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John Wesley Powell Student Research  
Conference

2015, 26th Annual JWP Conference

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Apr 18th, 7:30 AM - 8:00 AM

## Complete 2015 Program

Illinois Wesleyan University

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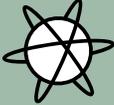
THE TWENTY-SIXTH ANNUAL

2015

Illinois Wesleyan University  
John Wesley Powell

**STUDENT**  
RESEARCH CONFERENCE

To Recognize the Research Projects & Creative Endeavors of IWU Students






Center for Natural Sciences  
& State Farm Hall

Saturday

APRIL 18

**2015**

<http://www.iwu.edu/jwprc>

*The conference is named for explorer and geologist John Wesley Powell, a one-armed Civil War veteran and a founder of the National Geographic Society who joined Illinois Wesleyan University's faculty in 1865. He was the first U.S. professor to use field work to teach science. In 1867 Powell took Illinois Wesleyan students to Colorado's mountains, the first expedition of its kind in the history of American higher education. Later, Powell was the first director of the Smithsonian Institution's Bureau of Ethnology.*

Twenty-Sixth Annual  
John Wesley Powell • IWU

# Student Research Conference

Center for Natural Sciences and State Farm Hall

Saturday, April 18, 2015

*Official Program*

## **ACKNOWLEDGEMENTS**

The John Wesley Powell Research Conference Committee would like to acknowledge the contributions of several individuals.

This conference could not have been a success without the contributions of Pat Neustel, Associate Provost's Office, in organizing many aspects of the conference and assembling and printing the program booklet.

The invaluable assistance provided by Mike Welsh and his staff at Sodexo Campus Services in setting up breakfast, luncheon and other refreshments is gratefully acknowledged.

The assistance of Information Technology Services in setting up computer equipment in all rooms along with Ann Aubry and Michael Gorman for registration and website consultation is greatly appreciated.

John Wesley Powell Research Conference Committee:

- David Vayo (Music)
- Christopher Callahan (French)
- Daniel Roberts (Mathematics)
- Edgar Lehr (Biology)
- Michael Seeborg (Economics)
- Marcia Thomas (Ames Library)
- Crystal Boyce (Ames Library)

## **WALLS AND BRIDGES THEME**

As part of Illinois Wesleyan's strategic initiatives and commitment to a strong intellectual campus environment, we continue to enhance the use of intellectual themes in curricular and co-curricular programming. This year's theme is "Walls and Bridges". The world continues to be marked by the construction and demolition of both walls and bridges - physical, economic, ideological and political. They serve to separate and unite; however, they are also complex – informed by history, power and ideas. The theme of "Walls and Bridges" calls upon us to examine relations of power and people, in the past, in the present and in the future.

## SCHEDULE OF EVENTS

**Saturday, April 18, 2015**

8:30 a.m.	Continental Breakfast and Poster Setup	Atrium of CNS and State Farm Hall
9:00 a.m.	Poster Session A Poster Presentations – Educational Studies	Atrium of CNS State Farm Hall
10:00 a.m.	<i>Oral Presentations – Session One</i> <i>Oral Presentations – Educational Studies</i>	CNS SFH
11:00 a.m.	<i>Oral Presentations – Session Two</i> Poster Presentations – Educational Studies	CNS SFH
12:15 p.m.	Luncheon  Music Composition Performances  Keynote Address: Kim Potowski	Young Main Lounge
2:00–3:00 p.m.	Poster Session B	Atrium of CNS
3:00 p.m.	Senior Art Show and Critique	Merwin and Wakeley Galleries

**KEYNOTE SPEAKER**

**“HOW I BECAME A LANGUAGE ACTIVIST”**

Kim Potowski, Associate Professor of Spanish Linguistics  
University of Illinois at Chicago

Kim Potowski is associate professor of Spanish linguistics at the University of Illinois at Chicago. Her research focuses on describing and promoting Spanish use in the United States.

She has authored, co-authored, and edited works including *Language and identity in a dual immersion school* (Multilingual Matters 2007), *Bilingual youth: Spanish in English-speaking societies* (John Benjamins 2008), *Language diversity in the USA* (Cambridge University Press 2011), *Heritage language teaching: Research and practice* (McGraw Hill 2014) and *El español de los Estados Unidos* (Cambridge University Press 2015).

She has also authored two Spanish textbooks, one for beginners and a composition book for heritage speakers and advanced second language learners. She is executive editor of the journal *Spanish in Context* and co-director of the Language in Context Research Group at the University of Illinois at Chicago. You can learn more about her work at [potowski.org](http://potowski.org).

**STUDENT PARTICIPANTS**

Oral and Poster Presentations

Olive-Kemi Adeleye	P1	Ethan Gelke	P24
Alyssa Aiello	P2	Jonathan Gholson	O12.2
George Alex	P3	Gregory Goeden	Music
Jennifer Altman	P4	Sarah Gooding	P11
Samuel Aronson	P5	Sarah Goth	ES
Stephanie AuBuchon	P6	Meghan Gradle	P25
Randy Azuogu	O7.1	Nicole Greenhill	P26
Jessica Beringer	ES, O8.3	Kristen Grisamore	O5.1
Alexandra Bidner	ES	Tanya Gupta	P23
Jennifer Bjorklund	P7	Tyler Hatcher	O1.1
John Blumenreich	ES	Casie Henrikson	P27
Anthony Bohner	P8	Meghan Henwood	ES
Hannah Bowen	ES	Kelli Herlitz	ES
Thomas Bravos	Music	Ross Hettinger	P11
Timothy Broederdorf	P9	Nathaniel Hocker	O12.1
Kathryn Bulandr	P10	Natalie Hoijer	O6.2
Caitlin Cadwalder	P11	Ryan Holden	P28
Stephanie Carlson	O5.4	Ene Ikpebe	O1.2
Dominique Castle	P12, O3.3	Bradley Jenisch	ES
Aida Cheung	P14	Mallika Kavadi	O10.3
Jennifer Chlebek	P13	Tess Kelley	P4
Christopher Crown	P15	Samuel Kim	P7
Cynthia Cruz	O10.1	Beatrice Koka	P30
Sean Curtin	ES	Jessica Kraut	P6
Jessica Davis	ES	Nitesh Kumar	P31
Amy DeBoer	ES	Nicholas Lazzara	P33
Margaret DeMaegd	P16	Toan Le	P3
Meagan DeSalvo	ES	Meghan Linder	P14
Donald DeSalvo	ES	Johanna Linman	ES
Michael Dickinson	O2.3	Lunjun Liu	P17, P18, P32, P40
Zhenghao Ding	P17, P18, P32	Michelle Lui	ES
Michelle Dominguez	P19	Melissa Mariotti	ES
Nathaniel Douglas	ES, O3.2, O8.2	Colleen Melone	O5.2
Hannah Eby	O6.1	Jennifer Merrill	O9.3
Spencer Eidsmoe	P11	Jordan Miller	P14
Jordan Eldridge	P11	Megan Mink	P11
Rachel Ende	P20	Lisa Mishra	O4.1
Atul Eppurath	P21	Meaghan Mormann	P4
Ethan Fischer	P5	Luke Mueller	O5.3
Katherine Ford	P22	Niall Mulcahy	ES
Yizhe Gao	O11.1	Gwenyth Naftzger	ES
Annmarie Gast	P23	Nicole Nelson	P23, P34

*continued.....*

THE JOHN WESLEY POWELL STUDENT RESEARCH CONFERENCE - APRIL 2015

Duc Nguyen	O7.3	Rachel Wimberly	O4.2
Tung Nguyen	O7.2	Ruomeng Zhang	O12.3
Mark Nosiglia	P35	Wenting Zhao	P44
Kyle Nottingham	P33	Jinze Zheng	P45
Kyle O'Daniel	ES	Kaitlyn Zieman	P46
Jessica Omark	P5	Zachary Zimmer	P47
Candace Parrott	O8.1		
Alexandra Partipilo	ES		
Stephanie Patton	P36		
Jennifer Prochotsky	P37		
Krystal Randazzo	ES		
Colin Rathe	ES		
Tyler Rauwolf	P38		
Kasey Reaber	ES		
Tiffany Remijas	P14		
Joseph Richards	P3		
Lydia Rudd	P39		
Joseph Ruskey	O2.2		
Alexander Samuel	ES		
Angel Sanchez	ES		
Ryan Schonert	P30		
Amy Seter	O9.3		
Thomas Simmons	O11.2		
Amelia Smith	O3.1		
Audrey Smith	P14		
Samantha Sorenson	P41		
Jadeah Spindler	P14		
KiriLi Stauch	P42, O9.2		
Lauren Streblo	O9.3		
Colleen Swanson	ES		
Lexia Swope	O10.2		
Ian Taylor	P11		
Ashley Tegge	O9.1		
Ruchen Tian	P14		
Jeffrey Toraason	P5, P8		
Daniel Truesdale	O1.3		
Brendan Wall	P8		
Sen Wang	O4.3		
Natalie Weimer	P5		
Kimberly Wenger	O11.3		
Michael Wettengel	O2.1		
Jessica White	P43		
Randi Wilson	P11		

**BA/BFA SENIOR EXHIBITION PRESENTATIONS  
SCHOOL OF ART**

**Saturday, April 18, 2015, 2:00 p.m., Merwin and Wakeley Galleries**

Student Presenters:

Eric Novak

Devon Redlin

Nikki Taylor

*Refreshments will be served*

**MUSIC COMPOSITION STUDENT PRESENTATIONS**

**Saturday, April 18**

**12:15 p.m.**

**Young Main Lounge, Memorial Student Center  
(as part of the conference luncheon program)**

*from* Four Moons  
I. Io

Gregory Goeden '15

Gregory Goeden, Jeremy Gruner, trumpet  
Zachary Siegel, Christopher Cooper, trombone

Flow

Thomas Bravos '17

Thomas Bravos, voice, piano  
Celia Williams, voice  
Matthew Capone, trumpet  
Krystyna Lopez, violin

Music Presentation

**IO – MOVEMENT 1, FROM “FOUR MOONS FOR BRASS QUARTET”**

Gregory Goeden and David Vayo\*  
School of Music, Illinois Wesleyan University

“Io” is the introductory movement of a four-part suite, entitled *Four Moons for Brass Quartet*, by Gregory Goeden (Music Education ‘15). As suggested by the title, the four movements of the work were modeled after a specific set of astronomical entities, the four Galilean moons of Jupiter.

These celestial satellites provided inspiration for this work in a number of different ways. Scientific observations and measurements for each moon, such as diameter, mass, density and composition, provided melodic and harmonic ideas through a 20<sup>th</sup> century musical process that is commonly referred to as “pitch set theory.” The visual and physical qualities of each moon, and their relationships with one another, also influenced many musical decisions. The programmatic directions of the various movements were derived, in part, from the Greek mythology associated with the names of each moon: Io, Europa, Ganymede and Callisto.

Music Performance

**FLOW**

Thomas Bravos and David Vayo\*  
School of Music, Illinois Wesleyan University

*Flow* was composed in the Spring of 2014 and premiered in its entirety during the April Student Composition Concert here at Illinois Wesleyan University. I composed the piece during an emotionally tumultuous time, and it represents many events that were occurring cyclically in my life at the time. The emotional events that directly inspired *Flow* were like opposite sides of a coin: one being relationships attempting to grow and the other being relationships gradually turning sour, needing to be left behind. These ideas are represented by the piece revolving around the recurring motive, showing how these events constantly wove in and out of my life for a lengthy time.

**ORAL PRESENTATIONS- SESSION 1**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (C102)**  
**Economics**  
**MODERATOR: Ngoc (Cindy) Nguyen**

- 1.1 Tyler Hatcher (Economics)
- 1.2 Ene Ikpebe (Economics)
- 1.3 Daniel Truesdale (Economics)

**ORAL PRESENTATIONS - SESSION 2**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (E101)**  
**Creative Writing, Novels/Short Stories**  
**MODERATOR: Anna Lowenthal**

- 2.1 Michael Wettengel (English)
- 2.2 Joseph Ruskey (English)
- 2.3 Michael Dickinson (English)

**ORAL PRESENTATIONS - SESSION 3**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (E103)**  
**Modern European Literature**  
**MODERATOR: Jahona Osmani**

- 3.1 Amelia Smith (German)
- 3.2 Nathaniel Douglas (Hispanic Studies)
- 3.3 Dominique (Nikki) Castle (International Studies)

**ORAL PRESENTATIONS - SESSION 4**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (E104)**  
**Religion and Sociology**  
**MODERATOR: Grace McCarten**

- 4.1 Lisa Mishra (Religion)
- 4.2 Rachel Wimberly (Sociology)
- 4.3 Sen Wang (Sociology)

**ORAL PRESENTATIONS – SESSION 5**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (E102)**  
**History**  
**MODERATOR: Stephanie Stahl**

- 5.1 Kristen Grisamore (History)
- 5.2 Colleen Melone (History)
- 5.3 Luke Mueller (History)
- 5.4 Stephanie Carlson (History)

**ORAL PRESENTATIONS - SESSION 6**  
**10:00 – 11:00**  
**CENTER FOR NATURAL SCIENCES (C101)**  
**Music**  
**MODERATOR: Cathryn Volk**

- 6.1 Hannah Eby (Music)
- 6.2 Natalie Hoijer (Music)

**ORAL PRESENTATIONS - SESSION 7**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (C102)**  
**Economics and Finance**  
**MODERATOR: Lu Liao**

- 7.1 Randy Azuogu (Economics)
- 7.2 Tung Nguyen (Economics)
- 7.3 Duc Nguyen (Finance)

**ORAL PRESENTATIONS – SESSION 8**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (E101)**  
**Renaissance Literature**  
**MODERATOR: Hannah Eby**

- 8.2 Nathaniel Douglas (Hispanic Studies)
- 8.3 Jessica Beringer (Hispanic Studies)

**ORAL PRESENTATIONS - SESSION 9**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (E103)**  
**Psychology and Nursing**  
**MODERATOR: Austin Charlet**

- 9.1 Ashley Tegge (Nursing)
- 9.2 KiriLi Stauch (Psychology)
- 9.3 Jennifer Merrill, Amy Seter, Lauren Streblo (Psychology)

**ORAL PRESENTATIONS - SESSION 10**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (E104)**  
**Sociology**  
**MODERATOR: Rebecca Fiedler**

- 10.1 Cynthia Cruz (Sociology)
- 10.2 Lexia Swope (Sociology)
- 10.3 Mallika Kavadi (Sociology)

**ORAL PRESENTATIONS – SESSION 11**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (E102)**  
**Mathematics**  
**MODERATOR: Yolanda Juarez**

- 11.1 Yizhe Gao (Mathematics)
- 11.2 Thomas Simmons (Mathematics)
- 11.3 Kimberly Wenger (Mathematics)

**ORAL PRESENTATIONS - SESSION 12**  
**11:00 – 12:00 NOON**  
**CENTER FOR NATURAL SCIENCES (E105)**  
**Chemistry and Physics**  
**MODERATOR: Kevin Roenitz**

- 12.1 Nathaniel Hocker (Chemistry)
- 12.2 Jonathon Gholson (Physics)
- 12.3 Ruomeng Zhang (Physics)

Presentations are 12-15 minutes in length. If time permits, there will be a question-and-answer period for all presenters following the final presentation.

Oral Presentation O1.1

## **WHAT IS THE SUPERSTAR EFFECT FOR AN NBA FRANCHISE?**

Tyler Hatcher and Michael Seeborg\*  
Economics Department, Illinois Wesleyan University

This paper aims to see how superstars in the NBA affect the teams they play for. Based on the economic theory of sports, demand for labor, and the concept of business valuation theories, the effects of the number of superstars on franchise success was examined. The top 40 Superstars were selected each year based on the player efficiency rating statistic. The PER is a summation of many variables such as points per game, minutes per game, and field goal percentage. The focus was on how superstars specifically effect wins, revenue and team valuation for an NBA franchise. All thirty NBA teams were studied through a five-year period (2009-2014). It was hypothesized that having a superstar on a team would lead to an increase in wins, revenue and valuation. Descriptive statistics supported this expectation. Multiple regression analysis also supported the hypothesis that the more superstars a team have the greater the number of wins. However, the number of superstars was not found to be as important of a predictor of revenue and valuation.

Oral Presentation O1.2

**ANALYSIS OF LABOR MARKET PERFORMANCE OF COLLEGE-  
EDUCATED AFRICAN IMMIGRANTS IN THE UNITED STATES**

Ene Ikpebe and Michael Seeborg\*  
Economics Department, Illinois Wesleyan University

Because African immigrants have become a significant presence in the United States in the past few decades, understanding the dynamics of the immigrant labor market is important. In this paper, I build on my previous research which shows incomplete assimilation of African immigrants with natives. I further investigate the effects of immigrant specific variables such as education, time of arrival in the U.S., and English-speaking abilities, on their wages in the U.S. labor market. Using a cross sectional data set from the American Community Survey, this study employs OLS regression analysis to test hypotheses about how the aforementioned human capital and immigration variables affect immigrant and native earnings. Results show that after controlling for education, African immigrants are at an earnings disadvantage compared to natives. I also find that African immigrants that are non-citizens are at a greater disadvantage than those that are naturalized citizens, and late arrivals are at a greater disadvantage than early arrivals.

Oral Presentation O1.3

## **INCENTIVIZING CADAVER ORGAN DONORS**

Daniel Truesdale and Craig Broadbent\*  
Economics Department, Illinois Wesleyan University

This article analyzes the use of monetary incentives to increase the supply of cadaver organs in Bloomington, Illinois. The focus is whether a waiver of a driver's license fee can increase the supply of cadaver donors. In addition, the dynamics of organ donation are addressed and bivariate regressions are utilized to test if being a college student, religion, age, gender, and overall knowledge of donation has any impact on being an organ donor and willingness to accept the monetary incentive. Finally, the concern that a monetary and altruistic market can coexist is addressed in the paper. Utilizing sample z-tests, we discover that a small incentive has a significant impact increasing the number of cadaver organ donors for the studied population and the introduction of the market would not deplete altruistic donations. Utilizing binary regressions, this paper concludes "students" are more likely to respond to the incentive, relative to non-students.

Oral Presentation O2.1

## **LANDFALL: A FANTASY NOVEL**

Michael Wettengel and Michael Theune\*  
English Department, Illinois Wesleyan University

Landfall is a novel the first in a series composed of two trilogies. It, on paper at least, lives in the fantasy genre, though I have taken many efforts to differentiate it from the oversaturated genre of heroes, elves, and dragons. Landfall's main character is William, an engineer who is nearly blind from a childhood injury. He and his wife find themselves under the scrutinizing and ambitious gaze of Alistair Steinholt, a young lord with a reputation for rashness and violence. All the while, a war that has been eating away at the country continues to rage unchecked. The desire to create a strong narrative and beautiful prose was, of course, important in Landfall's design, but its attention to the lives of normal people in a genre so often concerned with the mighty or heroic, is what will set it apart from other works in the genre.

Oral Presentation O2.2

## **DIABLO'S SADDLE**

Joseph Ruskey and Michael Theune\*  
English Department, Illinois Wesleyan University

For my presentation, I will read a section from my novel in progress, *Diablo's Saddle*. Four drifters arrive at Venice in the midst of running away from something that cannot be escaped. Each do their best to evade and confront their inner demons and those chasing them as they split up; one to Paris to kill a man who should have died long ago, one to Sardinia to battle with the monster of their nightmares, and the others rooted in place, waiting for something good to finally happen in their bleak alcohol fueled lives. Joe Ruskey's *Diablo's Saddle* is a maddening noir with violent hallucinatory prose poetry that searches for the wild amongst the thick foliage of an ever present narrator, who cannot help but remind the reader that we are made of our choices.

Oral Presentation O2.3

## **PROTECTION**

Michael Dickinson and Michael Theune\*  
English Department, Illinois Wesleyan University

For my submission to the conference, I will be reading a segment of “Protection” the short story I wrote in the fall semester of 2014 for Professor Theune’s Senior Writing Project. The story is composed of the correspondence between two brothers separated physically and emotionally by conflicts of love and war as they communicate with each other via email and messenger apps regarding the current events of their changing lives as well as those which took place before the beginning of the story. At the same time, the narrative moves backward in time to show readers parts of what happened in a pseudo love triangle to cause the initial drama between the two protagonists. This is an examination of the importance of the life changing decisions that people my age have to make at this time in our lives. It is a suspenseful novela geared toward examining colloquial dialogue between members of our generation at casual and dramatic moments.

Oral Presentation O3.1

## **KAFKA'S "DAS URTEIL" AND PHILOSOPHY OF THE PENAL SYSTEM**

Amelia Smith and Sonja Fritzsche\*  
German Department, Illinois Wesleyan University

In Kafka's short story "Das Urteil," Georg Bendemann's death has commonly been interpreted as a suicide. As Georg was sentenced to death by his father, an alternate motivation for his death is that of a "self-execution" of capital punishment. Using the framework of Immanuel Kant's philosophy, while a suicide is morally wrong, capital punishment is morally required. Georg's action is not one of individual weakness, but of compliance to judgment. Kafka presents a paradox of judgment and authority. Because Georg has not committed a crime befitting capital punishment, the sentence to death is unjust. However, in order to maintain the punitive system, Georg must comply. Though Kant believed in the moral justification for a punitive system, "Das Urteil" shows that a punitive system is imperfect—there will be unjust decisions. This makes the system dangerous. Kafka's lack of an offered solution at the end of "Das Urteil" suggests that he believed there may be no solution to this problem. The state is reliant on a punitive system, but the system is immoral and, at times, tyrannical.

Oral Presentation O3.2

**“SOME CREATURES WERE BORN TO LIVE”: A PSYCHOSOCIAL  
ANALYSIS OF *NADA* (1944)**

Nathaniel Douglas and Carmela Ferradans\*  
Hispanic Studies Department, Illinois Wesleyan University

Winner of the first Premio Nadal in 1945, *Nada* (1944), the first published work of then-unknown author Carmen Laforet, has remained a captivating, yet elusive work of Spanish literature. Since its very publication, readers, critics, and even censors have debated the true emancipatory message (or lack thereof) within the pseudo-autobiographical, confessional work. While the majority of critics maintain the novel's characterization as a feminist, female *bildungsroman*, dissenters cite traces of palimpsestic ennui mediated by the novel's complex narrative schema as reason to believe otherwise. This critical reading of *Nada* seeks to shed new light on these debates through the analytical framework of Bronfenbrenner's Theory of Nested Ecological Systems. The present analysis of relationships, environments, and systems presented to the modern reader throughout the novel seeks to refute critique of the novel as “a primer on self-discipline” (Barry 117) and further support the interpretation of the text as a tale of female emancipation and personal development in conservative post-civil war Spain.

Walls and Bridges



Oral Presentation O3.3

## **BETWEEN HISTORY AND STORY: VISUALIZING CONTEMPORARY POLISH CULTURAL IDENTITY**

Dominique Castle and Marina Balina\*  
International Studies Program, Illinois Wesleyan University

Contemporary Polish cultural identity is derived from shared memories of Poland's turbulent past. This project explores the role of media in the construction of "shared" national memory in Poland today. Cinematographic recollections of major traumatic experiences of the nation in 20th century history led to the creation of "prosthetic memory" ('borrowed' memories) by members of generations too young to recall events depicted. Three films, Andrzej Wajda's *Ashes and Diamonds* (1958), Agnieszka Holland's *To Kill a Priest* (1988), and Andrzej Wajda's *Katyń* (2007), represent an attempt to create such common experiences over the most divisive traumas in Polish history: WWII and the years of Soviet occupation. Fact and fiction, story and history are interwoven in these visual narratives. Wajda's *Katyń* will be explored as an example which utilizes fictional characters to relay actual historical events, shaping present day cultural memory and helping to create a new intergenerational bond.

Walls and Bridges



Oral Presentation O4.1

**ICONS & IMAGES, TEXTS & TRADITIONS:  
TOWARDS THE DEVELOPMENT OF AN INTERFAITH PRAYER SPACE AT  
ILLINOIS WESLEYAN**

Lisa Mishra and Nawaraj Chaulagain\* and Elyse Nelson Winger\*  
Religion Department, Illinois Wesleyan University

As the contours of American religious demography continue to develop and expand, there arises a need to engage its growing plurality in sincere and meaningful ways. Interfaith work has been instrumental in addressing this social transformation. Moving beyond the limits of tolerance – which, while necessary, cannot be the ultimate goal – pluralism uses the commonalities of all while celebrating the particularities that distinguish them from one another. On a college campus, this work manifests itself in the conversations we have, the programs we create, the communities we build, and the architectural spaces we provide. First, I study the religious history and spaces of Illinois Wesleyan. I then research worship across five faith groups in the US – Christianity, Judaism, Islam, Buddhism, and Hinduism. Lastly, I research issues and challenges concerning multi-faith centers on other college campuses and make suggestions for our own space to be opened fall of 2015.

Oral Presentation O4.2

**LESBIAN, GAY, AND BISEXUAL IDENTITY WORK – A COMPARATIVE  
STUDY BETWEEN THE US AND DENMARK**

Rachel Wimberly and Meghan Burke\*  
Sociology Department, Illinois Wesleyan University

Within the past ten years, research on the lesbian, gay, bisexual (LGB) community has increased drastically. While most of this work focuses on public opinion, this study concentrates on how LGB people interact with the public space, and the way in which society influences how they view themselves, not just in the United States, but in the happiest country in the world: Denmark. I conducted interviews with LGB people in Denmark and the US in order to get a better understanding of the ways that LGBs in both countries performed their sexual identity in public. I found that Danish LGBs are more likely than those in the US to concentrate on educating the public about their queerness. I argue that this may be because Danish LGBs are more comfortable expressing themselves as queer than American LGBs, given the liberal nature of their country.

Oral Presentation O4.3

**DESIRABLE AS A MAN? HEGEMONIC MASCULINITY AND  
ASIAN AMERICAN GAYNESS**

Sen Wang and Meghan Burke\*  
Sociology Department, Illinois Wesleyan University

More than a taxonomic tool, hegemonic masculinity entails a hierarchy of masculinities and manifests itself through its historically embedded negotiations of power within its borders and against its “others” (Connell and Messerschmidt 2005). In other words, hegemonic masculinity must be unpacked in relation to what it purports to reject. Following R.W. Connell’s study and Judith Butler’s analysis of gender performativity (1990, 1993), this paper seeks to expand our understanding of hegemonic masculinity as a structuring ideal by analyzing recent studies on gay Asian Americans’ experiences within the hierarchy of hegemonic masculinity. I argue that hegemonic masculinity sustains an economy of desire that prizes controlling images of white, middle-class, muscular bodies, causing potential psychological and physical harm to gay Asian Americans who fail to meet this norm (Han 2006). Hegemonic masculinity does the job of covering over, or negating, a vulnerability and communal identity that may resist these unjust distributions of power. The paper ends with a series of potentially fruitful questions for further research.

Oral Presentation O5.1

**CULTURAL TENSION IN THE ANTEBELLUM LOUISIANA  
SCHOOL SYSTEM**

Kristen Grisamore and Robert Schultz\*  
History Department, Illinois Wesleyan University

I will present on the subject of education in antebellum Louisiana, spanning from the late 1830s to 1860. During this time, Louisiana had established a public school system, opening a number of schools across the mostly-rural state. Students attended either the public schools or private schools established by the Catholic Church and various Protestant churches, but both options proved problematic. The school system was vocally criticized by prominent members of Louisiana society, including those closely associated with the public schools. Critics faulted the schools for their structural failures and the poor quality of teachers, among other problems. Through published writings on the schools such as in the popular journal *DeBow's Review*, many criticisms of Louisiana schools are revealed to stem from a fear of the South's cultural inferiority to the Northern states. The presentation will examine the effects of perceived cultural inferiority in writings on education in Louisiana.

Oral Presentation O5.2

**PUSHING THE LIMIT: AN ANALYSIS OF THE WOMEN OF THE SEVERAN  
DYNASTY**

Colleen Melone and Amanda Coles\*  
History Department, Illinois Wesleyan University

Women of the ancient world are frequently characterized by their lack of independence and legal rights. It is therefore often surprising for scholars when they begin to study the women of the imperial Roman families and discover the level of autonomy and self-governance that these women appear to have enjoyed. Applying Judith Butler's theory that actions create identity, this presentation will study the actions of the imperial women of the Severan dynasty and the ways in which they both obeyed and defied typical gender constructs in order to determine the identities of the Severan empresses. After clarifying who the women were, I will then utilize Butler's theories of identity to explain why the Severan women were able to act in ways contrary to traditional Roman gender roles. By applying Butler's theories of identity to the Severan women, which postulate the ways in which identity is formed and defined, as well as the ways in which various identities interact, this presentation will prove that while the Severan women had many identities, their imperial identity was most esteemed due to its ability to give them the freedom to step outside many aspects of their gender role and to behave in ways which would customarily be deemed inappropriate.

Oral Presentation O5.3

## **GENERAL DOUGLAS MACARTHUR: A CAREER OF DEFIANCE**

Luke Mueller and Michael Weis\*  
History Department, Illinois Wesleyan University

General Douglas MacArthur can be considered one of the premier military generals in United States history. However, MacArthur gained his renowned reputation through insubordination. MacArthur was inherently defiant. He consistently disobeyed the orders of his superiors, yet escaped disciplinary action. It was not until the Korean War that President Truman fired MacArthur and replaced him with General Matthew Ridgeway. It is troublesome that a man who so regularly disobeyed direct orders accomplished and sustained such success. My research seeks to understand why MacArthur was never cited for insubordination prior to his relief in April 1951. Evidence suggests that MacArthur's political allies, overwhelming national support, and military brilliance secured his job. It was not until his disobedience threatened U.S. security that he was relieved of command.

Oral Presentation O5.4

**CONFLICTING PERCEPTIONS:  
CHIVALRY IN 12<sup>TH</sup> CENTURY HISTORIOGRAPHY**

Stephanie Carlson and Michael Young\*  
History Department, Illinois Wesleyan University

Historians have found the task of defining medieval chivalry to be an elusive task. Chivalry was at the intersection of warrior culture, aristocratic values and religious ideals. By analyzing the texts of contemporary historians, William of Malmesbury, Orderic Vitalis and Henry of Huntingdon. Histories are a genre of resources that have not previously been systematically examined. I have found that contemporary historians were just as conflicted over these factors as modern historians. Comparing and contrasting twelfth century histories opens a new area of serious research into chivalric studies, and proves that chivalry was not a commonly-agreed upon set of standards, but had more to do with reconciling military purpose, aristocratic expectations and religious values. Twelfth-century commentators all ascribed different precedence to these factors and the examination of their connections between these values brings the nature of chivalry as a system of interactions between social elements into the open.

Oral Presentation O6.1

**“O! MY SON”: MUSICAL INTERPRETATIONS OF A FATHER’S GRIEF IN  
THE AGE OF JACOBAN RHETORIC**

Hannah Eby and Adriana Ponce\*  
School of Music, Illinois Wesleyan University

This study presents an analysis of musical rhetorical strategies found in four early seventeenth century settings of II Samuel 18:33. Composers Weelkes, Tomkins, Dering, and Ramsey transform this simple yet powerful text, developing uniquely persuasive renditions of David’s lament for Absalom. As their illustrative techniques reveal the exceptionally close connection between words and music in Jacobean England, differences in dramatic emphasis place these settings within the evolving emotional rhetoric of the period. Dramatic innovations and intensification in pathos set Weelkes’s and Tomkins’s interpretations apart, and their progressive strategies create cohesive stories of David’s journey through the grieving process. In joining the contemporary scholarly discussion of these settings’ interpretative considerations and compositional intent, this paper seeks to explore the implications of these different musical rhetorical approaches to ‘When David heard.’

Oral Presentation O6.2

**UNLEASHING MUSIC'S HIDDEN BLUEPRINT: AN ANALYSIS OF  
MATHEMATICAL SYMMETRIES USED IN MUSIC**

Natalie Hoijer and Mario Pelusi\*  
School of Music, Illinois Wesleyan University

The history of the development of mathematics and the development of Western music unleashes fascinating connections between the two fields and illustrates their similarities and dependence on each other. The human brain's logical functioning left side and creative functioning right side, as studied by psychobiologist Robert Sperry ("Whole Brain Development") are bridged together in this project as mathematical patterns meld with the art of musical composition. These studies investigate mathematical patterns such as the Fibonacci Series and the Golden Mean; as they apply to the composition of concert music, in comparison to other mathematical symmetries used as compositional tools, such as palindromes, crab canons, and fractals. This research explores the impact that these compositional techniques have on the style, structure, and aesthetic beauty of a composition as a whole, and thus considers how these techniques set the piece apart from other works that do not use such mathematics. The findings show that the Fibonacci Series and Golden Mean were the most effective compositional tools and yielded the most aesthetically pleasing results.

Oral Presentation O7.1

## **PRICE DETERMINANTS OF SULFUR DIOXIDE MARKET**

Randy N. Azuogu and Craig Broadbent\*  
Economics Department, Illinois Wesleyan University

The introduction of the U.S. Sulfur Dioxide (SO<sub>2</sub>) cap and trade market in 1994 has provided a significant approach to mitigating the hazardous effects of acid rain. The merit of the cap and trade program is within the design of the program itself because the cap determines the total SO<sub>2</sub> emission reduction, while the trading process determines which sources reduce their emission of SO<sub>2</sub> through the buying and selling of allowance permits. Although this milestone in environmental regulation has had an immense impact in the reduction of sulfur dioxide in the atmosphere, the focus of this research is to study the determinants that will ultimately establish the spot price for allowances. Through the use of regression analysis this paper analyzes key commodities prices, economic indicators, and environmental factors that is believed to play a primary role in the determination of allowance prices.

Oral Presentation O7.2

**INTRA-REGIONAL CURRENCY LINKAGE AND THE EVOLUTION OF  
EXCHANGE RATE REGIME OF THE ASEAN REGION**

Tung Nguyen and Amit Ghosh\*  
Economics Department, Illinois Wesleyan University

This paper investigates the intra-regional currency linkages and evolution of exchange rate regimes of the Association of South East Asian Nations (ASEAN) region. Do nations follow regimes they are classified into? Have exchange rate regimes of ASEAN nations become more flexible and less dependent on the US dollar? Are the intra-regional currency linkages strong enough for ASEAN nations to form a monetary union? Answers to these are important as the official regimes announced by ASEAN countries may not reflect their actual behaviors. Using monthly exchange rates per unit SDR and foreign exchange reserves data spanning the entire post-Bretton Woods era (1973-2014), and employing the Frankel-Wei estimation model, I find that before the Asian financial crisis period (1973-1996), ASEAN currencies were mostly de facto dollar peggers and the intra-regional currency linkages were very weak. However, post-crisis (1999-2014) ASEAN currencies have become more flexible and the intra-regional currency linkages have increased considerably.

Oral Presentation O7.3

**THE ROLE OF FOREIGN DIRECT INVESTMENT AND FOREIGN  
PORTFOLIO INVESTMENT ON THE  
FINANCIAL CONVERGENCE OF BRICS**

Duc Nguyen and Elisabeta Pana\*  
Economics Department, Illinois Wesleyan University

This study investigates the role of Foreign Direct Investment and Foreign Portfolio Investment flows on the degree of financial convergence of BRICS countries (Brazil, Russia, India, China, and South Africa) towards developed countries and global equity markets, at both national and sectoral levels. Beta convergence, sigma convergence, dynamic conditional correlation, and wavelet coherence approaches are employed using weekly stock indices returns to measure the level of co-integration of BRICS towards EU, U.S, and global equity markets. Empirical results show that correlations between BRICS and EU, U.S., and global equity markets vary over time, investment horizons, and economic sectors. The Foreign Direct Investment and the Foreign Portfolio Investment are found to have significant short-run Granger causality on the level of financial integration of Brazil, Russia, and India when no causal relationships are found for China, and South Africa.

Oral Presentation O8.2

## **LET'S TALK ABOUT SEX: PROMISCUITY, SOCIAL CRITIQUE, AND TRAGEDY IN *LA CELESTINA***

Nathaniel Douglas and Carolyn Nadeau\*  
Hispanic Studies Department, Illinois Wesleyan University

Originally published as a work in 16 acts of dialogue in 1499 and republished as a complete 21 act version in 1502, the *Tragicomedia de Calisto y Melibea*, better known as *La Celestina*, is a hallmark work of Spanish literature that marks the cultural transition into the Early Modern Age, sometimes called the *Siglo de Oro*. A *converso* living in a society of Christian normativity, Fernando de Rojas, author of *La Celestina*, takes issue with the cultural, religious, and economic homogeneity of the enforced ideals of the newly-united Spain of the Catholic Monarchs in his only literary publication. To arrive at this end, de Rojas makes heavy use of illustrative language in many forms, which, in some cases, leads to both veiled and direct references to sexual activity. The correspondence of these euphemisms with the rising dramatic action of the work links the practice to the futility of the text's main players. By his use of erotic language and dramatic ends, de Rojas provides acute critique of the increasing homogeneity of Early Modern Spain.

Walls and Bridges



Oral Presentation O8.3

**DISTANCE AND CONTROL: AN ANALYSIS OF NARRATIVE VOICE IN THE  
PICARESQUE NOVELS *LAZARILLO DE TORMES* AND *LA VIDA DEL BUSCÓN***

Jessica Beringer and Carolyn Nadeau\*  
Hispanic Studies Department, Illinois Wesleyan University

The typical Spanish picaresque novel relies heavily on a pseudo-autobiographical structure that inherently incorporates the perspective of the narrator. This narrator, commonly referred to as the *pícaro*, influences the way the reader interprets events based on the characteristics of his method of storytelling. The *pícaro*'s self-concept and self-representation, manner of discourse, and the overall narrative distance between the *pícaro* and his story affect the outcome of the novel. This investigation focuses specifically on the narration styles in the anonymous work *Lazarillo de Tormes* and Francisco de Quevedo's *La vida del buscón* and how they contribute to the way the reader views each *pícaro*.

Oral Presentation O9.1

## **LEVELS OF EMPATHY IN HEALTHCARE PROFESSION STUDENTS**

Ashley Tegge and Noel Kerr\*  
School of Nursing, Illinois Wesleyan University

Empathy is viewed as a central component in effective healthcare provider-patient relationships. There is evidence that health profession students lack empathy. A cross-sectional survey was completed to identify whether there is any relationship between empathy levels in health professions students who have or have not identified a projected specialty upon entry into practice, and compare these findings between baccalaureate nursing, psychology, pre-medical, pre-dental, pre-physical therapy, and pre-occupational therapy majors. A 28-item questionnaire was completed by a convenience sample of 202 students with declared majors in the health professions of interest. There was no significant difference between students of all majors who had or who had not indicated a projected specialty. Empathy levels in nursing students with a projected specialty were significantly higher than those of students in all other majors with projected specialties. Gender and age significantly influenced empathy levels between students of all majors with a projected specialty. These findings expand the current understanding of empathy and what may influence empathy levels in students planning to enter healthcare. Suggestions for future research are described.

Oral Presentation O9.2

**THE DOMESTIC DOGS' (*CANIS FAMILIARIS*) UNDERSTANDING OF  
INTENTIONAL AND GOAL ORIENTED ACTION**

KiriLi Stauch, Stephanie AuBuchon, and Ellen Furlong\*  
Psychology Department, Illinois Wesleyan University

Domestic dogs possess unique sensitivity to human social cues, perhaps due to our shared evolutionary history. We explored whether dogs share social cognitive abilities - understanding intentions and goals - humans demonstrate from infancy. In Study 1, dogs watched a researcher either unable (i.e. she dropped a treat) or unwilling (i.e. she offered and then withdrew a treat) to provide food. Dogs demonstrated sensitivity to intentions by spending more time close to the researcher during unable than unwilling trials. In Study 2, dogs watched a researcher reach for a ball and ignore a duck. Next, the ball and the duck switched locations. Dogs looked longer when the researcher reached for the duck, violating the goal, suggesting they encoded the goal, not simply motor patterns. Combined these results suggest that sophisticated social cognitive abilities may have evolved in dogs due to our shared evolutionary history.

Oral Presentation O9.3

**EFFECTS OF EDUCATION, SOCIAL NORMS, AND GREEN IDENTITY:  
BEHAVIORAL INTENT TO COMPOST**

Jennifer Merrill, Lauren Streblo, Amy Seter and Linda Kunce\*  
Psychology Department, Illinois Wesleyan University

Psychological theory and research can be applied to offer insight into the cognitions, emotions, and behaviors of individuals' environmentally relevant actions (Kazdin, 2009). Research on Community-Based Social Marketing (McKenzie-Mohr, 2011) and the Theory of Planned Behavior (Ajzen, 1991) provided a backbone for this research on students' behavioral intent to compost at Illinois Wesleyan University. We assessed the impact of a brief video-based intervention (no information, information only, information plus social modeling) and pro-environmental identity on participants' reactions to composting, specifically with respect to their attitudes, knowledge, perceptions of subjective norms, and behavioral intentions. Results indicated a main effect for the video intervention on subjective norms, behavioral intent, and knowledge, with participants in the information only and the information plus modeling conditions expressing more favorable reactions to composting than participants in the no information condition. Results have implications for techniques to further enhance composting on college campuses.

Oral Presentation O10.1

**STUDENT AWARENESS OF WHITE PRIVILEGE AND WHITE RACIAL  
IDENTITY AT ILLINOIS WESLEYAN UNIVERSITY**

Cynthia Cruz and Meghan Burke\*  
Sociology Department, Illinois Wesleyan University

Privilege and prejudice is alive and well; coming to see privilege is essential in understanding injustices. By examining white privilege's invisible workings and operations, while also exploring the awareness of those who are positively affected by it, we can then begin the arduous task of dismantling it both institutionally and personally. This study uses qualitative and quantitative survey data from self-identified white Illinois Wesleyan students in order to investigate white student's awareness of white privilege. I also explore the attitudes and perceptions of racial identity among white students. This presentation will discuss those findings and how they impact Illinois Wesleyan's students of color.

Oral Presentation O10.2

**EFFECTS OF RACIAL LITERACY ON COLOR-BLIND  
RACIST ATTITUDES**

Lexia Swope and Meghan Burke\*  
Sociology Department, Illinois Wesleyan University

The purpose of this study is to explore Illinois Wesleyan's students' and faculty's racial literacy and racial attitudes. Because IWU is a primarily white institution its faculty and students may lack sufficient diversity experience and training. Students were invited to participate in an anonymous survey that assessed their color-blind racial attitudes, experience in US Diversity Flag courses, and allowed them to share their experience with race more broadly. Professors participated in short, semi-structured interviews in order to gain their perspective on teaching race-related courses. Results showed that many students held some level of color-blind racial attitudes, which inhibits racial literacy. Also, many students felt they did not have sufficient experience with race-related topics. Professors expressed that it is difficult to teach race-focused courses at IWU, but that it remains important to do so. Based on my findings, I suggest that IWU should offer more classes and events focused on increasing students' racial literacy.

Oral Presentation O10.3

## **IMPLICATIONS OF FARMER SUICIDE IN INDIA FOR THE SOCIOLOGY OF SUICIDE**

Mallika Kavadi and Meghan Burke\*  
Sociology Department, Illinois Wesleyan University

There have been multiple studies dealing with the economic explanations of farmer suicides in India, with major attention being given to the farmers' severe debts or the political nature of the suicides. It is more than just economic difficulties, however, that have pushed farmers to commit suicide. They have also changed the traditional fabric of the agrarian Indian society. The large proportion of suicide is not unique to farmers but extends to other vulnerable populations as well, such as housewives and the unemployed. This paper shifts the focus from farmer suicide as a result of only agrarian crisis or indebtedness among farmers, considering it instead as part of larger structural changes. With greater economic uncertainties, and large groups of vulnerable populations who are more susceptible to suicide, it is important to retain a sociological understanding of suicide.

Oral Presentation O11.1

**MULTIDECOMPOSITIONS OF COMPLETE GRAPHS INTO A  
GRAPH PAIR OF ORDER 6**

Yizhe Gao and Mark Daniel Roberts\*  
Mathematics Department, Illinois Wesleyan University

A graph is a mathematical structure consisting of a set of objects called vertices and a set of 2-element subsets of vertices, called edges. The complete graph on  $n$  vertices is the graph with  $n$  vertices and an edge between any pair of distinct vertices. Let  $C_6$  denote the cycle on 6 vertices. We are interested in partitioning the edges of the complete graph on  $n$  vertices into copies of  $C_6$  and its complement with at least one copy of each graph. We provide necessary and sufficient conditions on  $n$  for the existence such a structure.

Oral Presentation O11.2

## **A COMPUTATIONAL STUDY OF ICART'S FUNCTION**

Thomas Simmons and Andrew Shallue\*  
Mathematics Department, Illinois Wesleyan University

A hash function maps elements of a larger, initial set into a smaller, resultant set. Sometimes, not all elements in the smaller set will be mapped to as a result; in general it is useful to know the size of this image. Here our target set is the points on an elliptic curve, which has an equation of the form  $y^2 = x^3 + ax + b$ . A hash function is useful here in offering a deterministic way to map an input to a pair of  $x$  and  $y$  values that satisfy such an equation. One such hash function was created by Thomas Icart. The researchers Fouque and Tibouchi provided a bound on the size of the image of Icart's output for curves defined over fields larger than  $2^{19}$ . This research confirms their result for all fields and for many curves.

Oral Presentation O11.3

**AN  $\alpha$ -LABELING WALKED INTO A COMPLETE GRAPH...**

Kimberly Wenger Diller and Daniel Roberts  
Mathematics Department, Illinois Wesleyan University

In 1967, Alex Rosa introduced multiple graph labelings useful for the purpose of studying decompositions. Since then, graph labeling has become a popular research topic independent of decompositions. In this talk, we return to the original purpose of two of Rosa's labelings, the graceful labeling and the  $\alpha$ -labeling, demonstrating their use in the study of decompositions. We also present a portion of our own results involving an extension of a class of trees called uniform  $k$ -distant trees; every tree in this new class of trees admits an  $\alpha$ -labeling.

Oral Presentation O12.1

**ANALYSIS OF TEA POLYPHENOLS USING DIFFERENTIAL PULSE  
VOLTAMMETRY AND HIGH PERFORMANCE  
LIQUID CHROMATOGRAPHY**

Nathaniel Hocker and Manori Perera\*  
Chemistry Department, Illinois Wesleyan University

Tea is currently the second most popular beverage in the world, with only water being consumed more. For centuries, people have consumed tea for the taste, but as of late, it has been consumed for its medical benefits. Teas contain organic compounds known as polyphenols that have been shown to act as antioxidants in the body. The focus of this research was on analysis of these polyphenols. In order to do this, different types of teas, all of which come from the same plant, were brewed. These teas are white, green, oolong, and black. A number of other flavored teas and blends were looked at as well. In looking at the teas, there were several things that we looked for. We wanted to know the differences in the total amount of polyphenols present in each of the teas, the types of polyphenols present (along with how much of each was in the teas), as well as whether or not these polyphenols would decay over time. Previous work involved a number of spectroscopic techniques, but recent studies on teas has involved the use of differential pulse voltammetry, which is able to directly measure the reduction potentials of the polyphenols in order to better quantify their concentrations. High performance liquid chromatography is also being used which will separate out each individual polyphenol and help us to identify which ones are present in the teas. There are no definitive results that have arisen yet, and so work on the teas will continue into the foreseeable future.

Oral Presentation O12.2

## **INTERACTIVE PHYSICS SIMULATIONS**

Jonathan Gholson and Narendra Jaggi\*  
Physics Department, Illinois Wesleyan University

The primary focus of this project is to create interactive, real-time physics simulations for educational use with the ultimate goal of improving students' physical intuition. Ideally a student would be able to work with a system in a physical lab environment in order to build their intuition, but this may not always be feasible due to the size and scope of the system or the student's access to required materials. These simulations seek to provide practical alternatives for the aforementioned limitations. In any given simulation, both accuracy and realism are strived for, yet the general scope for each is to recreate those elements that are fundamental to an individual's understanding of the system. The topics covered by this project are those that would be found in an undergraduate physics curriculum with special focus on systems for which analytical solutions are difficult or impossible.

Oral Presentation O12.3

## **OSCILLATING CHEMICAL REACTIONS**

Ruomeng Zhang and Narendra Jaggi\*  
Physics Department, Illinois Wesleyan University

Briggs-Rauscher reaction and Belousov-Zhabotinsky reaction are two well-known, but still incompletely understood, nonlinear oscillating chemical reactions which are characterized by cyclic color changes. We have discovered that, in the absence of stirring, the time period of these nonlinear oscillations is affected by the depth of the solution in a container, and not just upon the specific chemistry, for example the concentrations of various reagents and reaction temperature. This makes it clear that macroscopic diffusion, over length scales that are comparable to the dimensions of the container, play an important role in these oscillations. We have therefore extended our study to explore the dynamics of two diffusion-coupled chemical oscillators, and look for possible novel and interesting modes of coupled nonlinear chemical oscillations. This is done by machining two small shallow wells in a thick Teflon sheet, connected by a narrow channel. The strength of diffusional coupling decreases as the length of the coupling channel increases. Reactions, for varying channel lengths, and chemistry, were recorded by a video camera, and the resulting videos were exported to Mathematica for an RGB analysis of various parts of the reaction chamber. The result of the study will be presented.

**POSTER SESSION A**

**9:00 - 10:00 a.m.**

Odd-Numbered Posters

**POSTER SESSION B**

**2:00 – 3:00 p.m.**

Even-Numbered Posters

**EDUCATIONAL STUDIES ORAL AND POSTER PRESENTATIONS - ES**

State Farm Hall

Note: Student's name is underlined, faculty advisor designated with \*

During each poster session the author will be present to discuss her or his research with conference attendees, and answer questions.

Please remove your posters from CNS Atrium by 3:30 p.m.

Poster Presentation P1

**THE RAMIFICATIONS OF COLONIAL PAST: CHALLENGES TO SUSTAINABLE DEVELOPMENT IN CONTEMPORARY AFRICA**

Olive Kemi Adeleye and Marina Balina\*  
International Studies Program, Illinois Wesleyan University

The path of African nations toward attaining sustainable development is complicated and full of controversy. At the core of this study are three countries with dissimilar colonial pasts and different pathways toward current development, Ghana, Angola, and Rwanda. Through the examination of their historical pasts and current political and social structures I intend to analyze the possible ways that would influence these countries' capacities to eliminate poverty, limit political corruption, and ameliorate civil unrest. The main focus on my presentation will be on development strategies to prevent «brain drain» - emigration of African professionals - that should help these three African countries - as well as others - transition unto a pathway that can lead towards more effective sustainable development.

Poster Presentation P2

**THE EFFECTS OF INCREASED VISCOSITY ON THE INGESTION AND  
CLEARANCE RATES OF THE ROTIFER SPECIES,  
*BRACHIONUS PLICATILIS***

Alyssa Aiello and William Jaeckle\*  
Biology Department, Illinois Wesleyan University

Rotifers are a group of water-dwelling invertebrates that use rings of cilia located above and below the mouth to capture particulate foods. *Brachionus plicatilis* is a species commonly used as a food source for commercially-reared fish and normally consumes singled-celled algae (2-10  $\mu\text{m}$ ) as its food source. We examined the effect of sea water viscosity on the ingestion of 4.5  $\mu\text{m}$  polystyrene beads by *B. plicatilis*. There are a variety ways to change the viscosity of a medium, this study introduces the sugar molecule dextran at a concentration of 150  $\text{mg mL}^{-1}$  as a method of increasing the viscosity in order to determine how this would affect the ingestion rate (beads ingested per hour) and the clearance rate (milliliters of sea water ingested per hour) of *B. plicatilis*. The rotifers were transferred to clean filtered sea water for three hours to clear their digestive system before being exposed to polystyrene beads at a concentration of  $7.5 \times 10^3$  beads  $\text{mL}^{-1}$  in 25 $^{\circ}\text{C}$  filtered sea water or 25 $^{\circ}\text{C}$  filtered sea water containing 150  $\text{mg mL}^{-1}$  dextran. After a fifteen minute incubation period, the specimens were fixed and the number of beads within their guts were counted and converted into an ingestion rate and a clearance rate. In three separate experiments, we found no statistically significant difference (ANOVA,  $p > 0.05$ ) between the ingestion and clearance rates of polystyrene beads by rotifers incubated in seawater of different viscosities. The clearance rates of *B. plicatilis* were not significantly affected by the increase in sea water viscosity, which was not expected based on what previous studies have shown. In these studies, the increase in viscosity tended to lead to a decrease in clearance rate, but those studies dealt with temperature fluctuations as opposed to the presence of a sugar. The results here could be explained by the use of a distinct particulate capturing mechanism by *B. plicatilis* that is more efficient at collecting particulates in more viscous solutions.

Poster Presentation P3

## **DESIGNING OPTICAL TRAPS FROM THE BOTTOM UP**

Toan H. Le, Joseph Richards, George W. Alex and Gabriel Spalding\*  
Physics Department, Illinois Wesleyan University

Optical trapping is a highly dexterous method of manipulating and interrogating nano- and micro-components. It has wide range of application, from fundamental biology and biomedical studies at the cellular and subcellular levels, to studies of colloid and surface chemistry as well as controlled studies of aerosol chemistry relevant to climate change models, to fundamental physics connected to our understanding of the statistical mechanics of small systems, with opportunities of working towards the macroscopic quantum limit. To allow greater flexibility of design we have supplemented our lab's use of a commercial fluorescence microscope with a new, open-source hardware microscope, of our own design, incorporating x-, y-, and z-motion of the sample stage, piezoelectric fine-scale control of microfluidic chambers within the workstation, Köhler illumination, a CMOS camera, automated tracking of microparticles, and provisions for alignment and calibration (in three dimensions) of optical traps. Here we describe our analysis of the two-dimensional potential well created by a single-beam laser gradient trap, and discuss algorithms for compensating for any factors that might otherwise limit the quality of the optical trap.

Poster Presentation P4

## **A COMPARATIVE STUDY OF EGGSHELL PORE MORPHOLOGY OF PALAEOGNATH BIRDS**

Meaghan Mormann, Jennifer Altman, Tess Kelley and  
Given Harper\* and William Jaeckle  
Biology Department, Illinois Wesleyan University

Avian eggshell pores, which allow gas exchange to and from the embryo, vary in size and structure (e.g., diameter, branching pattern, shape, abundance, and dispersion) among species. Previous studies have indicated that eggshell microstructures can contribute to the development of evolutionary hypotheses (phylogenies) of avian taxa. We are focusing on the Palaeognath taxon, which includes the extinct flightless Ratites (Elephant Birds and Moas), the extant flightless Ratites (i.e., Ostriches, Emus, Rheas, Kiwis, Cassowaries), and the extant flighted Tinamous. The purpose of our study is to evaluate whether eggshell pore morphologies are phylogenetically informative characters for Palaeognath birds. We are using a polyurethane-based resin to make three-dimensional corrosion casts of eggshell pore spaces. Preliminary data from the casts of Elephant Bird pore spaces indicate that in one third of the observed fragments, bifurcated branching exists in the palisade layer (the region closest to the external surface). Unbranched pores were cylindrical based on a comparison of pore diameters in the upper, middle, and lower regions.

Poster Presentation P5

## **DO DOGS EXPERIENCE COGNITIVE DISSONANCE?**

Ethan Fischer, Samuel Aronson, Natalie Weimer, Jessica Omark, Jeffrey Toraason  
and Ellen Furlong\*

Psychology Department, Illinois Wesleyan University

Cognitive dissonance, the mental discomfort experienced when a person hold contradictory beliefs and/or behaviors, has been studied through the effort justification paradigm – wherein people prefer a reward more when they have put more effort towards it. Contrast theory, a behaviorist approach, says this preference is due to the greater difference between participant’s starting and ending state. Dogs participated in a version of the effort justification paradigm designed to test if they experience cognitive dissonance. They alternated between two versions of a task: hearing either a severely or mildly annoying noise before receiving one of two differently colored dog treats from a “treat machine”. Afterwards, they were given a preference test to see if they formed a preference for the treat associated with the severely annoying noise (consistent with the effort justification paradigm). One explanation for the effort justification effect is contrast theory, which was eliminated by assigning dogs to either a contingent or non-contingent treatment. In the contingent treatment, noises preceded treats predictably and the noises and treats both came from the treat machine. In the non-contingent treatment, noises randomly preceded the treats and noises came from the other side of the room. Dogs’ preferences will be explored in light of cognitive dissonance and contrast theories.

Poster Presentation P6

## **DO DOGS POSSESS SELF-CONTROL?**

Stephanie AuBuchon, Jessica Kraut and Ellen Furlong\*  
Psychology Department, Illinois Wesleyan University

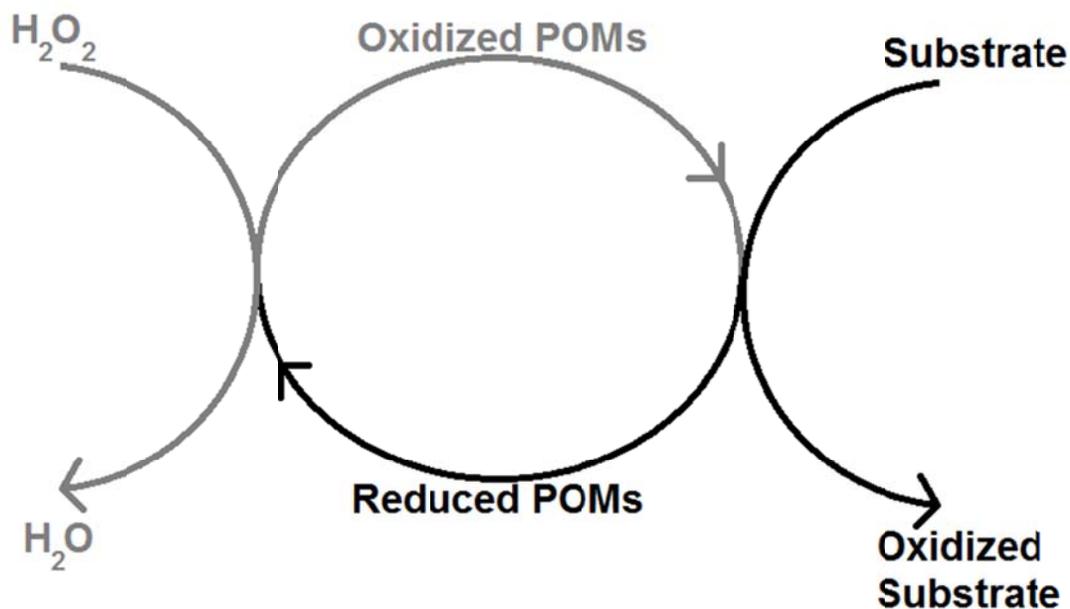
Each year 6 to 8 million pet dogs enter shelters, and approximately 60% are euthanized. Unfortunately, many dogs are taken to shelters or euthanized due to behavioral problems. Identifying dogs who may have these behaviors allows owners to be informed and prepared for these dogs, reducing the number returned to shelters. One way to identify potential problems may be through measuring self-control in dogs. We have adapted our methods from a similar method used with capuchin monkeys (Bramlett et al., 2012). We constructed a wheel with food that rotated in front of dog subjects. The dog had the choice to eat less-preferred kibble or wait an additional few seconds for a preferred jerky treat. Dogs wait for food, and demonstrate variation in how long they wait. Future studies will explore how long dogs can wait and if variation in self-control predicts behavioral problems.

Poster Presentation P7

## VANADIUM SUBSTITUTED POLYOXOMETALATES

Jennifer Bjorklund, Samuel Kim and Rebecca Roesner\*  
Chemistry Department, Illinois Wesleyan University

Oxidation reactions are important for many industries, including the bleaching of paper and waste water treatment. Chlorine, sodium hypochlorite, pyridinium chlorochromate and other chromium containing compounds are powerful oxidants, but are harmful to the environment. Green oxidants, such as hydrogen peroxide, often require a catalyst. In such systems, the catalyst is reduced as it oxidizes the substrate and then the catalyst is re-oxidized by hydrogen peroxide. This cyclic reaction, illustrated in Figure 1, has the potential to be repeated numerous times without much waste. The catalysts of interest in this work are polyoxometalates (POMs), which are known to function as oxidation catalysts. The phosphomolybdate ion,  $\text{PMo}_{12}\text{O}_{40}^{3-}$ , is known to have some catalytic activity; whereas the vanadium substituted phosphomolybdates,  $\text{PMo}_{11}\text{V}_1\text{O}_{40}^{4-}$  and  $\text{PMo}_{10}\text{V}_2\text{O}_{40}^{5-}$ , have higher activities and are the focus of this work. The vanadium substituted POMs were synthesized and characterized and their ability to act as oxidation catalysts was confirmed through the oxidation of benzyl alcohol to benzaldehyde. Current work is focused on immobilizing the POMs on anion exchange resins; the catalytic activity of the resin-bound POMs will be compared to that of the dissolved POMs.



**Figure 1.** Oxidation-reduction catalytic cycle

Poster Presentation P8

## **GOOD DOG! APPLICATIONS OF DOG SCIENCE**

Jeffrey Toraason, Brenden Wall, Anthony Bohner and Ellen Furlong\*  
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Each year 6 to 8 million pet dogs enter shelters, and unfortunately, many are returned to shelters, or euthanized, due to behavioral problems. Many behavioral problems can be alleviated if dogs get exercise; however, some owners cannot provide dogs sufficient exercise. Further, some dogs may be physically unable to exercise. One possible solution is to provide dogs with mental exercise. We are currently developing a series of touchscreen computer tasks with the hope that they provide mental stimulation and can be made available to owners via a tablet application. As of now, a few dogs in our lab have learned to effectively use the touch screen. In the near future, we hope such touch screen tasks will transfer over into an application that will serve as an effective program to minimize the amount of behavioral problems, and hence, the number of dogs sent to, returned to, and euthanized in shelters.

Poster Presentation P9

**A NOVEL PEPTIDE INHIBITOR OF THE POLYMERIZATION OF  
DEOXYGENATED SICKLE CELL HEMOGLOBIN**

Timothy Broederdorf and Brian Brennan\*  
Chemistry Department, Illinois Wesleyan University

Sickle cell disease is a genetic disorder that causes red blood cells to form sickle shapes. These sickle-shaped red blood cells cannot pass through small blood vessels, which in turn causes tissue damage and cell death. The disease is caused by the exchange of a hydrophilic amino acid for a hydrophobic residue. This exchange enables deoxygenated hemoglobin molecules to interact with each other. This interaction causes the formation of long polymeric chains of hemoglobin that cause the red blood cell to be distorted into the sickle shape. Our group focuses on discovering peptides that can inhibit the polymerization of sickle cell hemoglobin. We previously identified a peptide, ZSF-39, that shows promise in preventing polymerization. My research involves testing the effectiveness of ZSF-39 in delaying the polymerization time of sickle cell hemoglobin at varying concentrations. This was done with UV-Vis assays. The results show that ZSF-39 can delay polymerization and that the length of the delay increases as concentration increases.

Poster Presentation P10

## **ANXIETY SENSITIVITY, STRESS, AND PROBLEMATIC DRINKING BEHAVIORS AMONG COLLEGE STUDENTS**

Kathryn Bulandr and Marie Nebel-Schwalm\*  
Psychology Department, Illinois Wesleyan University

The association between excessive alcohol use and adverse consequences among college students has been extensively researched over the past several decades. More specifically, heavy drinking in the college population has been linked to severe violence, accidental injuries, sexual assault, poor classroom performance, and psychological impairment (Pedrelli et al., 2010). To successfully limit these adverse consequences, it is important to understand the main risk factors that lead to excessive alcohol use. Anxiety sensitivity (AS) and stress have been separately identified as risk factors for problematic drinking (Stewart et al., 1999; Zvolensky et al., 2004). Additionally, a theory of motivational use of alcohol has suggested that the primary factor that influences drinking behaviors is one's motivation (Cox & Klinger, 1988). The current study aims to investigate these three correlates. In particular, this study investigates whether AS and stress affect an individual's urge and motive to drink. A multivariate analysis will be used to examine two main effects and one interaction effect. If the hypothesis is supported, students with high AS levels and high stress levels will report greater urges and higher coping motives to drink, which are indicative of heavier and more frequent problematic drinking (Cooper, 1994).

Poster Presentation P11

## **ISOLATION AND CHARACTERIZATION OF A NOVEL BACTERIOPHAGE FROM A LOCAL STREAM**

Jordan Eldridge, Ian Taylor, Caitlin Cadwalder, Spencer Eidsmoe, Ross Hettinger, Megan Mink, Randi Wilson, Sarah Gooding and Richard Alvey\*  
Biology Department, Illinois Wesleyan University

Students collected bacteriophage from the environment, isolated and purified the phage, and then analyzed their genomic properties. A total of sixteen bacteriophages were isolated and purified at Illinois Wesleyan University and may contribute to future scientific research in the field of genomics. Using a phage sample enriched on *Mycobacterium smegmatis*, each student isolated a single phage population through a series of plating procedures. Once that phage had been purified, students isolated its genomic DNA and analyzed it using gel electrophoresis. Two phages from the class, Morrow and Eidsmoe, were sent to be sequenced. Eidsmoe was sequenced at NC State Genomic Sciences Laboratory. Eidsmoe is highly similar to the other bacteriophage in sub-cluster, A9. Members of this sub-cluster that are the most similar to Eidsmoe are Alma, Catalina, and PackMan with the main deviation in Eidsmoe being the tRNA present. The genome of Eidsmoe is 52,946 bp in length and contains 92 genes. Previously annotated genomes that are most similar to Eidsmoe are Alma and PackMan. The sequenced genomes were annotated and analyzed by students primarily through the programs DNA Master and Phamerator.

Poster Presentation P12

**LOCAL ECONOMIC IMPACT OF STATE FARM'S  
1,600 POSITION RELOCATION**

Dominique Castle and Diego Mendez-Carbajo\*  
Economics Department, Illinois Wesleyan University

The presence of State Farm Insurance is a vital aspect of the Bloomington-Normal economy, so the announcement of the relocation of 1,600 local positions to an Atlanta hub has been a major cause for concern in the community. In this project I aim to quantify the local economic impact of this elimination and compare it to a shock of similar magnitude represented by a decrease in Mitsubishi's local operations in 2004. IMPLAN multiplier analysis is used to obtain estimations of primary and secondary impacts of both shocks. IMPLAN's calculations are based on input-output tables, which is necessary to prevent underestimating the impact by excluding economic losses realized in a "chain reaction" to an economic shock. It is found that, although State Farm's closure results in losses among several sectors, the community should experience a smoother recovery than after the closure of Mitsubishi's second production shift a decade ago.

Poster Presentation P13

**EXPRESSION AND ISOLATION OF THE BCHE ENCODED PROTEIN OF  
*RHODOBACTER CAPSULATUS* IN *RHODOBACTER CAPSULATUS***

Jennifer Chlebek and David Bollivar\*  
Biology Department, Illinois Wesleyan University

Bacteriochlorophyll plays an essential role in the process of photosynthesis in photosynthetic bacteria, but several of the enzymes involved in the synthesis of this tetrapyrrole are yet to be entirely understood. The step in which the ring structure of the tetrapyrrole is formed is catalyzed by the enzyme Mg-protoporphyrin IX monomethyl ester cyclase (MPE-cyclase) which converts the substrate MPE into protochlorophyllide (Pchl<sub>id</sub>) and incorporates an oxygen atom from water. The gene *bchE* has been suggested to encode a protein required for MPE-cyclase activity in the photosynthetic bacterium *Rhodobacter capsulatus*. In order to study the cyclase enzyme, we attempted to isolate the polypeptide encoded by *bchE* by first expressing the protein using pRho expression vectors in *R. capsulatus*. With column chromatography we hoped to isolate the BchE protein for further studies and co-purify any strongly associated partners. A MSMS analysis of the elutions from the chromatography column revealed that Pyruvate carboxylase was purified along with the two propionyl-CoA carboxylase subunits alpha and beta. These results indicated that biotin from the RC-V media had out-competed the StrepII-tag of BchE for binding to the streptactin column thus leading to the purification of biotin utilizing enzymes, but confirmed that it is possible to co-purify protein partners with strong binding affinities.

Poster Presentation P14

**ISOLATION AND CHARACTERIZATION OF AN A4  
MYCOBACTERIOPHAGE FROM CENTRAL ILLINOIS**

Aida Cheung, Jadeah Spindler, Ruchen Tian, Jordan Miller, Audrey Smith, Meghan Linder, Tiffany  
Remijas and Richard Alvey\*  
Biology Department, Illinois Wesleyan University

Sixteen mycobacteriophages were isolated by students at Illinois Wesleyan University in Bloomington IL using a soil enrichment technique and a *Mycobacterium smegmatis* host. Each student created and archived a high titer lysate of his or her mycobacteriophage, and of these sixteen, two were selected to be sent in for sequencing, Eidsmoe and Morrow. Morrow was found just outside the Morrow Plots at the University of Illinois at Urbana-Champaign in 2014, and was found to be one of 64 members of the A4 subcluster. Its 51,411 base pair genome is comparable to the average A4 genome of 51,395 base pairs. However, Morrow has 94 genes, which is eight more genes than the average A4 genome. Morrow was then annotated using BLASTp, Phamerator, Starterator, and DNA Master, and was found to be 98% identical to Abdiel, which was found in Missouri in 2011. The identification of the sixteen mycobacteriophages and the sequencing and annotation of two of them expands our knowledge, as well as the online database, where they are contributing to scientific research.

Poster Presentation P15

**DETECTION AND QUANTIFICATION OF LEAD AND COPPER IN FIREARM  
HARVESTED GROUND VENISON INTENDED FOR  
HUMAN CONSUMPTION**

Christopher Crown and Manori Perera\* and Given Harper\*  
Chemistry Department, Illinois Wesleyan University

Most White-tailed Deer (*Odocoileus virginianus*) in Illinois are harvested with firearms that use lead or copper shotgun slugs or muzzleloader bullets, which may fragment when they strike bone. Lead is a neurotoxin to both humans and animals that scavenge deer that have escaped from hunters, and excess amounts of copper ingestion can impair lipid and DNA function. In a preliminary study in 2014, packets of ground venison from firearm and bow hunters in Illinois were x-rayed, and six out of ten firearm-harvested packets contained possible metal fragments. The purpose of this study is to utilize Anodic Stripping Voltammetry (ASV) and Atomic Absorption Spectroscopy to identify the presence and concentration of lead and copper in ground venison meat meant for human consumption. Current research and manipulation of test parameters and solutions has yielded ASV standard addition curves for both lead and copper solutions. Using this method we have been able detect lead in solution at levels of 300 µg/L, with predicted detections limits of 50-100 µg/L. This protocol will be used to analyze ground venison collected during the 2013 and 2014 deer hunting seasons.

Poster Presentation P16

## **EVALUATING ACTION POTENTIAL BLOCKADE OF SPINAL CORD STIMULATION USING AN EATHWORM MODEL**

Margaret DeMaegd, Dana Tilley, and Joseph Williams\* and David Cedeño\*  
Psychology Department, Illinois Wesleyan University

Spinal cord stimulation (SCS) is known to be an effective therapeutic treatment to relieve symptoms of chronic pain in patients with either a high risk for opiate dependence, or insufficient response to conservative treatments (Alo, Yland, Kramer, Charnov, and Redko, 1998; Campbell and Meyer, 2006; Smits, Kleef, Holsheimer, and Joosten, 2013). It is thought to operate by the mechanism described in the gate-control theory, meaning painful stimuli in the form of action potentials from the extremities can be masked using a secondary source of electrical potential placed between the site of pain and the brain, the site of perception (Smits et al, 2013). There is a large amount of variation in the stimulation parameters among physicians and few in-depth studies have examined the optimal stimulation parameters for clinical treatment. The earthworm (*Lumbricus terrestris*) is a well understood model in electrophysiological experiments because of its relative simplicity and its direct similarities to human nerves (Bullock, 1945; Eduardo and Bennett, 1955). In this experiment, an earthworm model is used to simulate a human A $\beta$ -fiber, which is targeted in clinical SCS treatment. Results will be discussed evaluating the blockage of action potentials by the application of SCS at three major frequencies (50 Hz; 1,000 Hz; 10,000 Hz) using a range of voltages (0.01-10 mV using a logarithmic scale) in order to find an optimal blockage condition.

Poster Presentation P17

## **DEMONSTRATION OF ION TRAP PRINCIPLES**

Zhenghao Ding, Lunjun Liu and Gabriel C. Spalding\*  
Physics Department, Illinois Wesleyan University

Particle trapping is a state-of-the-art technology, which already a powerful tool for scientists working with micro- and nano-components. Much interest now revolves around length scales where *quantum mechanical* effects become pronounced. Quantum mechanics forms our only framework for understanding many problems in solid-state physics (*e.g.*, magnetism), and is playing an ever more important role in applied chemistry, biochemistry and many other areas. Trapping technologies provide a test bed for systematic exploration of fundamental paradigms, offering enhancements to our understanding of key mechanisms and, perhaps, opportunities for quantum information technology. We have assembled a Newtonian Lab demonstration trap, demonstrating key principles of an ion trap, as a first step toward more advanced particle-trapping technology. This system utilizes a low-frequency alternating voltage to trap charged micro-particles. We have confirmed that trapping has occurred, by scattering visible laser beams off the trapped particles. Our next step is to explore designs for a hybrid combination of high-frequency optical tweezers with the sort of low-frequency electrostatic trap we have demonstrated, with the goal of stabilizing particles trapped in low-pressure atmospheres, where it may be possible to achieve cooling towards the quantum mechanical ground state of at least one degree of freedom.

Poster Presentation P18

## **MICROFLUIDIC GENERATOR OF SUB-10-MICRON HYDROSOMES**

Zhenghao Ding, Lunjun Liu, and Gabriel C. Spalding\*  
Physics Department, Illinois Wesleyan University

Known as the fundamental “lab on a chip” technology, microfluidics is a thriving young research area that first took off in the 1990s. It is commonly used for reducing the amount of material required for biochemical analysis, such DNA sequencing. Its narrow tunnels can annihilate turbulence even in high-speed fluid flow, facilitating controlled, systematic processing. Also, by leveraging lithographic techniques developed for the semiconductor industry, enormous *capability* can be integrated into a single microfluidic chip. We have thus far utilized templates designed and fabricated by previous students in our lab, for fabrication of a series of microfluidic chips, made of transparent silicone rubber, which we seal to microscope coverslips via oxygen plasma activation of the rubber surfaces (which makes them sticky enough to adhere to glass).

Our next step is to generate, at high speeds, many droplets of nearly identical, microscopic dimensions, to ensure that we can stabilize these droplets against coalescence upon collection, and that we can optically trap and manipulate these droplets within the confines of the original microfluidic chip.

Subsequently, we plan to incorporate entrained nanocomponents into each droplet generated (quantum dots at first, and, later on, DNA origami, or diamond microparticles containing Nitrogen vacancy defects). The collected droplets can be manipulated with much higher precision by optical traps than would be possible with direct trapping of the nanocomponents. The long-term potential of our research purposes seems significant (ranging from development of DNA-based information storage technologies to weak magnetic field detection for basic physics research).

Poster Presentation P19

**AEROBIC EXERCISE AS A REHABILITATIVE STRATEGY FOLLOWING  
ISCHEMIC STROKE IN AGED C57BL/6 MICE**

Michelle Dominguez and Abigail Kerr\*  
Psychology Department, Illinois Wesleyan University

Current stroke rehabilitative strategies fail to yield complete recovery in patients. Further, these strategies require intensive training that is not often feasible for patients. Because aerobic exercise is neuroprotective, it has been explored as a means to promote better functional outcome post-stroke. Exercise is also an appealing rehabilitative strategy because it requires less intensity and clinician oversight than traditional therapy. This study investigated the efficacy of post-stroke exercise in an aged-mouse model of stroke. Mice were trained on a skilled reaching task before receiving focal ischemic stroke affecting their dominant limb. Following stroke, the mice were subdivided into four different groups for rehabilitative training including traditional focused rehabilitation of the impaired limb, aerobic exercise, a combination of focused rehabilitation and exercise, and a control group. Results suggest that exercise is as beneficial as traditional rehabilitative training for functional outcome, indicating that exercise may be a beneficial rehabilitative strategy in humans.

Poster Presentation P20

## **GENETIC SCREEN FOR NITROGEN FIXATION DEFICIENT MUTANTS IN THE CYANOBACTERIUM *ANABAENA***

Rachel Ende and Loralyn Cozy\*  
Biology Department, Illinois Wesleyan University

A fundamental question in biology is how a cell is able to differentiate and take on a specialized function. In an environment lacking bioactive nitrogen, *Anabaena*, a multicellular cyanobacterium, differentiates specialized cells that can assimilate atmospheric nitrogen into organic compounds. However, the genetic network that controls differentiation is incompletely understood. To determine the genes required for heterocyst differentiation, a piece of DNA capable of random insertion into the genome, called a transposon, was introduced into wild type *Anabaena*. These cells were then cultured on antibiotic-containing media to select for the cells in which the transposon had inserted into the genome. The resulting colonies were transferred to media lacking a source of bioactive nitrogen, and assessed for the ability to survive. Whereas continued growth and green coloration on nitrogen-limited media suggested normal heterocyst development, colonies that became yellow suggested that at least one gene responsible for heterocyst differentiation had been disrupted by the transposon. Yellowed colonies were rescued by placing them back on media containing bioactive nitrogen and the location of the transposon insertion was determined. The genes identified in this screen will be important to future work on the genetic network governing heterocyst development.

Poster Presentation P21

**CHARACTERIZATION OF *RHODOBACTER CAPSULATUS*  
BACTERIOPHAGES USING TRANSMISSION  
ELECTRON MICROSCOPY**

Atul Eppurath and Loni Walker\* and David Bollivar\*  
Biology Department, Illinois Wesleyan University

Bacteriophages are viruses that infect specific bacterial hosts in order to grow and replicate. Because bacteriophages are miniscule in size, it is not possible to obtain images of the structural features using light microscopy. Transmission electron microscopy (TEM) is a useful technique to view images with higher resolution and magnification using electrons to illuminate the subject. This technique allows for clear visualization of bacteriophage structural features, including the head, capsid, and tail. Bacteriophages isolated from infections of the bacterial host *Rhodobacter capsulatus*, which include RcTitan, RcOceanus, RcSpartan, RcRhea, RcSaxon, and RcCronus, were examined. In order to obtain contrast, new lysates of each phage were placed on a formvar coated 200-mesh grid and stained with uranyl acetate. The negative stain from uranyl acetate allowed for high contrast, as the background is stained, while the phage is not and thus visible. Bacteriophage morphology, such as head sizes and tail lengths, will be presented in this poster.

Poster Presentation P22

## **MORAL REASONING IN DOGS**

Katherine Ford and Ellen Furlong\*  
Psychology Department, Illinois Wesleyan University

A sense of morality, values predisposing right (fair, just, kind) from wrong (unfair, cruel, dishonest) appears universally across all humankind (Kinnier, Kernes & Dautheribes, 2000). But where does morality come from? Is it uniquely human or do we share some moral values with nonhuman animals? To explore these questions domestic dogs—nonhumans with exceptional social cognitive skills—were tested for moral values through a replication of a study on moral reasoning in human infants (Hamlin & Wynn, 2011). Dogs watched a puppet show with a moral (helpful) and immoral (hinderer) actor. Dogs looked longer when the neutral puppet chose to associate with the moral helper than the immoral hinderer, demonstrating that dogs, like human infants, prefer agents associate with moral helpers. This preliminary study suggests morality may be an evolved trait shared by humans and nonhumans alike.

Poster Presentation P23

## **DAILY GENERATIVE CONCERN AND WELL-BEING: THE ROLE OF DISPOSITIONAL GENERATIVITY AND PURPOSE IN LIFE**

Niccole A. Nelson, Annmarie Gast, Tanya Gupta and Mignon Montpetit\*  
Psychology Department, Illinois Wesleyan University

Many studies have investigated the impact of dispositional generativity on well-being, but few consider how daily fluctuations in generative concern impact well-being each day. Daily relationships between generative concern and cognitive and affective dimensions of subjective well-being (life satisfaction and positive affect, respectively) were explored using multilevel random coefficient modeling using data from 95 participants from *Successful Aging in Context: The Macroenvironment and Daily Lived Experience* ( $M_{\text{Age}} = 67$  years,  $SD_{\text{Age}} = 4.9$  years; range: 58-86 years). Results suggest that daily generativity exerts a greater influence over daily well-being than the reverse. Daily life satisfaction tended to be higher on days when generativity was higher than average for an individual, particularly for those reporting greater dispositional generativity. Interestingly, this relationship is weaker for individuals reporting greater purpose in life. Similarly, on days of higher than typical generativity, individuals experienced greater positive affect. Lastly, individuals higher in dispositional generativity reported feeling more generative on days they experienced greater positive affect; this daily relationship was, again, weaker for those reporting greater purpose in life. Taken together, results suggest that daily generativity augments both cognitive and affective aspects of subjective well-being each day, particularly for those high in generative concern. Results also suggest that daily generativity may not play as large a role in enhancing subjective well-being each day for those with a greater sense of purpose in life, whom may maintain well-being through other means.

Poster Presentation P24

## **MECHANISMS OF SPINAL CORD STIMULATION TO TREAT NEUROPATHIC PAIN**

Ethan Gelke and Joseph Williams\*  
Psychology Department, Illinois Wesleyan University

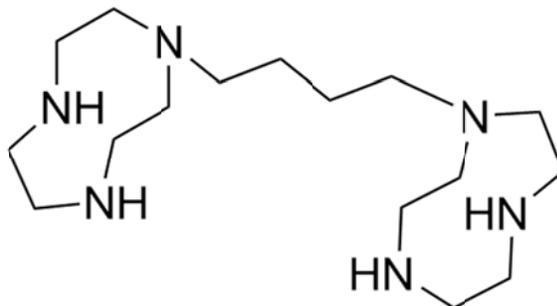
Chronic pain of neuropathic origin affects millions of people throughout the world every year. One potential treatment for neuropathic pain is Spinal Cord Stimulation (SCS), which involves implanting a small series of electrodes in the spinal canal atop the dorsal aspect of the spinal cord. The electric field produced by this electrode modulates the transmission of pain signals. SCS has enjoyed modest clinical success in treating patients with chronic neuropathic pain conditions in which conservative treatments and/or surgical interventions have failed. However, the biological mechanism underlying the therapeutic benefits of SCS is poorly understood. The present study aims to better establish the mechanism by analyzing the changes induced by SCS on protein expression within nervous system tissue. A well-established animal model of neuropathic pain paired with reliable behavioral assessment techniques were used to verify the therapeutic benefits of SCS. Following treatment, nervous tissues were extracted and subjected to Proteomic analysis. Results will be presented examining the effects of SCS on the expression of proteins related to transmission of pain. AMPA receptor proteins which are thought to be responsible for neuronal excitability, NMDA receptors proteins which are thought to be responsible for maintaining pathological pain circuits, and numerous nucleotide-modifying proteins which have been implicated in cellular signaling are some proteins hypothesized to mediate the mechanism of SCS.

Poster Presentation P25

## **MULTI-STEP SYNTHESIS OF A SUPRAMOLECULAR HOST MOLECULE FOR POLYOXOMETALATE GUESTS**

Meghan E. Gradle and Rebecca A. Roesner\*  
Chemistry Department, Illinois Wesleyan University

Supramolecular chemistry concerns intermolecular forces between chemical species in multi-component systems rather than bonding within individual molecules. One important subfield of supramolecular chemistry is anion recognition. Whereas the host-guest chemistry of common anions has been widely studied, the host-guest chemistry of polyoxoanions is a relatively new field. This work involves the development of azamacrocyclic host molecules that can wrap around polyoxometalate guests. Through multi-step synthesis, triazacyclononane (TACN) has been prepared and two TACN units have been connected using a polymethylene strap. Both nucleophilic acyl substitution to a diacid chloride and nucleophilic substitution to a dialkyl halide have been employed in assembling the "earmuff" structures. Further research will involve varying the length of the polymethylene strap and studying interactions between the newly synthesized "earmuff" hosts and polyoxometalate guests.



Poster Presentation P26

**EXAMINING WHETHER BODY IMAGE DISSATISFACTION IS A  
PREDICTOR OF RISKY SEXUAL BEHAVIOR**

Nicole Greenhill and Marie Nebel-Schwalm\*  
Psychology Department, Illinois Wesleyan University

The present study sought to determine if body image dissatisfaction is a predictor of risky sexual behavior. Participants (n = 146) included male and female college students from a small Midwestern university. Participants completed self-report measures of the known correlates of risky sexual behavior (i.e., well-being, depressive symptoms, self-esteem, alcohol and drug use, psychological distress), body image satisfaction, and risky sexual behavior. We predict that body image dissatisfaction will be correlated with riskier sexual behaviors; however, we predict that this link will be stronger for women than it is for men.

Poster Presentation P27

**THE IMPACT OF DEXAMETHASONE ON BEHAVIORAL DEVELOPMENT IN LARVAL ZEBRAFISH (*DANIO RERIO*)**

Casie Henrikson and Brad Sheese\*

Psychology Department, Illinois Wesleyan University

Stress can have damaging effects on a developing organism. Cortisol, a glucocorticoid that is a critical component of the stress response, can readily permeate across the placenta barrier and may have long-lasting, deleterious effects on the stress response of the developing organism. The synthetic homologue of cortisol is dexamethasone (dex), a corticosteroid used as an anti-inflammatory drug in humans to treat various autoimmune diseases and cancer. Dex is also often given to preterm infants to accelerate fetal lung development prior to delivery. Research with animal models has linked prenatal dexamethasone exposure to increased fear reactivity, decreased locomotor activity, and elevated cortisol levels in response to stress, in addition to brain cell loss and neurodevelopmental disability. The present study uses larval Zebrafish (*Danio rerio*) to examine the effects of dex exposure on anxiety-related behavior during a window critical for Hypothalamic-Pituitary-Interrenal axis development. By varying exposure to dex (dex vs. control) and timing of exposure (0 to 12 hours or 12 to 24 hours post fertilization), and examining the effect on motor behaviors in 5 day old zebrafish larvae, this study will advance our understanding of the mechanisms by which stress may cause long-term changes in stress reactivity.

Poster Presentation P28

## **THE EFFECTS OF GOOD LIMB TRAINING ON C57BL/6 MICE**

Ryan Holden and Abigail Kerr\*

Psychology Department, Illinois Wesleyan University

Engaging the bad limb after stroke can promote long-term functional improvement of the impaired limb, whereas engaging the good limb has detrimental effects on behavioral outcome. In the present study, mice were separated into three training groups following focal ischemic stroke: good limb training, bad limb training, and no training. The pasta matrix task was used for post-operative training and assessing limb function. We hypothesized that the mice receiving good limb training would show less functional improvement than the mice receiving either bad limb training or no training at all. Using an anterograde tract tracer (BDA), the effects of good limb training on the anatomical connections in the brain were investigated. We hypothesized that training the good limb would result in fewer crossing-fibers in the corpus callosum. The current study replicated previous behavioral findings, with good limb training impeding functional outcome of the bad limb. Anatomical analyses are currently underway.

Poster Presentation P30

## **DELVING DEEPER IN TO SPACE: OBSERVING AREAS SURROUNDED BY INTERSTELLAR DUST**

Beatrice Koka, Ryan Schonert and Rebecca Roesner\* and Thushara Perera\*  
Chemistry Department, Illinois Wesleyan University

While many stars are easily visible to the naked eye at night, many areas of space are not visible because they are surrounded by clouds of interstellar dust. Interstellar dust absorbs visible light such that areas surrounded by dust cannot be seen with conventional telescopes. Instead, the dust emits radiation at mm/sub-mm wavelengths that are roughly 1000 times longer than the wavelengths of visible light. In order to interpret the radiation coming from dusty areas of space, astrochemically relevant dusts have been replicated in the laboratory so that they can be studied at mm/sub-mm wavelengths. Mineral dusts including forsterite ( $Mg_2SiO_4$ ), periclase ( $MgO$ ), enstatite ( $MgSiO_3$ ) and fayalite ( $Fe_2SiO_4$ ) have been synthesized using the sol-gel technique, whereby dust particles are generated from solution and form a gel. The gel is then dried, baked, and ground in to a dust. The dusts have been characterized using infrared (IR) spectroscopy, scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), and X-ray powder diffraction. The dusts are being prepared so that they can be studied in a special IR spectrometer that tests the samples at astronomically relevant wavelengths.

Poster Presentation P31

***EX VIVO* COMPARISON OF LESIONS CREATED WITH COOLED  
RADIOFREQUENCY AND PROTRUDING ELECTRODE RADIOFREQUENCY  
PROBES**

Nitesh Kumar and Joseph Williams\* and David Cedeño\*  
Psychology Department, Illinois Wesleyan University

Radiofrequency (RF) ablation of nerves is a minimally invasive alternative for the treatment of chronic pain conditions. In RF therapy, an electrical current produced by a radio wave is used to heat up the tip of a needle placed near the target nerve tissue, thereby decreasing pain signals from that specific area. Positioning of the RF probe and the size of the ablation lesion produced are critical factors for the success of the treatment. Traditionally, RF has been applied using monopolar electrodes set to generate lesions at 80 °C for 90 seconds. The size of the lesion is limited to a small volume around the active tip of the RF probe. Alternative electrode designs have been developed to increase the volume of lesion, including a cooled active tip and a protruding electrode designs. Despite the proven clinical efficiency of RF ablation, there is room for improvement in terms of creating lesion sizes that provide optimum overlap with the affected nerve, while utilizing proper positioning of the probe and minimally affecting the surrounding structures. This study compares RF lesion volumes and shapes produced in a chicken muscle model by either cooled tip RF or protruding electrode RF using commercially available setups. Mean lesion volume made using cooled RF ablation was 2.8 times larger than that produced using protruding electrode RF with an 18 gauge, 10 mm tip, and 3.4 times larger than that produced with a 20 gauge, 10 mm tip. Cooled RF provides larger distal lesion projection when compared to other systems, which may be an advantage when considering a perpendicular approach to the target nerve. Larger size and distal projection obtained with cooled RFA may better accommodate any imprecise probe placements made by physicians, because larger lesions predictably have bigger compensatory probe placement error ranges than other systems.

Poster Presentation P32

## **ASSEMBLY, ALIGNMENT, AND MAINTENANCE OF AN AUTOMATED LASER CUTTER**

Zhenghao Ding, Lunjun Liu and Gabriel C. Spalding\*  
Physics Department, Illinois Wesleyan University

We have assembled a kit for an automated laser cutter system, intended to play an important role in a wide variety of student-led design projects on our campus. We began by electrically soldering the wiring for a powerful (60 Watt), pulsed infrared (10.6 $\mu$ m wavelength) CO<sub>2</sub> laser beam, which can thermally induce shockwaves that locally ablate a wide range of (non-reflective) materials. The laser tube itself generates significant heat when operating, so we also assembled the required water-cooling system. Given the high powers involved, careful alignment this invisible laser was required, to ensure that the beam is safely contained while traversing a sequence of mirrors, some of which are mounted to movable armatures controlled by computerized stepping motors, before redirection into an objective lens. Misalignment of the beam as it enters this final optical element results in significant aberration of the focal spot, diminishing the effectiveness and speed of the laser cutter, as well as the quality and resolution of the resulting cut. Again, as it is infrared laser, it cannot be seen by the naked eye, and so alignment is a challenge, which we addressed by using brief pulses to mark movable paper targets, which allowed us to trace out the trajectory of the beam.

Ideally, alignment should be sustained as the motorized armatures rapidly redirecting the beam to different regions of the material to be cut or optically etched. As an initial demonstration of the quality of our alignment, we successfully carved Aztec calendars onto wood and plastic plates. Because any matter ejected during ablation, or any smoke generated in the cutting process, has the potential to scatter the incident laser, we supply compressed air to clear the region above the target before each rapid pulse. Also we worked with the IWU Physical Plant to ensure adequate ventilation maintains a safe environment.

Poster Presentation P34

**PARENTS AND THEIR ADULT CHILDREN:  
CREATION OF A SOCIAL SUPPORT EXCHANGE MEASURE**

Niccole Nelson and Mignon Montpetit\*  
Psychology Department, Illinois Wesleyan University

Family support contributes to the maintenance of health and well-being in later life. Although there are several commonly-used measures of both partner and sibling support, there are few well-validated measures of social support involving adult children. This state of affairs is ironic: child-parent bonds tend to be enduring, adult children are expected to outlive elders' siblings or partners, and elders themselves are living longer—likely assisting with family caregiving and potentially needing care. Semi-structured interviews with community-dwelling elders resulted in the creation of a measure of social support exchanged between elderly parents and adult children. Domains addressed include proximity; emotional, instrumental, and material support exchanges between parents and their adult children; and, relationship dynamics, including common disagreements and typical responses thereto. The measure can be used to understand not only the nature of support exchange between parents and their adult children, but also how all of these facets contribute to aging well.

Poster Presentation P36

**VIRUSES AS A POTENTIAL FOOD SOURCE FOR THE BRACKISH-WATER ROTIFER, *BRACHIONUS PLICATILIS***

Stephanie Patton and William Jaeckle\*  
Biology Department, Illinois Wesleyan University

Viruses are abundant within freshwater, saltwater, and brackish waters ( $\sim 1 \times 10^7$  / mL). Consumption of bacteria (0.5-5  $\mu\text{m}$ ) by zooplankton has been studied, but few studies have addressed viruses (0.005-0.3  $\mu\text{m}$ ) as a possible source of diet. We studied the effects of viruses on survival and reproduction of *Brachionus plicatilis*, a brackish-water rotifer that feeds on algae, detritus, bacteria and protozoans. For each experiment, eighteen neonate rotifers (<18 hours old) were each placed into an individual 2 ml well of a multiwell plate and were supplied with either viruses ( $5 \times 10^6$  cells / mL), algal cells (*Nannochloropsis* sp.;  $1 \times 10^5$  cells / mL) or an equivalent volume of filtered seawater (starved controls); three times each day for a total 10 days the survival and reproduction of each rotifer was assessed. The experiment was replicated three times. Both survivorship and reproduction was greatest for rotifers fed *Nannochloropsis* (ANOVA;  $P < 0.05$ ). The presence of viruses significantly (ANOVA;  $P < 0.05$ ) increased the average reproduction and time reproducing (hrs) of rotifers when compared to starved controls. In contrast, the time (hrs) to first offspring was not significantly (ANOVA;  $P > 0.05$ ) different between any of the treatments. Survivorship of rotifers varied across the three replicate experiments. Our data suggest that the viral particles contribute to a difference in reproductive output of rotifers that is not due to a survivorship limitation. These nonliving particles could serve as a source of nutrition for planktonic organisms and our results suggest an unrecognized, but prominent role of viruses in aquatic food webs.

Poster Presentation P37

## **QUANTIFICATION AND SCAVENGING ABILITY OF ANTIOXIDANTS IN BOTTLED TEA**

Jennifer Prochotsky and Manori Perera\*  
Chemistry Department, Illinois Wesleyan University

Bottled tea is made from brewed leaves of the *Camelia sinensis* plant. These leaves contain molecules called polyphenols that have aromatic rings with many alcohol groups. Different fermentation processes of the leaves lead to different types of tea, including black, oolong, green, and white tea. The polyphenols present in bottled tea have antioxidant properties, which have been seen to prevent certain types of diseases. Antioxidants work by stabilizing highly unstable free radicals, which are missing an electron in their orbital. Different studies have concluded contradictory results about which type of tea contains the highest quantity of antioxidants. There has been limited research in the activity of antioxidants in commercially brewed tea. The goal of our research is to analyze the quantity of different antioxidants present in bottled tea, and then analyze their effectiveness by examining their activity. Quantification is conducted with UV-Vis Photospectrometry to look at the total polyphenol content as well as individual classes of compounds. Reactivity is conducted to mimic a cellular response to the presence of a radical when there are polyphenols present, and to oxidize the polyphenols to measure their capacity for oxidation.

Poster Presentation P39

## **DESIGN OF ION OPTICS FOR A NEW INSTRUMENT TO STUDY ASTROCHEMICAL REACTIONS**

Lydia Rudd and Manori Perera  
Chemistry Department, Illinois Wesleyan University

We are building an instrument to study the gas phase reaction dynamics of ions with neutral molecules using conditions similar to the interstellar medium with ions and neutral molecules that are known to exist in space. Specifically, we will be studying the branching ratios of product channels available in these reactions under a variety of temperatures, pressures, and external photon energies that adequately simulate the conditions of the interstellar medium. There are no commercial instruments that can provide all these specific conditions, therefore we are building a custom instrument at IWU. To efficiently build an instrument, often times scientists use simulation programs like SIMION to (1) optimize the use of space and (2) to design the optics to guide the ions as a beam. This program will reduce the time for troubleshooting the instrument, as well as the cost associated with it. The region that needed the most ion optics is near the ion trap where reactions take place. Therefore, a several types of ion optics were explored using SIMION (simulation program) in this study. The final design and current progress of the instrument building will be presented as part of the study.

Poster Presentation P40

## **A NEW LABORATORY FOR MM-/SUB-MM-WAVE CHARACTERIZATION OF COSMIC DUST ANALOGS**

Lunjun Liu and Thushara Perera\*  
Physics Department, Illinois Wesleyan University

At visible wavelengths, cosmic dust obscures many interesting astronomical environments such as stellar nurseries and new planetary systems. Studying how light interacts with cosmic dust would help reveal the nature of the objects and environments that are obscured by dust. In order to study the optical properties of cosmic dust analogs in the lab, we constructed a custom apparatus, which consists of a vacuum chamber, a cooling mechanism to vary the temperature of dusts in an astronomically interesting range (7-50 Kelvin), and a long-wavelength spectrometer. Since completing the construction of the custom apparatus, we are currently assembling and testing the system piece by piece. Here, we highlight the design and construction of two unique components of the new setup: (1) a spectrometer, based on a novel concept, that works in the mm/sub-mm wavelength range and (2) a cold “filter wheel” used for holding and switching between multiple samples.

Poster Presentation P41

**INGESTION OF FLUORESCENTLY LABELED VIRUSES BY *BRACHIONUS Plicatilis* (ROTIFERA)**

Samantha Sorenson and William Jaeckle\*  
Biology Department, Illinois Wesleyan University

Rotifers are aquatic suspension-feeding invertebrates that use cilia to produce water currents for swimming and capturing particles. They can consume a variety of different sized foods ranging from protozoans (300  $\mu\text{m}$ ) through algae (2-10  $\mu\text{m}$ ) to bacteria (0.5-1  $\mu\text{m}$ ). In marine and freshwater environments where rotifers are found, viruses (0.03-0.2  $\mu\text{m}$ ) are the most abundant biological particle ( $10^7$  viruses / mL). Although previous studies have shown that single-celled flagellates and ciliates ingest viruses, it is not known if rotifers can also consume viruses. We examined the ingestion of viruses by the brackish-water rotifer *Brachionus plicatilis*. Rotifers were incubated (dark, 20 °C) in seawater with viruses ( $10^8$  viruses / mL) that were labeled with the fluorescent molecule 5-(4, 6 dichlorotrizinyl) aminofluorescein (DTAF), in a 2  $\mu\text{g}$  / mL solution of DTAF, and with no additions (control) for periods of time that ranged between 1 hour and 24 hours. After incubation the rotifers were fixed and the presence and distribution of the fluorescence stain was detected using fluorescent microscopy (EX 450-490 nm, EM  $\geq$  520 nm). When incubated with DTAF-labeled viruses for 12 and 24 hours, the fluorescence was restricted to the lumen of the gut and the intensity of the fluorescence increased as the exposure time increased. After a 1-hour incubation with DTAF, the fluorescence in rotifers was present throughout their body and the intensity of DTAF increased with longer exposure times. No fluorescence was detected in the control animals that were not exposed to the fluorescent label. These results indicate that *Brachionus plicatilis* can ingest viruses and that these abundant particles represent a previously unknown food source for rotifers.

Poster Presentation P42

## **A COMPARISON OF UNITED STATES AND CHINESE SOCIETAL VIEWS ON CORPORAL PUNISHMENT**

KiriLi Stauch and Charles Springwood\*  
Anthropology Department, Illinois Wesleyan University

Views on punishment differ from one society to another. What is viewed as culturally acceptable in one society may be frowned upon in a different society. In order to understand these differing views, it is crucial to place them within the context of societal norms. It is important to distinguish each society's definition of corporal punishment. Once a set definition is established within the cultural context, interviews can be used as case studies. These interviews provide an insider perspective on the subject, allowing for a deeper understanding of views on corporal punishment.

Poster Presentation P43

**NEURAL EFFECTS OF VARYING LEVELS OF SOCIAL RE-INCLUSION  
AFTER VARYING PERIODS OF SOCIAL EXCLUSION**

Jessica White and Jason Themanson\*  
Psychology Department, Illinois Wesleyan University

This project studied the effects of social ostracism on individuals. Specifically, how conditions of exclusion and various levels of re-inclusion affect participant's responses in terms of social pain and neural activation due to exclusion. Participants played a Cyberball paradigm where they were randomly assigned a varying condition of exclusion and then re-inclusion during a computerized social interaction. Event-related brain potentials in response to the game were measured via electroencephalography. Dependent measures were neural activation and survey responses. All data has been collected and data analysis is currently underway. Results will contribute to understanding the effects of ostracism, as well as whether specific levels of social re-inclusion alleviate social pain caused by exclusion.

Poster Presentation P44

## **CONTACT ANGLE MEASUREMENT**

Wenting Zhao and Mark Liffiton\*

Computer Science Department, Illinois Wesleyan University

The Contact angle, where a liquid/vapor interface meets a solid surface[wiki], has been widely used to measure the wettability of a surface in physics and chemistry. Scientists place a drop on a surface of interest, take an image of the drop in profile, and measure the angle the drop makes with the surface. We have developed a Contact Angle Measurement plugin for the ImageJ image analysis framework, which provides researchers a easier way to access experiment data. The major goal of our algorithm is to automatically detect drops and surfaces via image analysis, so that we can calculate the contact angle. Firstly, we filter the image by detecting edges and randomly sample a collection of three points on edges to get a collection of circles (note that three points define a circle)which could potentially fit the drop; then we apply various mathematical analyses to adjust the radius and position of the circle to gain a better fit. After the circle detection, we apply linear regression analysis to determine where the surface is. This approach turns out to be very reliable when the input drop region chosen by users is fairly small.

Poster Presentation P45

## **GROUP-ANTIMAGIC LABELING OF A CLASS OF GRAPHS**

Jinze Zheng and Daniel Roberts\*  
Mathematics Department, Illinois Wesleyan University

For  $k \geq 2$ , a graph  $G$  is called  $Z_k$ -*antimagic* if there exists a labeling of its edges  $f: E(G) \rightarrow Z_k - \{0\}$  such that the labels induced on the vertices given by the sums of the labels of the edges incident to each vertex are all distinct. For a given graph  $G$ , the *integer antimagic spectrum* is the set of all integers  $k$  for which  $G$  is  $Z_k$ -antimagic. This project focuses on characterizing the integer antimagic spectrum for a class of graphs called *closed helms*. Our method consists of applying previous results on the existence of  $Z_k$ -antimagic labelings of subgraphs of closed helms, and extending these labelings to include the remaining edges.

Poster Presentation P46

**ANIMAL BEHAVIOR AT THE MILLER PARK ZOO:  
EFFECTS OF KEEPER AND PUBLIC PRESENCE**

Kaitlyn Zieman and Mark Ellen Furlong\*  
Psychology Department, Illinois Wesleyan University

Animal welfare, especially for animals living in captivity, is of utmost importance, not only for ethical reasons, but legally (Animal Welfare Act, 1966). To ensure the health and well being of animals, particularly those in zoos, they must be observed regularly for healthy species typical behavior as well as unhealthy stereotype behavior (i.e., pacing, over grooming etc). We observed four primate species (callimico, red handed tamarin, Mueller gibbons, red ruffed lemurs) and two marsupials (wallabies and wallaroos) at the Miller Park Zoo in Bloomington, Illinois to examine behavioral differences in the presence and absence of zookeepers and the general public. Animals were observed daily and their behavior scored using ethograms compiled from Ethosearch.org. Behavior of the animals in the presence and absence of zookeepers and general public will be discussed.

Poster Presentation P47

**THE DRINKING OF MICROPARTICLES (< 0.5  $\mu$ M) BY  
*BRACHIONUS PLICATILUS***

Zachary Zimmer and William Jaeckle\*  
Biology Department, Illinois Wesleyan University

Many aquatic animals capture particulate foods from water currents created by the beating of their cilia. This process of particle capture in invertebrate larvae and adults involves the separation of “large” particles (1-20  $\mu$ m) from these currents before the particles enter the digestive system. However, members of the phylum Rotifera also ingest smaller particles (<0.5  $\mu$ m) and dissolved organic materials, yet the mechanism by which these materials are captured remains unknown. Rotifers may obtain these small particles and dissolved nutrients by creating and directing a current of fluid into their digestive system; a process which can be described as “drinking”. To examine the ability of the brackish-water rotifer, *Brachionus plicatilis*, to drink seawater; we incubated rotifers in  $4.71 \times 10^{-6}$  M dextran which was linked to a fluorescent molecule, fluorescein isothiocyanate (FITC-dextran), for 10, 30, and 60 minutes. Animals which were treated in an identical fashion, but not exposed to the FITC-dextran represented experimental controls. After each incubation period, the rotifers were fixed and then photographed using fluorescence microscopy (1/7s shutter speed, 170 c-gain). In order to quantify the fluorescence present in different regions of each image, the photos were analyzed using the ImageJ software. We found that fluorescence from the digestive system of *Brachionus plicatilis* increased with longer exposure times to FITC-dextran. ( $R^2=0.54$ ,  $P = 0.024$ ). This leads us to accept that the increasing presence of fluid containing the fluorescent label over time indicates that the replacement of fluid within the digestive tract of the animal, thus “drinking”, is occurring.

**EDUCATIONAL STUDIES**

**POSTER PRESENTATIONS - SESSION 1**

**April 18, 2015, 9:00 – 10:00 am  
SFH FOYER**

- 1.1 Nathaniel Douglas
- 1.2 Kelli Herlitz
- 1.3 Alexander Samuel
- 1.4 Colleen Swanson
- 1.5 Angel Sanchez
- 1.6 Melissa Mariotti
- 1.7 Donald DeSalvo
- 1.8 Gwenyth Naftzger
- 1.9 John Blumenreich
- 1.10 Amy DeBoer
- 1.11 Krystal Randazzo

**ORAL PRESENTATIONS - SESSION 2**

**April 18, 2015, 10:00 – 11:00 am  
SFH 102**

**MODERATOR: ALEXANDRA BURNSIDE**

- 2.1 Hannah Bowen
- 2.2 Jessica Beringer
- 2.3 Niall Mulcahy
- 2.4 Meghan Henwood

**POSTER PRESENTATIONS - SESSION 3**

**April 18, 2015, 11:00 – 12:00 noon**

**SFH FOYER**

- 3.1 Alexandra Bidner & Kasey Reaber
- 3.2 Kyle O'Daniel
- 3.3 Meagan DeSalvo
- 3.4 Sean Curtin
- 3.5 Jessica Davis
- 3.6 Johanna Linman
- 3.7 Colin Rathe
- 3.8 Michelle Lui
- 3.9 Sarah Goth
- 3.10 Bradley Jenisch
- 3.11 Alexandra Partipilo

Poster Presentation ES P1.1

**#SEMANASSOCIALES: USING AUTHENTIC MATERIALS TO IMPROVE  
STUDENTS' SPANISH WRITING**

Nathan Douglas and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Within the field of foreign language education, authentic materials and writing proficiency are two areas of extreme interest. Despite this, there has been little research performed within live classroom environments. In this self-study of teaching, I examine how my daily incorporation of authentic sources affected a class of thirty Spanish IV students with regards to their writing proficiency in Spanish. Throughout, I also demonstrate how students may depend upon authentic materials as a support for moving into the Zone of Proximal Development (ZPD) (Vygotsky, 1978). Although some researchers claim that authentic materials are too complex and inappropriate for second language (L2) learners, the results of this study indicate that teacher-supported use of authentic materials can aid students in making gains in grammatical accuracy, written voice, and structure choice. These improvements are evidenced by qualitative analysis of student writing samples elicited before and after the study implementation. The current classroom study validates the classroom study of authentic materials and discusses future research concerns.

Poster Presentation ES P1.2

## **EMERGING TRENDS IN CLASSROOM MANAGEMENT RESEARCH**

Kelli Herlitz and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

While classroom management continues to be a serious concern for teachers because of its important contribution in providing quality education to students, little is known about the reappearing trends that correlate with it. For instance, bullying in schools has become very prevalent in today's society, however not very much is known about the relationship between classroom management and bullying in the classrooms. Allen (2010) reported that effective classroom management could help the prevention of bullying. This literature review addresses the effects classroom management have on students' academic success and a teacher's career, as well as ways to help improve students' and teachers' success in the classroom through effective classroom techniques. Additionally, future research should consider an investigation of the need for pre-service and in-service teacher education programs to value the teaching of classroom management practices in preparing teachers to meet the challenges of K-12 classrooms (Ferber & Nillas, 2010).

Poster Presentation ES P1.3

**BECOMING CRITICAL REVIEWERS OF LITERATURE:  
LEARNING THE WRITING PROCESS**

Alexander Samuel and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Every student has a voice, and this voice should be used to further students' involvement with schoolwork. This belief was the main drive for me to inquire how writing critical reviews of literature could impact high school students. The reviews that the students write are embodiments of their voices and feelings toward the literature. All while doing so, students must practice and engage with the formal writing process. The goal of this study was to judge if writing reviews improved the students' grasp on the writing process, and if they were more engaged with the text. Data was taken in the forms of student work, lesson plans, and a questionnaire. A few techniques that were used when closely looking at the data were focusing on similarities and differences, repetitions, and theory related materials. The expected results of the inquiry were backed by research carried out by Wendy Ranck-Buhr (2012), Taylor & Parsons (2011), and Bayat (2014).

Poster Presentation ES P1.4

## **PROCESS DIFFERENTIATION: THE KEY TO STUDENT LEARNING AND ENGAGEMENT**

Colleen Swanson and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

As the learning needs of students continue to diversify today, differentiated instruction has become essential in successfully teaching students of different backgrounds. Differentiation involves the *content* students' learn, the *process* in which students' learn the content, the *product* students' generate as evidence of their learning, and the *learning environment* in which students discover and learn (Tomlinson, 2000). This study focused on the *process* aspect of differentiated instruction, employing three different strategies involving movement to aid in students' sight word acquisition and their learning engagement. I collected and content analyzed videos and photographs, sight word assessments, as well as field notes during the course of this study. The results indicate the incorporation of movement into the instruction and practice was the key to process differentiation. My findings highlight the beneficial impact these differentiation strategies have on students' overall learning in terms of increased sight word acquisition as well as visible student engagement during instruction and practice.

Poster Presentation ES P1.5

## **PUTTING THE “INTER-” IN INTERDISCIPLINARY EDUCATION**

Angel Sanchez and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

According to the National Council of Teachers of English (1995) an interdisciplinary approach to education “encourage(s) students to become active learners equipped with analytical, interpretative and evaluative skills needed to solve real-life problems” (National Council of Teachers of English [NCTE], 1995). The implementation of interdisciplinary programs is essential for students to view that knowledge is not static; knowledge is always growing and connected. Education must move in the direction where there is interaction and fusion of different content knowledge rather than compartmentalizing knowledge in single discipline categories. This literature review conceptualizes practices in interdisciplinary teaching by looking at current interdisciplinary programs at the high school and undergraduate level. The findings from this research synthesis will help teachers and administrators to create programs that emphasize connections between different subject matter knowledge.

Poster Presentation ES P1.6

## **INCORPORATING MULTICULTURAL LITERATURE IN AN ELEMENTARY LANGUAGE ARTS CLASSROOM**

Melissa Mariotti and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

The purpose of this research is to examine how classrooms are able to incorporate multiculturalism in a classroom through the use of multicultural literature. Every day, the United States' population is increasingly become more diverse (Morrell & Morrell, 2012) and teachers become more aware of and responsive towards this changing demographic in their classrooms. Incorporating different cultures into a curriculum helps create an atmosphere of mutual respect among students in the classroom along with allowing all students an opportunity to connect to the curriculum ([Szecsi](#), [Spillman](#), Vázquez-Montilla, & Mayberry, 2010). One such way to do this is by exposing students to literatures that incorporate diverse cultures. This study analyzed two volumes of a 2<sup>nd</sup> grade ELA textbook to discover what kinds of cultures students are currently being exposed to and what is missing, focusing on cultural content and traditions, language, and illustrations. This textbook reveals that, while students are being exposed to diverse cultures, these cultures they are exposed to are very limited and all given from a very "Americanized" perspective. Overall this study aims to identify the limitations of multicultural literatures that are currently being provided to teachers and allow for development of these literatures that need to be provided outside of a typical textbook.

Poster Presentation ES P1.7

## **CURRENT EVENT INTEGRATION TO FACILITATE HISTORICAL CONCEPT LITERACY**

Donald DeSalvo and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

A recent problem plaguing history courses in secondary classrooms is the apparent lack of applicability to students of what they are learning. This research aims to find the effects of integrating current events into history curriculum on history concept literacy. By developing historical concept literacy, students develop a requisite skill that can be applied not only to future historical studies, but also to other real-life applications. The data was collected during DeSalvo's student teaching experience in freshman World History and sophomore American History classrooms. By analyzing lesson plans, students' feedback and responses to the lesson, and students' written responses to critical thinking questions, this study aims to confirm that current events are an effective tool to develop historical literacy: specifically concept literacy.

Poster Presentation ES P1.8

**THE INCORPORATION AND EFFECTS OF DYNAMIC GEOMETRY SOFTWARE ON STUDENTS IN A GEOMETRY CLASSROOM**

Gwenyth Naftzger and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Concepts in a high school Geometry classroom can be difficult for students to understand without a visual representation. By incorporating Dynamic Geometry Software (DGS) into the classroom, students will be given the opportunity to create and provide visual representations of the concepts they are learning about. DGS also gives students the opportunity to explore the concepts, so they can understand what the concepts really mean and also why the theorems of the concepts have been proven. In this literature review, I explored the impact DGS had on both students and teachers and how best it can be incorporated into the classroom. To enhance the research, I also explored a high school geometry textbook to examine how DGS and other technology were incorporated and provide suggestions for improvement. Vanicek (2011) claims the use of dynamic geometry can help train generalization with the method of analogy. Analogies improve the ability for the students to express themselves and also helps improve their logic.

Poster Presentation ES P1.9

## **THE TRANSITION TO STANDARDS-BASED GRADING**

John Blumenreich and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Standards-based grading is a method of assessing students that is used to determine different levels of achievement of topics in each subject area (Marzano, 2010). It is meant to provide students with feedback so they can meet certain standards, or learning objectives, in a particular course (Iamarino, 2014). Assessing both honors and remedial mathematics students during my student teaching experience using standards-based grading helped pinpoint what concepts and skills students did or did not understand. Using standards-based grading to assess students' summative assessments throughout the semester, I was able to analyze what academic standards students were meeting. Analyzing the benefits of standards-based grading and ways in which teachers can integrate this grading system into their classrooms were goals of this study. I analyzed both qualitative and quantitative data such as students' graded summative assessments, a general grading rubric, and students' survey results on standards-based grading. I have found that using standards-based grading as an evaluation tool has made it easier to analyze student assessments in order to focus on the individual learning needs unique to each student.

Poster Presentation ES P1.10

**GOING AGAINST THE NORM: THE USE OF  
STUDENT-DESIGNED ASSIGNMENTS**

Amy DeBoer and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

In most classrooms, assignments are teacher-designed and used to assess what students learned. However, if students are included in designing their own assignments, their work has the potential to more closely reflect their individual learning preferences and interests. During my student teaching in a fifth grade classroom, I conducted a self-study on the use of student-designed assignments in an effort to better understand my students as individuals and as learners, and to promote student autonomy. At the end of a history unit on European explorers, students generated an assignment on one of the explorers in the format of their choice, such as a song or rap, poster, slide presentation, movie, scrapbook, or sculpture. Field notes and students' work samples showed that students chose a project format that met their individual learning needs and interests. Students' enthusiastic responses to the assignment showed that they valued getting to choose their own project.

Poster Presentation ES P1.11

## **ENGAGING HS GEOMETRY STUDENTS THROUGH STUDENT-CENTERED ACTIVITIES**

Krystal Randazzo and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

The National Council of Teachers of Mathematics (NCTM) has advocated the use of manipulatives since 1940 (Hartshorn & Boren, 2005). Traditionally, however, hands-on activities and manipulatives are rarely seen in the high school mathematics classroom. Valuing the importance of student-centered learning, this study was implemented in two geometry classrooms in a rural high school with the goal to explore the impact of hands-on activities on student engagement. Lesson plans, teacher reflections, and student work samples were collected throughout the study. These data sources, along with student questionnaires, were content analyzed in order to uncover emerging themes that characterize student-centered learning experiences. Findings indicate that engaging students in these hands-on activities positively impact their mathematical understanding and participation in exploratory and collaborative mathematics learning environment.

Oral Presentation ES O2.1

## **FAMILY-CENTERED AND CULTURALLY COMPETENT CARE**

Hannah Bowen and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

The purpose of this research synthesis is to explore the history and benefits of Family-Centered Care (FCC) and examine ways to facilitate family support for hospitalized children. FCC recognizes the psychosocial aspect in healthcare and maintains cultural competence. After conducting a three-step research approach, the grounded theory (Glasser & Strauss, 1966) was used to construct a framework for family-centered care and support. In successful FCC programs, data highlighted evidence of collaboration, honest communication, and cultural competence between staff and patients and their families (Institute For Family-Centered Care, Sep 2003). Acknowledging the benefits of FCC and collaborating with the child life specialists not only encompass the characteristics of culturally competent care, but also encourage family support within the hospital. Family support, as a result, enhances patient and family satisfaction, improves job satisfaction for the staff, and reduces healthcare costs on an institutional level (Bell, Johnson, Desai, and McLeod, 2009).

Oral Presentation ES O2.2

**TECHNOLOGY TAKEOVER: TRANSITIONING TO AN  
ELECTRONIC SECONDARY CLASSROOM**

Jessica Beringer and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Over the last three decades, the presence of technology has grown considerably in American households. In order to cultivate 21<sup>st</sup> century knowledge and skills in their students, teachers must take on the responsibility of integrating technology into their daily instruction and classroom practices. The purpose of this study was to examine the factors affecting successful implementation of a 1:1 computing initiative in a high school Spanish classroom, as well as to determine the perceived benefits and challenges of utilizing this technology from the perspective of the students as well as the instructor. This study included a qualitative thematic analysis of field notes, an online classroom management system (CMS) website, and student feedback. Findings suggest that there are advantages to using 1:1 devices in a Spanish classroom such as increased access to resources and authentic input, but the challenges of hardware and software issues create frustration and complicate the transition from a traditional to a technology-dependent classroom.

Oral Presentation ES O2.3

## **ENHANCING TECHNOLOGY USE IN TEACHING STATISTICS**

Niall Mulcahy and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

The purpose of this research is to examine the use of technology in teaching high school statistics. Research studies on various technologies were analyzed including *Fathom*, *GeoGebra*, and *SMARTBoard*, as well as specific activities that apply technology to explore mathematical concepts. To understand the reality of classroom integration of technology, the textbook, *Elementary Statistics* (Triola, 2001), was also content analyzed to examine how different technological tools were integrated in teaching statistics. Given the limitations of the applications of these tools, strategies to expand or enhance the integration of technology were explored. Analysis of data suggests technology is used as an instrument for students to develop their conceptual understanding about statistical concepts and not just an automated visual or computation tool. Previous research supports this idea, Meletiou-Mavrotheris (2004) notes that too often the technology just provides students with the practicality of statistics, and not a development of their conceptual understandings of the ideas covered in the classroom.

Oral Presentation ES O2.4

**“THEY SHOULD BE ALLOWED TO LIVE IN A SAFE PLACE LIKE US”:  
SOCIAL JUSTICE IN THE SOCIAL STUDIES CLASSROOM**

Meghan Henwood and Leah Nillas\*

Educational Studies Department, Illinois Wesleyan University

Today’s students are in charge of all aspects of the future; they must be taught how to challenge issues of oppression in order to model to the world just, appropriate behavior. This teaching and learning takes place within the social studies classroom. Through my self-study, I examined ways to go beyond the standard social studies curriculum by teaching with a framework of social justice. *Social justice* is defined as a view that respects each individual, and each individual’s cultural and academic uniqueness, rights, and importance in the global world. I collected data from individual student journals, conversations with and between students in my field journal, sample student work, and lesson plans. After examining my data using various scrutiny techniques described by Ryan & Bernard (2003), I discovered that elementary students are able to make personal connections to the global world and feel empathy for oppressed groups, if they are able to discuss these emotions in a safe environment using terminology consistent with their age level.

Poster Presentation ES P3.1

## **ENHANCING INTRINSIC READING MOTIVATION IN ELEMENTARY STUDENTS**

Alexandra Bidner, Kasey Reaber and Leah Nillas\*  
Educational Studies Department, Illinois Wesleyan University

For our research, we focused on our student teaching experiences in first and fourth grade classrooms. We specifically looked at the physical and social environments affecting students' motivation to read. Froiland, Oros, Smith, and Hirschert (2012) describe intrinsic motivation as "the behavior motivated purely by the inherent benefits" and extrinsic motivation as "seeking to avoid punishments and gain external rewards". Our interest was to develop a stance toward reading instruction that fostered students' intrinsic motivation to read and drew on their interests and curiosities by looking at the physical and social approaches that we could use to support students in becoming motivated readers. Analysis of journal entries, field notes, photographs, guest reader observations, interviews, and questionnaires showed how a change in the physical and social environments positively motivated students to read. Our findings support that elementary school educators should strive to use various strategies when looking to enhance students' reading motivation.

Poster Presentation ES P3.2

## **ONE EYE TO THE FUTURE: A STUDY OF STUDENT EXPLORATION WITH GOOGLE GLASS**

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Rapidly evolving technologies have the potential to provide massive benefits to student learning, but those benefits also come with the potential for obstacles in integration and implementation. This study explores the learning experiences available to students when given access to some of the most up to date technology available — Google Glass — and what students, when framing the technology with a critical eye, recognize as the benefits and challenges of new technology in the classroom. This study was conducted in an urban high school with a focus group of ten diverse students. Participants engaged in discussions about the role of technology in school, conducted online research about Glass's capabilities and current uses, and worked hands on with Glass. Data collected includes self-reflective journals, focus group notes, focus group discussion transcriptions, and participant journals. Findings from this study suggest that students see Glass as a novelty rather than a practical tool for learning and generally believe that the technology used in schools is often not used to its fullest potential. Implications of this study suggest that students can be an invaluable resource when exploring the possibilities of technology in the classroom.

Poster Presentation ES P3.3

**TEACHING OF INFERENCE MAKING IN THE  
ADOLESCENT CLASSROOM**

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Students are taught from a young age to look to the text for evidence in responding to a question. Through this constant practice, students are able to respond with evidence, but they often times fail to divulge deeper into the text especially in making inferences. To make inferences, students need to use textual evidence and then explicitly state their thinking in how the evidence corresponds to the inference. During Meagan's student teaching experience, she addressed the diverse needs of each student in being able to explicitly state the thought process to making inferences. She conducted a self-study in which she utilized scaffolded techniques in various forms that catered to the multiple intelligences of each student. The content analyzed included field notes and student assessments in response to inference making activities. With varied methods and steps, students were successful in making inferences in the English Language Arts classroom.

Poster Presentation ES P3.4

## **MATHEMATICS AS A LANGUAGE**

Sean Curtin and Leah Nillas\*

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During my student teaching process, I observed a separation between my students' procedural knowledge of mathematics, and their mathematical reasoning. I attempted to bridge this gap by conducting research on the role of academic language in the classroom. Academic language is a way to communicate ideas, concepts, and higher thinking processes, but it is used so that students may acquire a greater insight into the material (Gottlieb & Ernst-Slavit, 2013). I specifically discuss how the incorporation of academic language affects student learning as well as possible implementations of academic language in the classroom. I constructed a series of lesson plans that focused on students engaging in mathematics through language and I constructed quizzes that focused on mathematical reasoning and justifying results. I content analyzed the quizzes, department tests, and review assignments using both qualitative and quantitative approaches. The results of my analysis demonstrate that the incorporation of academic language into the classroom is beneficial for the students because it forces the students to delve deeply into the mathematics and to find meaning in their work. My results also support that incorporating academic language is beneficial for student learning because it lends more opportunity for teachers to understand student thinking and a result, easily spot misconceptions about topics.

Poster Presentation ES P3.5

## **NOTE TAKING: TEACHING STUDENTS STRATEGIES FOR SUCCESS**

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Note-taking is a skill critical to be successful at all levels of school. However, in order to become competent note-takers students must have some exposure to note-taking instruction and strategies. This study examined the importance of note-taking in relations to students' learning. This study took place in a rural-elementary school. Strategies like graphic note-taking, traditional note-taking, and T-charts were analyzed in relation to their effectiveness in the classroom. All notes were taken from fiction and non-fiction social studies lessons. The primary data analyzed during this study was students work, field notes, discussion transcripts, and photos. Different note-taking methods were found to be suited relative to particular learning goals and classroom tasks. Group mind mapping was found to increase student engagement and collaboration.

Poster Presentation ES P3.6

## **CHILD SEXUAL ABUSE COUNSELING STRATEGIES**

Johanna Linman and Leah Nillas  
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Child sexual abuse (CSA) is increasingly recognized in survivors as a connection to emotional or psychological, relational or social and sexual or physical difficulties later in life that range in severity (Chouliara, Karatzias, Scott-Brien, MacDonald, MacArthur & Frazer, 2012). The purpose of this literature review is to enhance school counselor's general education of child sexual abuse counseling strategies by highlighting important guidelines on detecting, reporting, and utilizing different strategies such as: when to use them, what accommodations are made to fit the victim's needs, how to strengthen efficacy, etc. The different strategies researched are trauma focused, person centered, solution focused, cognitive behavioral therapy and play therapy. Data sources included in the review were chosen based on their significant findings, detailed description of therapy and date published. School counselors have a duty to not only be aware of this more prevalent abuse in current society, but to be well informed on the necessary elements to provide high quality counseling for each victim.

Poster Presentation ES P3.7

## **IMPLEMENTING CONSTITUTIONAL RIGHTS INTO THE HISTORY CLASSROOM**

Colin Rathe and Leah Nillas\*

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The field of social science education is continually changing and developing in accordance with contemporary beliefs. Boyle-Baise (2003) writes that properties and qualities of “citizenship” within a Democratic government have taken many different definitions and meanings. The purpose of this study was to explore and investigate current beliefs of citizenship, and how citizenship is often taken for granted by most high school students. By incorporating Supreme Court cases on Constitutional issues into the history classroom, students were led to visualize and contextualize their own definitions and meanings of citizenship. The data collected in my research include lesson plans, field observations, and student work. The lessons created in this study were intended to engage students to reconsider how they conduct themselves in society, and ultimately, raise awareness of citizenship rights. My goal in this study was to examine the advantages and disadvantages of focusing on Supreme Court cases that demonstrate citizens’ liberties.

Poster Presentation ES P3.8

## **LATE WORK POLICIES: THEIR IMPACT ON STUDENT ACHIEVEMENT**

Michelle Lui and Leah Nillas\*

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In a perfect world, students in every classroom around the world would turn in their assignments on time. However, this is not the case. This self-study focuses on potential approaches that could be implemented for a late work policy in a high school classroom in order for educators to better understand the potential implications of their policies. This study was conducted in a suburban high school in which student surveys, teacher interviews, and researcher memos were analyzed. Students and teachers were asked their opinion on the fairness of grade penalties on late work and what they believed to be an effective late work policy to best help students learn. Three categories were created from the responses: a no penalty policy, a points-based policy, and a class construction policy where students and teachers collaborate to find the best policy possible for the class. Of the responses from the students, there was an overwhelming preference for the implementation of a penalty while the teachers differed in their preference for a no penalty policy.

Walls and Bridges



Poster Presentation ES P3.9

**DISCIPLINARY INTEGRATION IN THE FIFTH GRADE *EVERYDAY MATHEMATICS* TEXTBOOK**

Sarah Goth and Leah Nillas\*

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One way to understand the mathematics expectations placed on 5<sup>th</sup> grade students is to analyze the textbooks they use in their mathematics class. I examined how other subjects were integrated into the *Everyday Mathematics* (EM) textbook. In an effort to further my own understanding of disciplinary integration, I searched for 12 articles on the topic, varying from science and mathematics integration to English Language Arts (ELA) and mathematics. After reading and analyzing these articles, I used Berlin and White's integrated mathematics and science model (Kurt & Pehlivan, 2013), balanced model (Kiray, 2012), and authentic integration model (Treacy, 2013) when analyzing EM integration of mathematics and science. For the ELA integration with mathematics, I focused on skills used in both subjects, how mathematics benefits English Language Learners (ELL), and how to mathematize literature (Chevalier, Phippen, & Stevens 2008). Findings show that EM textbook focuses on integration practices that benefit ELL students' comprehension of mathematics language and connect mathematics with literature. Additionally, mathematics and science integration is lacking throughout the textbook.

Poster Presentation ES P3.10

**MORE THAN GAMES: UTILIZING GAMES IN THE  
SECOND LANGUAGE CLASSROOM**

Brad Jenisch and Leah Nillas\*

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Game based learning, or educational games, is increasing rapidly and being used by more instructors each year (Vandercruysse, Vandewaetere, Cornillie, & Clarebout, 2013). In an effort to examine the utilization of games in the language learning classroom, I analyzed research studies that have been done on differing games. I furthered that by examining how the different games were categorized and how each type was analyzed individually to achieve a better understanding of how they were implemented into the second language acquisition. After looking at how multiple languages were studied, I focused on games used specifically in learning Spanish as a second language. The exposure from playing games aided in the understanding through seeing, hearing, reading, and speaking the language (Dedeaux and Hartsell, 2011).

Poster Presentation ES P3.11

## **BRAIN BREAKS: AN INNOVATIVE TOOL TO RE-ENGAGE STUDENTS**

Alexandra Partipilo and Leah Nillas\*

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With the importance of standardized tests increasing in schools, teachers are starting to feel the pressure of student performance within these tests. This pressure has caused schools to cut back on time for physical education and recess leaving students to spend more time sitting at their desk. Knowing that physical activities are being cut back in the curriculum, I implemented a study to observe how brain breaks affect student behavior and engagement. I utilized these breaks during our reading time, which was at the end of our day, a time when student's had a lack of engagement. I used observation notes, class interviews, and a list of interactive breaks to observe how student's behavior and engagement differed before and after the break. Analysis of this data demonstrates that first grade students become re-engaged on a lesson after a quick physical movement break (content or non-content related). After these breaks students were on-task and needed very few reminders about staying focused.



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