the dyes easier to be synthesized without compromising its quality and yield.

Cornell College Student Symmposium

Inaugurated in the spring of 1997, the Cornell College Student Symposium provides an annual opportunity for undergraduate students on the Hilltop to share the fruits of their study in a forum that encourages wide community participation and attendance. Students who have done interesting and accomplished work in the setting of regular term courses or in independent research may be invited to present by faculty members or may themselves seek faculty sponsorship. Over a period of weeks beginning in the late fall, and with the assistance of their faculty sponsors, students indicate their intention to present, prepare a brief abstract of their work for inclusion in the Symposium program, and formulate the presentations themselves. The event, coordinated by a faculty steering committee in conjunction with the Center for Teaching & Learning, occurs in April each year.

The Symposium features three modes of presentation. One is an oral presentation of 20 minutes summarizing the project and its findings before a seated audience. Another is a poster presentation offering a graphic representation of the project along with explanatory comments made for the benefit of an audience circulating among the various poster displays. A third mode is the performance/lecture, particularly tailored to the fine arts. All of the presentations are made in concurrent sessions, some organized by mode of presentation, others by topical theme.

For presenters, the Symposium offers a prime setting for refining ideas, sharpening skills, and receiving feedback from the campus community, including students and faculty members in and beyond the presenters' major programs. For attendees, the Symposium offers a rich sampling of liberal arts research, represented by the work of dozens of students, in every academic division. For the College, the Symposium offers a memorable enactment of academic community, the contemporary realization of a historic ideal.